Consumers Power

POWERING MICHIGAN'S PROGRESS

Palisades Nuclear Plant: 27780 Blue Star Memorial Highway, Covert, MI 49043

March 29, 1996

U S Nuclear Regulatory Commission
Document Control Desk
Washington, DC 20555

DOCKET 50-255 - LICENSE DPR-20 - PALISADES PLANT
TECHNICAL SPECIFICATION CHANGE REQUEST - CONVERSION TO STANDARD TECHNICAL SPECIFICATIONS.

A request for a change to the Palisades Technical Specifications is enclosed. The proposed change will upgrade Palisades Technical Specifications (TS) and their bases to emulate, as closely as possible, the Standard Technical Specifications for Combustion Engineering Plants, NUREG 1432, Revision 1 (STS).

On June 30, 1994, Consumers Power Company notified the NRC of our intent to submit this Technical Specifications change request (TSCR). At that time it was our intent to submit each Revised Technical Specification (RTS) section as it was completed, with the first sections submitted in the fall of 1994 and the final sections submitted about 18 months later. Subsequent discussions with the NRC staff indicated that it would be more desirable for the entire submittal to be made at one time. Therefore, on October 28, 1994, we notified the NRC staff that our schedule then showed an expected completion date of April 1, 1996.

040001

A001 Limited Dist: Encl to: File
PM
PDR

Since the TSCR (Enclosure 1) is bulky, it has been divided into fourteen separate parts; one part describing the changes related to each section of the STS. Each of these parts contains a TSCR describing the proposed changes for that part, and includes the following information:

An explanation of the content of each attachment,

A discussion of each major change from existing TS to proposed RTS,

A discussion of each major difference between proposed RTS and STS,

A No Significant Hazards Analysis for that part of the TSCR, and

The following Attachments pertaining to that part of the TSCR:

1) Proposed LCOs
2) Bases for proposed LCOs
3) Comparison listing of existing and proposed RTS
4) Redline/strike out of STS LCOs showing proposed differences,
5) Redline/strike out of STS Bases showing proposed differences,
6) Comparison listing of proposed RTS and STS.

In addition to the fourteen parts of Enclosure 1 and their attachments, two additional enclosures are provided:

An overall comparison listing of existing TS and proposed RTS (Enclosure 2), and
An overall comparison listing of proposed RTS and STS (Enclosure 3).

The attachments to each part of this TSCR present the same material in different formats. The copies of the STS marked to show the proposed changes (Attachments 4 and 5) are intended to assist the NRC reviewers in determining the differences between the proposed RTS and the STS. Similarly, the comparison listings (Attachments 3 and 6) are intended to provide assistance in assuring that all existing TS requirements have been addressed and that all STS requirements have been considered for inclusion. If differences exist between the information provided in these attachments, the proposed RTS and Bases (Attachments 1 and 2) are to be considered correct. Significant effort was made to make all of these Attachments consistent, but some minor differences may exist.

Several items have been relocated from TS to licensee controlled documents. With the exception of the cycle specific limits relocated to the Core Operating Limits Report (COLR) and Pressure Temperature Limits Report (PTLR), these items do not meet the criterion of 10 CFR 50.36(c)(2)(ii). Each of these relocated items, other than those relocated to the COLR or PTLR has been reviewed by the Probabilistic Risk Assessment department, and none was found to be of importance in limiting the likelihood or severity of those accident sequences significant to the conclusions of the Palisades Probabilistic Risk Assessment.

In preparation and review of the proposed RTS, two items were found which will be the subject of further analysis, and which may require supplementing this submittal.

The STS and proposed RTS specify Limiting Safety System Settings as "Allowable Values." The Reactor Protective System and Engineering Safety Feature setpoints in the existing TS were not calculated using the methodology specified for determining STS "Allowable Values." Operation with the currently specified setpoints will ensure that the plant stays within the bounds of the safety analyses, however some change in the proposed "Allowable Values" may be appropriate when they are calculated with the specified methodology. The recalculation of these settings is currently in progress and is expected to be completed prior to September 1, 1996. If the analyses indicate that a change is required to the values proposed in this TSCR, a supplement will be submitted.

The STS and proposed RTS include an LCO on the Ultimate Heat Sink (Lake Michigan), for Palisades. The maximum temperature limit in the proposed LCO is currently being re-analyzed. We expect that analysis to conclude that the maximum temperature specified in that LCO may be raised a few degrees. That analysis is also expected to be completed by September 1, 1996. If the analysis indicates that a change is required to the values proposed in this TSCR, a supplement will be submitted.

Conversion to STS will involve a significant amount of training and procedure revision effort. It also involves performance of several new or revised surveillance tests, some of which may only be performed when the plant is shutdown. In order to provide time to complete the required training and procedure effort, and to provide the opportunity to complete the new surveillance testing, several months will be needed between approval of the proposed RTS and implementation. We are deferring our selection of an implementation date for these proposed Technical Specifications until we can better estimate the approval date.

SUMMARY OF COMMITMENTS

This letter establishes no new commitments. It completes the action to submit a TSCR for conversion to STS made in our June 30, 1994 and October 28, 1994 letters.

Richard W Smedley
Manager, Licensing

CC: Administrator, Region III, USNRC
Project Manager, NRR, USNRC
Chief, Technical Specifications Branch
NRC Resident Inspector - Palisades

Enclosures

CONSUMERS POWER COMPANY

To the best of my knowledge, the contents of this Technical Specifications change request, which will upgrade Palisades Technical Specifications and their bases to emulate the Standard Technical Specifications for Combustion Engineering Plants, are truthful and complete.

By ______________________
Thomas J. Palmisano
Plant General Manager

Sworn and subscribed to before me this 29th day of March 1996.

Mary Ann Engle

Mary Ann Engle, Notary Public
Berrien County, Michigan
(Acting in Van Buren County, Michigan)
My commission expires February 16, 2000

ATTACHMENT 1

CONSUMERS POWER COMPANY
PALISADES PLANT
DOCKET 50-255

STS CONVERSION TECHNICAL SPECIFICATION CHANGE REQUEST

3.8 ELECTRICAL POWER SYSTEMS PART

Proposed Technical Specifications Pages

3.8 ELECTRICAL POWER SYSTEMS

3.8.1 AC Sources - Operating

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

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

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

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

ACTIONS

CONDITION	REQUIRED ACTION		COMPLETION TIME
A. One required offsite circuit inoperable.	A.1	Perform SR 3.8.1.1 (Offsite Source Check) for required OPERABLE offsite circuit.	1 hour <u>AND</u> Once per 8 hours thereafter
	<u>AND</u>		
	A.2	Restore required offsite circuit to OPERABLE status.	72 hours

(continued)

ACTIONS (continued)

CONDITION	REQUIRED ACTION		COMPLETION TIME
B. One DG inoperable.	B.1	Perform SR 3.8.1.1 (Offsite Source Check) for the OPERABLE required offsite circuits.	1 hour AND Once per 8 hours thereafter
	AND		
	B.2	Declare required features supported by the inoperable DG inoperable when their redundant required features are inoperable.	4 hours from discovery of Condition B concurrent with inoperability of redundant required features.
	AND		
	B.3.1	Determine OPERABLE DG is not inoperable due to common cause failure.	24 hours
	OR		
	B.3.2	Perform SR 3.8.1.2 (DG start test) for OPERABLE DG.	24 hours
	AND		
	B.4	Restore DG to OPERABLE status.	Such that the total time when any required DG is inoperable does not exceed 7 days (total for both) during any calendar month.

(continued)

ACTIONS (continued)

CONDITION	REQUIRED ACTION		COMPLETION TIME
C. Two required offsite circuits inoperable.	C.1	Declare required features inoperable when their redundant required features is inoperable.	12 hours from discovery of Condition C concurrent with inoperability of redundant required features.
	<u>AND</u>		
	C.2	Restore one required offsite circuit to OPERABLE status.	24 hours
D. One required offsite circuit inoperable. <u>AND</u> One DG inoperable.	D.1	Restore required offsite circuits to OPERABLE status.	12 hours
	<u>OR</u>		
	D.2	Restore DG to OPERABLE status.	12 hours
E. Two DGs inoperable.	E.1	Restore one DG to OPERABLE status.	2 hours
F. One or both automatic load sequencers inoperable.	F.1	Declare affected DGs inoperable.	Immediately
G. Fuel Oil Transfer Pump P-18A inoperable.	G.1	Declare DG 1-2 inoperable.	24 hours
H. Fuel Oil Transfer Pump P-18B inoperable.	H.1	Restore P-18B to OPERABLE status.	7 days

(continued)

ACTIONS (continued)

CONDITION	REQUIRED ACTION		COMPLETION TIME
I. Both Fuel Oil Transfer pumps inoperable.	I.1	Restore one Fuel Oil Transfer pump to OPERABLE status.	8 hours
J. Required Action and Associated Completion Time of Condition A, B, C, D, E, F, G, H, or I not met.	J.1	Be in MODE 3.	6 hours
	<u>AND</u>		
	J.2	Be in MODE 5.	36 hours
K. Three or more required AC sources inoperable.	K.1	Enter LCO 3.0.3.	Immediately

SURVEILLANCE REQUIREMENTS

SURVEILLANCE		FREQUENCY
SR 3.8.1.1	Verify correct alignment and voltage for each required offsite circuit.	7 days
SR 3.8.1.2	Verify each DG starts from standby conditions and is ready for loading in $\leq$ 10 seconds, and achieves steady state voltage $\geq$ 2280 V and $\leq$ 2520 V, and frequency $\geq$ 59.5 Hz and $\leq$ 61.2 Hz.	31 days

(continued)

SURVEILLANCE REQUIREMENTS (continued)

SURVEILLANCE		FREQUENCY
SR 3.8.1.3	-------------------NOTE----------------- Momentary transients outside the load range do not invalidate this test. --- Verify each DG is synchronized and loaded, and operates for ≥ 60 minutes; for ≥ 15 minutes at a load above its peak accident loading, and for the remainder of the test at a load ≥ 2300 kW and ≤ 2500 kW.	31 days
SR 3.8.1.4	Verify each DG starting air tank pressure is ≥ 200 psig.	31 days
SR 3.8.1.5	Verify each DG day tank contains ≥ 2500 gallons of fuel oil.	31 days
SR 3.8.1.6	Verify each fuel oil transfer pump and the fuel oil transfer system controls operate to transfer fuel oil from fuel oil storage tank to each DG day tank and engine mounted tank.	92 days
SR 3.8.1.7	-----------------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 transfer of the safety related buses from the normal AC source to Startup Transformer 1-2.	18 months

(continued)

SURVEILLANCE REQUIREMENTS (continued)

SURVEILLANCE		FREQUENCY
SR 3.8.1.8	-----NOTE----- 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 ≤ 68 Hz; b. Within 3 seconds following load rejection, the voltage is ≥ 2280 V and ≤ 2640 V; and c. Within 3 seconds following load rejection, the frequency is ≥ 59.5 Hz and ≤ 61.5 Hz.	18 months
SR 3.8.1.9	Verify each DG, operating at a power factor ≤ 0.9, does not trip, and voltage is maintained ≤ 4000 V during and following a load rejection of ≥ 2300 kW and ≤ 2500 kW.	18 months

(continued)

SURVEILLANCE REQUIREMENTS (continued)

SURVEILLANCE		FREQUENCY
SR 3.8.1.10	-------------------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 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 ≥ 2280 V and ≤ 2520 V; 4. Maintains steady state frequency ≥ 59.5 Hz and ≤ 61.2 Hz; and 5. Supplies permanently connected loads for ≥ 5 minutes.	18 months

(continued)

SURVEILLANCE REQUIREMENTS (continued)

SURVEILLANCE		FREQUENCY
SR 3.8.1.11	-------------------NOTE----------------- Momentary transients outside the load and power factor ranges do not invalidate this test. -- Verify each DG, operating at a power factor ≤ 0.9, operates for ≥ 24 hours: a. For ≥ 100 minutes loaded above its peak accident load; and b. For the remaining hours of the test loaded ≥ 2300 kW and ≤ 2500 kW.	18 months
SR 3.8.1.12	-------------------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. Can be synchronized with offsite power source while loaded with its associated 2400 volt bus upon a simulated restoration of offsite power; b. Can transfer loads to offsite power source; and c. Can be returned to ready-to-load operation.	18 months

(continued)

SURVEILLANCE REQUIREMENTS (continued)

SURVEILLANCE		FREQUENCY
SR 3.8.1.13	-------------------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 the time of each sequenced load is within 0.1 seconds of the design timing for each automatic load sequencer.	18 months

(continued)

SURVEILLANCE REQUIREMENTS (continued)

SURVEILLANCE		FREQUENCY
SR 3.8.1.14	-------------------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 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 $\leq$ 10 seconds; 2. Energizes auto-connected emergency loads through automatic load sequencer; 3. Achieves steady state voltage $\geq$ 2280 V and $\leq$ 2520 V; 4. Achieves steady state frequency $\geq$ 59.5 Hz and $\leq$ 61.2Hz; and 5. Supplies permanently connected loads for $\geq$ 5 minutes.	18 months
SR 3.8.1.15	Verify, by analytical means, that diesel generator steady state automatically connected electric loads do not exceed the continuous rating of 750 amp at 2400 volts.	18 months

3.8 **ELECTRICAL POWER SYSTEMS**

3.8.2 AC Sources - Shutdown

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

a. One qualified circuit between the offsite transmission network and the onsite Class 1E AC electrical power distribution subsystems 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 subsystems required by LCO 3.8.10.

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

ACTIONS

CONDITION	REQUIRED ACTION	COMPLETION TIME
A. One required offsite circuit inoperable.	------------NOTE------------- Enter applicable Conditions and Required Actions of LCO 3.8.10, with one required train of electrical power distribution de-energized as a result of Condition A. -----------------------------	
	A.1 Declare affected required features with no offsite power available inoperable.	Immediately
	<u>OR</u>	
	A.2.1 Suspend CORE ALTERATIONS.	Immediately
	<u>AND</u>	
		(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	For AC sources required to be OPERABLE, the following SRs are applicable: SR 3.8.1.1, Offsite Source Check SR 3.8.1.2, DG Starting Test SR 3.8.1.4, DG Starting Air Check SR 3.8.1.5, DG Day Tank Level Check SR 3.8.1.6, Fuel Transfer Check SR 3.8.1.15, DG Load Verification	In accordance with applicable SRs

3.8 ELECTRICAL POWER SYSTEMS

3.8.3 Diesel Fuel Oil, and Lube Oil

LCO 3.8.3 The stored diesel fuel oil and lube oil shall be within limit.

APPLICABILITY: When any DG is required to be OPERABLE.

ACTIONS

CONDITION	REQUIRED ACTION	COMPLETION TIME
A. With stored fuel oil inventory < 23,700 gallons and > 20,110 gallons.	A.1 Restore stored fuel oil inventory to within limits.	48 hours
B. With stored lube oil inventory < 175 gallons and > 150 gallons.	B.1 Restore stored lube oil inventory to within limits.	48 hours
C. With stored fuel oil viscosity, or water and sediment not within limits.	C.1 Restore stored fuel oil viscosity, and water and sediment to within limits.	7 days
D. With stored fuel oil properties not within limits for reasons other than Condition C.	D.1 Restore stored fuel oil properties to within limits.	31 days

(continued)

ACTIONS (continued)

CONDITION	REQUIRED ACTION	COMPLETION TIME
E Required Action and associated Completion Time not met. OR With stored fuel or lube oil not within limits for reasons other than Condition A, B, or D.	E.1 Declare both DGs inoperable.	Immediately

SURVEILLANCE REQUIREMENTS

	SURVEILLANCE	FREQUENCY
SR 3.8.3.1	Verify the fuel oil storage tank contains ≥ 23,700 gallons of fuel oil.	24 hours
SR 3.8.3.2	Verify lube oil inventory is ≥ 175 gallons.	31 days
SR 3.8.3.3	Verify properties of new and stored fuel oil are tested in accordance with, and maintained within the limits of, the Fuel Oil Testing Program.	In accordance with the Fuel Oil Testing Program
SR 3.8.3.4	Check for and remove excess accumulated water from the fuel oil storage tank.	92 days

3.8 **ELECTRICAL POWER SYSTEMS**

3.8.4 DC Sources - Operating

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

a. Station battery D01 and charger D15; and

b. Station battery D02 and charger D16.

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

ACTIONS

CONDITION	REQUIRED ACTION	COMPLETION TIME
A. One required charger inoperable.	A.1 Place cross-connected charger for affected battery in service.	Immediately
	AND	
	A.2 Restore required charger to OPERABLE status.	7 days
B. One battery inoperable.	B.1 Place both chargers in service for the affected battery.	Immediately
	AND	
	B.2 Restore battery to OPERABLE status.	24 hours
C. Required Action and associated Completion Time not met.	C.1 Be in MODE 3.	6 hours
	AND	
	C.2 Be in MODE 5.	36 hours

SURVEILLANCE REQUIREMENTS

	SURVEILLANCE	FREQUENCY
SR 3.8.4.1	Verify battery terminal voltage is ≥ 123 V on float charge.	7 days
SR 3.8.4.2	Verify no visible corrosion at battery terminals and connectors. <u>OR</u> Verify each battery connection resistance is ≤ 120% of the resistance measured during installation.	92 days
SR 3.8.4.3	Inspect battery cells, cell plates, and racks for visual indication of physical damage or abnormal deterioration.	12 months
SR 3.8.4.4	Remove visible terminal corrosion and verify battery cell to cell and terminal connections are coated with anti-corrosion material.	12 months
SR 3.8.4.5	Verify each battery connection resistance is ≤ 120% of the resistance measured during installation.	12 months
SR 3.8.4.6	Verify each required battery charger supplies ≥ 180 amps at ≥ 125 V for ≥ 8 hours.	18 months

(continued)

SURVEILLANCE REQUIREMENTS (continued)

SURVEILLANCE		FREQUENCY
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. 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 ≥ 80% of the manufacturer's rating when subjected to a performance discharge test or a modified performance discharge test.	60 months <u>AND</u> 12 months when battery shows degradation or has reached 85% of the expected life with capacity < 100% of manufacturer's rating. <u>AND</u> 24 months when battery has reached 85% of the expected life with capacity ≥ 100% of manufacturer's rating.

3.8 ELECTRICAL POWER SYSTEMS

3.8.5 DC Sources - Shutdown

LCO 3.8.5 The DC electrical power sources shall be OPERABLE to support the DC electrical power distribution subsystems required by LCO 3.8.10, "Distribution Systems - Shutdown."

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

ACTIONS

CONDITION	REQUIRED ACTION	COMPLETION TIME
A. One or more required DC electrical power source inoperable.	A.1 Declare affected required features 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	
	A.2.4 Initiate action to restore required DC electrical power source to OPERABLE status.	Immediately

SURVEILLANCE REQUIREMENTS

	SURVEILLANCE	FREQUENCY
SR 3.8.5.1	For DC sources required to be OPERABLE, the following SRs are applicable: SR 3.8.4.1, Float Voltage Check SR 3.8.4.2, Connector Condition Check SR 3.8.4.3, Battery Physical Inspection SR 3.8.4.4, Connector Cleaning and Coating SR 3.8.4.5, Connector Resistance Check	In accordance with applicable SRs.

3.8 ELECTRICAL POWER SYSTEMS

3.8.6 Battery Cell Parameters

LCO 3.8.6 The Battery cell parameters for the Station Batteries D01 and D02 shall be within the limits of Table 3.8.6-1 and the average temperature of representative cells shall be ≥ 70°F.

APPLICABILITY: When associated DC electrical power source is 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 < 70°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.	31 days
SR 3.8.6.2	Verify average electrolyte temperature of representative cells is ≥ 70°F.	31 days
SR 3.8.6.3	Verify battery cell parameters meet Table 3.8.6-1 Category B limits.	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	≥ 2.13 V	≥ 2.13 V	> 2.07 V
Specific Gravity[(b)(c)]	≥ 1.200	≥ 1.200	Not more than 0.020 below average connected cells <u>AND</u> Average of all connected cells ≥ 1.190

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

(b) Corrected for electrolyte temperature 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 Inverters D06, D07, D08, and D09 shall be OPERABLE.

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

ACTIONS

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

SURVEILLANCE REQUIREMENTS

SURVEILLANCE		FREQUENCY
SR 3.8.7.1	Verify correct inverter voltage, frequency, and alignment to Preferred AC buses.	7 days

3.8 **ELECTRICAL POWER SYSTEMS**

3.8.8 Inverters - Shutdown

LCO 3.8.8 The Inverters shall be OPERABLE to support the Preferred AC Buses required by LCO 3.8.10, "Distribution Systems - Shutdown."

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

ACTIONS

CONDITION	REQUIRED ACTION	COMPLETION TIME
A. One or more required inverters inoperable.	A.1 Declare affected required features 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	
	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, frequency, and alignments to required Preferred AC buses.	7 days

3.8 ELECTRICAL POWER SYSTEMS

3.8.9 Distribution Systems - Operating

LCO 3.8.9 The left and right trains of AC, DC, and Preferred AC electrical power distribution subsystems shall be OPERABLE.

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

ACTIONS

CONDITION	REQUIRED ACTION	COMPLETION TIME
A. One AC electrical power distribution subsystem inoperable.	A.1 Restore AC electrical power distribution subsystem to OPERABLE status.	8 hours
B. One Preferred AC bus inoperable.	B.1 Restore Preferred AC bus to OPERABLE status.	8 hours
C. One DC electrical power distribution subsystem inoperable.	C.1 Restore DC electrical power distribution subsystem to OPERABLE status.	8 hours
D. Required Action and associated Completion Time not met.	D.1 Be in MODE 3. AND D.2 Be in MODE 5.	6 hours 36 hours
E. Two or more inoperable distribution subsystems that result in a loss of function.	E.1 Enter LCO 3.0.3.	Immediately

SURVEILLANCE REQUIREMENTS

SURVEILLANCE		FREQUENCY
SR 3.8.9.1	Verify correct breaker alignments and voltage to required AC, DC, and Preferred AC 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 Preferred AC 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.

ACTIONS

CONDITION	REQUIRED ACTION		COMPLETION TIME
A. One or more required AC, DC, or Preferred AC electrical power distribution subsystems inoperable.	A.1	Declare affected required features 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 Preferred AC electrical power distribution subsystems to OPERABLE status. <u>AND</u> A.2.5 Declare affected required shutdown cooling systems 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 Preferred AC electrical power distribution subsystems.	7 days

ATTACHMENT 2

CONSUMERS POWER COMPANY
PALISADES PLANT
DOCKET 50-255

STS CONVERSION TECHNICAL SPECIFICATION CHANGE REQUEST

3.8 ELECTRICAL POWER SYSTEMS PART

Bases for the Revised Technical Specifications

3.8 ELECTRICAL POWER SYSTEMS

B 3.8.1 AC Sources - Operating

BASES

BACKGROUND

The plant Class 1E Electrical Power Distribution System AC sources consist of the offsite power sources, and the onsite standby power sources, Diesel Generators 1-1 and 1-2 (DGs). As required by 10 CFR 50, Appendix A, GDC 17, the design of the AC electrical power system provides independence and redundancy to ensure an available source of power to the Engineered Safety Feature (ESF) systems.

The AC power system at Palisades consists of a 345 kV switchyard, three circuits connecting the plant with off-site power (station power, startup, and safeguards transformers), the on-site distribution system, and two DGs. The on-site distribution system is divided into safety related (Class 1-E) and non-safety related portions.

The switchyard interconnects six transmission lines from the offsite transmission system and the output line from the Palisades main generator. These lines are connected in a "breaker and a half" scheme between the Front (F) and Rear (R) buses such that any single off-site line may supply the Palisades station loads when the plant is shutdown.

Two circuits supplying Palisades 2400 volt buses from off-site are fed directly from a switchyard bus through the startup and safeguards transformers. They are available both during operation and during shutdown. The third circuit supplies the plant loads by "back feeding" through the main generator output circuit and station power transformers after the generator has been disconnected by a motor operated disconnect.

The station power transformers are connected into the main generator output circuit. Station power transformers 1-1 and 1-2 connect to the generator 22 kV output bus. Station power transformer 1-3 connects to the generator output line on the high voltage side of the main transformer. Station power transformers 1-1 and 1-3 supply non-safety related 4160 volt loads during plant power operation and during backfeeding operations. Station power transformer 1-2 can supply both safety related and non-safety related 2400 volt loads during plant power operation or backfeeding operation.

BASES

BACKGROUND (continued)

The three startup transformers are connected to a common 345 kV overhead line from the switchyard R bus. Startup transformers 1-1 and 1-3 supply 4160 volt non-safety related station loads; Startup Transformer 1-2 can supply both safety related and non-safety related 2400 volt loads. The startup transformers are available during operation and shutdown.

Safeguards Transformer 1-1 is connected to the switchyard F bus. It feeds station 2400 volt loads through an underground line. It is available to supply these loads during operation and shutdown.

The onsite distribution system consists of seven main distribution buses (4160 volt buses 1A, 1B, 1F, and 1G, and 2400 volt buses 1C, 1D, and 1E) and supported lower voltage buses, motor control centers (MCCs), and lighting panels. The 4160 volt buses and 2400 volt bus 1E are not safely related. Buses 1C and 1D and their supported buses and MCCs form two independent, redundant, safety related distribution trains. Each distribution train supplies one train of engineered safety features equipment.

In the event of a generator trip, all loads supplied by the station power transformers are automatically transferred to the startup transformers. Loads supplied by the safeguards transformer are unaffected by a plant trip. If power is lost to the safeguards transformer, the 2400 volt loads will automatically transfer to startup transformer 1-2. If the startup transformers are not energized when these transfers occur, their output breakers will be blocked from closing and the 2400 volt safety related buses will be energized by the DGs.

The two DGs each supply one 2400 volt bus. They provide backup power in the event of loss of off-site power, or loss of power to the associated 2400 volt bus. The continuous rating of the DGs is 2500 kW, with 110 percent overload permissible for 2 hours in any 24 hour period. The required fuel in the Fuel Oil Storage Tank and DG Day Tank will supply one DG for a minimum period of 7 days assuming accident loading conditions and fuel conservation practices.

If either 2400 volt bus, 1C or 1D, experiences a sustained undervoltage, the associated DG is started, the affected bus is separated from its offsite power sources, major loads are stripped from that bus and its supported buses, the DGs are connected to the bus, and ECCS or shutdown loads are started by an automatic load sequencer.

BASES

BACKGROUND (continued)

The DGs share a common fuel oil storage and transfer system. A single buried Fuel Oil Storage Tank is used to maintain the required fuel oil inventory. Testing has shown that each DG consumes about 2.6 gallons of fuel oil per minute at 2400 kW. Each day tank is required to contain at least 2500 gallons. Therefore, each fuel oil day tank contains sufficient fuel for more than 15 hours of full load (2500 kW) operation. Beyond that time, a fuel oil transfer pump is required for continued DG operation.

Two fuel oil transfer pumps are provided. The fuel oil transfer pumps are necessary for long term operation of the DGs. Either fuel oil transfer pump is capable of supplying either DG. However, each fuel oil transfer pump is not capable, with normally available switching, of being powered from either DG. DG 1-1 can power either fuel oil transfer pump, but DG 1-2 can only power P-18A. The fuel oil transfer pumps take suction on a common fuel oil storage tank, and utilize common piping.

Fuel oil transfer pump P-18A is powered from MCC-8, which is normally connected to Bus 1D (DG 1-2) through Station Power Transformer 12 and Load Center 12. In an emergency, P-18A can be powered from Bus 1C (DG 1-1) by cross connecting Load Centers 11 and 12.

Fuel oil transfer pump P-18B is powered from MCC-1, which is normally connected to Bus 1C (DG 1-1) through Station Power Transformer 19 and Load Center 19. P-18B cannot be powered, using installed equipment, from Bus 1D (DG 1-2).

APPLICABLE SAFETY ANALYSES

The safety analyses do not explicitly address AC electrical power. They do, however, assume that the Engineered Safety Features (ESF) are available. The OPERABILITY of the ESF functions is supported by the AC Power Sources.

The design requirements are for each assumed safety function to be available under the following conditions:

a. The occurrence of an accident or transient,

b. The resultant consequential failures,

c. A worst case single active failure,

d. Loss of all offsite or all onsite AC power, and

e. The most reactive control rod fails to insert.

BASES

APPLICABLE SAFETY ANALYSES (continued)

One proposed mechanism for the loss of off-site power is a perturbation of the transmission grid because of the loss of the plant's generating capacity. A loss of off-site power as a result of a generator trip can only occur during MODE 1 operation, with the generator connected to the grid. However, it is also assumed in analysis for events in MODE 2, such as a steam line break or control rod ejection at zero power. No specific mechanism for initiating a loss of off-site power when the plant is not on the line is discussed in the FSAR.

In most cases, it is conservative to assume that off-site power is lost concurrent with the accident and that the single failure is that of a DG. That would leave only one train of safeguards equipment to cope with the accident, the other being disabled by the loss of AC power. Those analyses which assume that a loss of off-site power and failure of a single DG accompany the accident also assume 10 seconds for the DG to start and connect to the bus, and additional time for the sequencer to start each safeguards load.

The same assumptions are not conservative for all accident analyses. When analyzing the effects of a steam or feed line break, the loss of the condensate and feedwater pumps would reduce the steam generator inventory, so a loss of off-site power is not assumed.

In MODE 5 and MODE 6, loss of off-site power is treated as an initiating event.

LCO

Two qualified circuits between the offsite transmission network and the onsite Class 1E Electrical Power Distribution System and an independent DG for each safeguards 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 or a postulated DBA.

General Design Criterion 17 requires, in part, that: "Electric power from the transmission network to the onsite electric distribution system shall be supplied by two physically independent circuits (not necessarily on separate rights of way) designed and located so as to minimize to the extent practical the likelihood of their simultaneous failure under operating and postulated accident and environmental conditions."

BASES

LCO (continued)

The qualified offsite circuits available are Safeguards Transformer 1-1 and Startup Transformer 1-2. Station Power Transformer 1-2 is not qualified as a required source for LCO 3.8.1 since it is not independent of the other two offsite circuits. This LCO does not prohibit use of Station Power Transformer to power the 2400 safety related buses, but the two qualified sources must be OPERABLE.

Each offsite circuit must be capable of maintaining acceptable frequency and voltage, and accepting required loads during an accident, while supplying the 2400 volt safety related buses.

Following a loss of offsite power, each DG must be capable of starting and connecting to its respective 2400 volt bus. This will be accomplished within 10 seconds after receipt of a DG start signal. 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 2400 volt safety related buses.

Proper sequencing of loads and tripping of nonessential loads are required functions for DG OPERABILITY.

APPLICABILITY

The AC sources are required to be OPERABLE in MODES 1, 2, 3, and 4 to ensure that redundant sources of off-site and on-site AC power are available to support engineered safeguards equipment in the event of an accident or transient. The AC sources also support the equipment necessary for power operation, plant heatups and cooldowns, and shutdown operation.

The AC source requirements for MODE 5 and MODE 6 are addressed 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.

BASES

ACTIONS (continued)

A.2

According to the recommendations of Regulatory Guide (RG) 1.93, operation may continue in Condition A for a period that should not exceed 72 hours. With one offsite circuit inoperable, the reliability of the offsite system is degraded, and the potential for a loss of offsite power is increased, with attendant potential for a challenge to the plant 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.

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.

B.2

The requirement to declare required features inoperable carries with it the requirement to take those actions required by the LCO for that required equipment, as stipulated by LCO 3.0.6.

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

ACTIONS (continued)

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 Completion 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 redundant required feature subsequently becomes inoperable, this Completion Time begins to be tracked.

Discovering one required DG inoperable coincident with one or more inoperable required supporting or supported features, or both, that are associated with the OPERABLE DG, results in starting the Completion Time for Required Action B.2. Four hours from the discovery of these events existing concurrently, is acceptable because it minimizes risk while allowing time for restoration before subjecting the plant 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.

ACTIONS (continued)

B.3.1 and B.3.2

Required Action B.3 provides an allowance to avoid unnecessary testing of the OPERABLE DG. If it can be determined that the cause of the inoperable DG does not exist on the OPERABLE DG, SR 3.8.1.2 (test starting of the OPERABLE DG) does not have to be performed. If the cause of inoperability exists on other DGs, the other DGs 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 to not exist on the remaining DGs, 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 B.3.1 or B.3.2 the corrective action system would normally 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, 24 hours is reasonable to confirm that the OPERABLE DG is not affected by the same problem as the inoperable DG.

B.4

In Condition B, the remaining OPERABLE DG and offsite circuits are adequate to supply electrical power to the onsite Class 1E Distribution System for a limited period.
The Completion Time, which limits the time when any required DG is not OPERABLE to 7 days (total for both DGs) in any calendar month, is a feature of the original Palisades licensing basis.

C.1

The requirement to declare required features inoperable carries with it the requirement to take those actions required by the LCO for that required equipment, as stipulated by LCO 3.0.6.

Required Action C.1, which applies when two required 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 RG 1.93 recommends a Completion Time of 24 hours for two required offsite circuits inoperable, based upon the assumption that two complete safety trains are OPERABLE.

BASES

ACTIONS (continued)

When a concurrent redundant required feature failure exists, this assumption is not the case, and a shorter Completion Time of 12 hours is appropriate. These features are powered from redundant AC safety trains.

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

a. All required offsite circuits are inoperable; and

b. A required feature is inoperable.

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

<u>C.2</u>

According to the recommendations of RG 1.93, 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 accomplish 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.

With both of the required offsite circuits inoperable, sufficient onsite AC sources are available to maintain the plant 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.

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.

ACTIONS (continued)

D.1 and D.2

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

According to the recommendations of RG 1.93, operation may continue in Condition D for a period that should not exceed 12 hours.

E.1

With both DGs inoperable, there are no remaining standby AC sources. Thus, with an assumed loss of offsite electrical power, no AC source would be 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 an inadvertent generator trip could also result in a total loss of offsite AC power, however, the time allowed for continued operation is severely restricted. The intent here is to avoid the risk associated with an immediate controlled shutdown and to minimize the risk associated with this level of degradation.

According to the recommendations of RG 1.93, with both DGs inoperable, operation may continue for a period that should not exceed 2 hours.

F.1

The sequencer is an essential support system to the DG. With the sequencer inoperable, the associated DG is unable to perform its specified function, and must thereby be immediately declared to be inoperable.

G.1, H.1, and I.1

Since DG 1-2 cannot power fuel oil transfer pump P-18B, without P-18A, DG 1-2 becomes dependant on offsite power or DG 1-1 for its fuel supply (beyond the 15 hours it will operate on the day tank), and does not meet the LCO requirement for independence. Since the condition is not as severe as the DG itself being inoperable, 24 hours is allowed to restore the fuel oil transfer pump to operable status prior to declaring the DG inoperable.

BASES

ACTIONS (continued)

Without P-18B, either DG can still provide power to the remaining fuel oil transfer pump, neither DG is directly affected. Continued operation with a single remaining fuel oil transfer pump, however, must be limited since an additional single active failure (P-18A) could disable the onsite power system. Because the loss of P-18B is less severe than the loss of one DG, a 7 day Completion Time is allowed.

If both fuel oil transfer pumps are inoperable, the onsite AC sources are limited to about 15 hours duration. Since this condition is not as severe as both DGs being inoperable, 8 hours is allowed to restore one fuel oil transfer pump to OPERABLE status.

J.1 and J.2

If the inoperable AC power sources cannot be restored to OPERABLE status 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.

K.1

Condition K 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. 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 (RG) 1.9 and RG 1.137.

BASES

SURVEILLANCE REQUIREMENTS (continued)

Where the SRs discussed herein specify voltage and frequency tolerances for the DGs operated in the "Unit" mode, the following is applicable. The minimum steady state output voltage of 2280 volts is 95% of the nominal 2400 volt generator rating. This value is above the setting of the primary undervoltage relays (127-1 and 127-2) and above the minimum analyzed acceptable bus voltage. It also allows for voltage drops to motors and other equipment down through the 120 volt level. The specified maximum steady state output voltage of 2520 volts is 105% of the nominal generator rating of 2400 volts. It is below the maximum voltage rating of the safeguards motors, 2530 volts. The specified minimum and maximum frequencies of the DG are 59.5 Hz and 61.2 Hz, respectively. The minimum value assures that ESF pumps provide sufficient flow to meet the accident analyses. The maximum value is equal to 102% of the 60 Hz nominal frequency and is derived from the recommendations given in RG 1.9.

Higher maximum tolerances are specified for final steady state voltage and frequency following a loss of load test, because that test must be performed with the DG controls in the "Parallel" mode. Since "Parallel" mode operation introduces both voltage and speed droop, the DG final conditions will not return to the nominal "Unit" mode settings.

SR 3.8.1.1 (Offsite Source check)

This SR assures that the required offsite circuits are OPERABLE. Each offsite circuit must be energized from associated switchyard bus through its disconnect switch to be OPERABLE.

Since each required offsite circuit transformer has only one possible source of power, the associated switchyard bus, and since loss of voltage to either the switchyard bus or the transformer is alarmed in the control room, correct alignment and voltage may be verified by the absence of these alarms.

The 7 day Frequency is adequate because disconnect switch positions cannot change without operator action and because their status is displayed in the control room.

BASES

SURVEILLANCE REQUIREMENTS (continued)

SR 3.8.1.2 (DG starting test)

This SR helps to ensure the availability of the standby electrical power supply to mitigate DBAs and transients and to maintain the plant in a safe shutdown condition.

The monthly testing starting of the DG provides assurance that the DG would start and be ready for loading in the time period assumed in the safety analyses. The monthly test, however does not, and is not intended to, test all portions of the circuitry necessary for automatic starting and loading. The operation of the bus undervoltage relays and their auxiliary relays which initiate DG starting, the control relay which initiates DG breaker closure, and the DG breaker closure itself are not verified by this test. Verification of automatic operation of these components requires deenergizing the associated 2400 volt bus and cannot be done during plant operation. For this test, the 10 second timing is started when the DG receives a start signal, and ends when the DG voltage sensing relays actuate.

For the purposes of SR 3.8.1.2, the DGs are manually started from standby conditions. Standby conditions for a DG mean the diesel engine is not running, but its coolant and oil temperatures are being maintained consistent with manufacturer recommendations.

Three relays sense the terminal voltage on each DG. These relays, in conjunction with a load shedding relay actuated by bus undervoltage, initiate automatic closing of the DG breaker. During monthly testing, the actuation of the three voltage sensing relays is used as the timing point to determine when the DG is ready for loading.

The 31 day Frequency for performance of SR 3.8.1.2 agrees with the original licensing basis for the Palisades plant, and is consistent with the testing frequency recommendation of Generic Letter 94-01.

SR 3.8.1.3 (DG loading test)

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 for at least 15 minutes. A minimum total run time of 60 minutes is required to stabilize engine temperatures.

BASES

SURVEILLANCE REQUIREMENTS (continued)

The 31 day Frequency for this Surveillance is consistent with the original Palisades licensing basis and with the testing frequency recommendation of Generic Letter 94-01.

This SR is modified by a Note which states that momentary transients because of changing bus loads do not invalidate this test.

SR 3.8.1.4 (DG starting air pressure check)

This Surveillance ensures that, without the aid of the refill compressor, sufficient air start capacity for each DG is available. The pressure specified in this SR is intended to reflect the lowest value at which successful 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 3.8.1.5 (DG day tank level check)

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 specified level is adequate for a minimum of 15 hours of DG operation at full load.

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

SR 3.8.1.6 (Fuel Transfer system checks)

This SR demonstrates that each fuel oil transfer pump and the fuel oil transfer system controls operate and control transfer of fuel from the Fuel Oil Storage Tank to each day tank and engine mounted tank. This is required to support continuous operation of standby power sources.

This SR provides assurance that the following portions of the fuel oil transfer system is OPERABLE:

Fuel oil transfer pumps
Day and engine mounted tank filling solenoid valves
Day and engine mounted tank automatic level controls

BASES

SURVEILLANCE REQUIREMENTS (continued)

The 92 day Frequency corresponds to the testing requirements for pumps in the ASME Code, Section XI. Additional assurance of fuel oil transfer system OPERABILITY is provided during the monthly starting and loading tests for each DG when the fuel oil system will function to maintain level in the day and engine mounted tanks.

SR 3.8.1.7 (Fast transfer verification)

Transfer of the safety related buses (Buses 1C and 1D) from the normal AC power source, that used during power operation, to the offsite circuit which meets the GDC 17 "immediately available" criterion (Startup Transformer 1-2) demonstrates the OPERABILITY of the "immediately available" circuit and of the fast transfer circuitry for use with that normal AC source.

The 18 month Frequency of the Surveillance is based on engineering judgment, taking into consideration the plant 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 3.8.1.8 (DG largest load rejection test)

Each DG is provided with an engine overspeed trip to prevent damage to the engine. 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 without exceeding predetermined voltage and frequency and while maintaining a specified margin to the overspeed trip. This Surveillance may be accomplished with the DG in the "Parallel" mode.

An acceptable method is to parallel the DG with the grid and load the DG to a load equal to or greater than its single largest post-accident load. The DG breaker is tripped while its voltage and frequency (or speed) are being recorded. The time, voltage, and frequency tolerances specified in this SR are derived from the recommendations of RG 1.9, Revision 3 (RG 1.9).

SURVEILLANCE REQUIREMENTS (continued)

RG 1.9 recommends that the increase in diesel speed during the transient does not exceed 75% of the difference between synchronous speed and the overspeed trip setpoint, or 15% above synchronous speed, whichever is lower. The Palisades DGs have a synchronous speed of 900 rpm and an overspeed trip setting range of 1060 to 1105 rpm. Therefore, the maximum acceptable transient frequency for this SR is 68 Hz.

The minimum steady state voltage is specified to provide adequate margin for the switchgear and for both the 2400 and 480 volt safeguards motors; the maximum steady state voltage is 2400 +10% volts as recommended by RG 1.9.

The minimum acceptable frequency is specified to assure that the safeguards pumps powered from the DG would supply adequate flow to meet the safety analyses. The maximum acceptable steady state frequency is slightly higher than the +2% (61.2 Hz) recommended by RG 1.9 because the test must be performed with the DG controls in the Parallel mode. The increased frequency allowance of 0.3 Hz is based on the expected speed differential associated with performance of the test while in the "Parallel" mode.

The 18 month surveillance Frequency is consistent with the recommendation of RG 1.9.

This SR is modified by a Note. In order to ensure that the DG is tested under load conditions that are as close to design basis conditions as possible, the Note requires that, if synchronized to offsite power, testing must be performed using a power factor ≤ 0.9. This power factor is chosen to be representative of the actual design basis inductive loading that the DG would experience.

<u>SR 3.8.1.9</u> (DG full load rejection test)

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 and generator load response under a complete loss of load. These acceptance criteria provide DG damage protection. The 4000 volt limitation is based on generator rating of 2400/4160 volts. While the DG is not expected to experience this transient during an event and continue 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.

BASES

SURVEILLANCE REQUIREMENTS (continued)

In order to ensure that the DG is tested under load conditions that are as close to design basis conditions as possible, testing must be performed using a power factor ≤ 0.9. This power factor is chosen to be representative of the actual design basis inductive loading that the DG would experience.

The 18 month Frequency is consistent with the recommendation of RG 1.9 and is intended to be consistent with expected fuel cycle lengths.

SR 3.8.1.10 (Loss of off-site power without SIS test)

As recommended by RG 1.9 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.

The requirement to energize permanently connected loads is met when the DG breaker closes, energizing its associated 2400 volt bus. Permanently connected loads are those which are not disconnected from the bus by load shedding relays. They are energized when the DG breaker closes. It is not necessary to monitor each permanently connected load. The DG auto-start and breaker closure time of 10 seconds is derived from requirements of the accident analysis to respond to a design basis large break LOCA. For this test, the 10 second timing is started when the DG receives a start signal, and ends when the DG breaker closes.

The requirement to verify that auto-connected shutdown loads are energized refers to those loads which are actuated by the Normal Shutdown Sequencer. Each load should be started to assure that the DG is capable of accelerating these loads at the intervals programmed for the Normal Shutdown Sequence. The sequenced pumps may be operating on recirculation flow.

The requirements to maintain steady state voltage and frequency apply to the "steady state" period after all sequenced loads have been started. This period need only be long enough to achieve and measure steady voltage and frequency.

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 supply permanently connected loads for ≥ 5 minutes, refers to the duration of the DG connection to the associated 2400 volt bus. It is not intended to require that sequenced loads be operated throughout the 5 minute period. It is not necessary to monitor each permanently connected load.

BASES

SURVEILLANCE REQUIREMENTS (continued)

The requirement to verify the connection and supply of permanently and automatically connected loads is intended to demonstrate the DG loading logic. This testing may be accomplished in any series of sequential, overlapping, or total steps so that the required connection and loading sequence is verified.

The Frequency of 18 months is consistent with the recommendations of RG 1.9.

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. However, credit may be taken for unplanned events that satisfy this SR.

<u>SR 3.8.1.11</u> (DG 24 hour load test)

RG 1.9 recommends 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, $\geq$ 2 hours of which is at a load above its analyzed peak accident loading and the remainder of the time at a load equivalent to the continuous duty rating of the DG. The 100 minutes required by the SR satisfies the intent of the recommendations of the RG, but allows some tolerance between the time requirement and the DG rating. Without this tolerance, the load would have to be reduced at precisely 2 hours to satisfy the SR without exceeding the manufacturer's rating of the DG.

The DG starts for this Surveillance can be performed either from standby or hot conditions.

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 $\leq$ 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 inspections in accordance with vendor recommendations in order to maintain DG OPERABILITY.

The 18 month Frequency is consistent with the recommendations of RG 1.9.

This Surveillance is modified by a Note which 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.

BASES

SURVEILLANCE REQUIREMENTS (continued)

SR 3.8.1.12 (DG load transfer to offsite)

As recommended by RG 1.9, 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. The test is performed while the DG is supplying its associated 2400 volt bus, but not necessarily carrying the sequenced accident loads. 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, the automatic load sequencer is reset, and the DG controls are returned to "Unit".

The Frequency of 18 months is consistent with the recommendations of RG 1.9.

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. However, credit may be taken for unplanned events that satisfy this SR.

SR 3.8.1.13 (Sequencer timing check)

If power is lost to bus 1C or 1D, 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 by concurrent motor starting currents. The 0.1 second 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 ensures that safety analysis assumptions regarding ESF equipment time delays are met. Logic Drawing E-17 Sheet 4 provides a summary of the automatic loading of safety related buses.

The Frequency of 18 months is consistent with the recommendations of RG 1.9, takes into consideration plant 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. However, credit may be taken for unplanned events that satisfy this SR.

BASES

SURVEILLANCE REQUIREMENTS (continued)

SR 3.8.1.14 (Loss of offsite power with SIS test)

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, PCS, and containment design limits are not exceeded.

The requirement to energize permanently connected loads is met when the DG breaker closes, energizing its associated 2400 volt bus. Permanently connected loads are those which are not disconnected from the bus by load shedding relays. They are energized when the DG breaker closes. It is not necessary to monitor each permanently connected load. The DG auto-start and breaker closure time of 10 seconds is derived from requirements of the accident analysis to respond to a design basis large break LOCA. For this test, the 10 second timing is started when the DG receives a start signal, and ends when the DG breaker closes.

The requirement to verify that auto-connected shutdown loads are energized refers to those loads which are actuated by the DBA Sequencer. Each load should be started to assure that the DG is capable of accelerating these loads at the intervals programmed for the DBA Sequence. The sequenced pumps may be operating on recirculation flow or in other testing mode. The requirements to maintain steady state voltage and frequency apply to the "steady state" period after all sequenced loads have been started. This period need only be long enough to achieve and measure steady voltage and frequency.

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 supply permanently connected loads for ≥ 5 minutes, refers to the duration of the DG connection to the associated 2400 volt bus. It is not intended to require that sequenced loads be operated throughout the 5 minute period. It is not necessary to monitor each permanently connected load.

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

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

BASES

SURVEILLANCE REQUIREMENTS (continued)

SR 3.8.1.15 (DG load verification)

This item is intended to provide assurance that the electrical loads which are automatically connected to the DG during an accident sequence do not exceed its continuous rating. The test may be accomplished by analytical means rather than by physical testing, and addresses running current of the loads rather than starting current. The requirement to perform the test each 18 months is based on the required frequency of an equivalent requirement in the former CE STS, NUREG 0212.

REFERENCES

1. 10 CFR 50, Appendix A, GDC 17
2. Regulatory Guide 1.93, December 1974
3. Generic Letter 84-15, July 2, 1984
4. 10 CFR 50, Appendix A, GDC 17
5. 10 CFR 50, Appendix A, GDC 18
6. Regulatory Guide 1.9, Rev. 3, July 1993
7. Regulatory Guide 1.137, Rev. 1, October 1979
8. Generic Letter 94-01, May 31, 1994
9. ASME, Boiler and Pressure Vessel Code, Section XI
10. IEEE Standard 308-1978
11. Palisades Logic Drawing E-17, Sheet 4

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 safety analyses do not explicitly address electrical power. They do, however, assume that various electrically powered and controlled equipment is available. Electrical power is necessary to terminate and mitigate the effects of many postulated events which could occur in MODE 5 or 6. Analyzed events which might occur in MODE 5 or 6 are Loss of PCS inventory or Loss of PCS Flow, (which in MODE 5 or 6 would be grouped as a Loss of Shutdown Cooling event), and radioactive releases (Fuel Handling Accident, Cask Drop, Radioactive Gas Release, Etc.). In general, when the plant is shut down, the Technical Specifications requirements ensure that the plant 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 MODE 5 or MODE 6. Worst case bounding events are deemed not credible in MODE 5 or 6 because the primary coolant temperature and pressure, and the corresponding stresses result in the probabilities of occurrence being significantly reduced, and in minimal consequences.
LCO	This LCO requires one offsite circuit to be OPERABLE. One OPERABLE offsite circuit ensures that all required loads may be powered from offsite power. Since only one offsite AC source is required, independence is not a criterion. Any of the three offsite supplies, Safeguards Transformer 1-1, Station Power Transformer 1-2, or Startup Transformer 1-2 is acceptable as a qualified circuit. An OPERABLE DG, associated with a distribution subsystem required to be OPERABLE by LCO 3.8.10, ensures a diverse power source is available to provide electrical power support, assuming a loss of the offsite circuit.

BASES

LCO (continued)

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

The DG must be capable of starting, accelerating to rated speed and voltage, connecting to its respective 2400 volt bus on detection of bus undervoltage, and accepting required loads. Proper "Normal Shutdown" loading sequence, and tripping of nonessential loads, is a required function for DG OPERABILITY. A Service Water Pump must be started soon after the DG to assure continued DG operability. The DBA loading sequence is not required to be OPERABLE since the Safety Injection Signal is disabled during MODE 5 operation.

APPLICABILITY

The AC sources required to be OPERABLE in MODES 5 and 6, and during movement of irradiated fuel assemblies provide assurance that equipment and instrumentation is available to:

a. Provide coolant inventory makeup,

b. Mitigate a fuel handling accident,

c. Mitigate shutdown events that can lead to core damage,

d. Monitoring and maintaining the plant in MODE 5 or 6.

The AC source requirements for MODES 1, 2, 3, and 4 are addressed in LCO 3.8.1, "AC Sources - Operating."

ACTIONS

A.1

An offsite circuit would be considered inoperable if it were not available to supply the 2400 volt safety related bus or buses required by LCO 3.8.10. Since the required offsite AC source is only required to support features required by other LCOs, the option to declare those required features with no offsite power available to be inoperable, assures that appropriate ACTIONS will be implemented in accordance with the affected LCOs.

BASES

ACTIONS (continued)

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

ACTION A.1 may involve undesired and unnecessary administrative efforts, therefore, ACTIONS A.2 provide alternate, but sufficiently conservative, ACTIONS.

With the required DG inoperable, the minimum required diversity of AC power sources is not available.

ACTIONS A.2 and B.1 require suspension of CORE ALTERATIONS, movement of irradiated fuel assemblies, and operations involving positive reactivity additions. The suspension of CORE ALTERATIONS and movement of irradiated fuel assemblies does not preclude actions to place a fuel assembly in a safe location; the suspension of positive reactivity additions does not preclude actions to maintain or increase reactor vessel inventory provided the required SHUTDOWN MARGIN is maintained.

These ACTIONS minimize the probability or the occurrence of postulated events. It is further required to immediately initiate action to restore the required AC sources (and to continue this action until restoration is accomplished) in order to provide the necessary AC power to the plant safety systems.

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

LCO 3.0.6 states that the Conditions of a supported system need not be entered solely due to the inoperability of a required support system unless otherwise noted in the support system Actions. Therefore, without a Note, the Distribution System's ACTIONS would not necessarily be entered even if all AC sources to it are inoperable, resulting in de-energization. Therefore, the Required Actions of Condition A are modified by a Note to indicate that when Condition A is entered with no AC power to one ESF bus, the applicable ACTIONS for LCO 3.8.10 must be immediately entered. This Note allows Condition A to provide requirements for the loss of the required AC source, whether or not a train is de-energized. LCO 3.8.10 provides the appropriate restrictions for the situation involving a de-energized train.

BASES

SURVEILLANCE REQUIREMENTS

SR 3.8.2.1 (Shutdown AC power surveillance)

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 MODE 5 and 6.

The SRs from LCO 3.8.1 which are required are those which both support a feature required in MODE 5 or 6 and which can be performed without effecting the OPERABILITY or reliability of the required sources.

With only one DG available, many tests cannot be performed since their performance would render that DG inoperable during the test. This is the case for tests which require DG loading: SRs 3.8.1.3, 3.8.1.8, 3.8.1.9, 3.8.1.10, 3.8.1.11, 3.8.1.12, 3.8.1.13, and 3.8.1.14.

With only one DG and only one offsite circuit available, SR 3.8.1.7 cannot be performed.

REFERENCES

None

3.8 **ELECTRICAL POWER SYSTEMS**

B 3.8.3 Diesel Fuel Oil and Lube Oil

BASES

BACKGROUND

The diesel generators (DGs) are provided with a storage tank having a required fuel oil inventory sufficient to operate one diesel for a period of 7 days, while the DG is supplying maximum post-accident loads. This onsite fuel oil capacity is sufficient to operate the DG for longer than the time to replenish the onsite supply from offsite sources.

Fuel oil is transferred from the Fuel Oil Storage Tank to either day tank by either of two fuel oil transfer pumps.

For proper operation of the standby DGs, it is necessary to ensure the proper quality of the fuel oil. Regulatory Guide (RG) 1.137 addresses the recommended fuel oil practices as supplemented by ANSI N195-1976.

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. 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 offsite sources. Implicit in this LCO is the requirement to assure, though not necessarily by testing, the capability to transfer the lube oil from its storage location to the DG oil sump, while the DG is running.

APPLICABLE SAFETY ANALYSES

A description of the Safety Analyses applicable in MODES 1, 2, 3, and 4 is provided in the Bases for LCO 3.8.1, "AC Sources Operating"; in MODE 5 and MODE 6, in the Bases for LCO 3.8.2 "AC Sources - Shutdown."

BASES

LCO

Stored diesel fuel oil is required to have sufficient supply for 7 days of full accident load operation. It is also required to meet specific standards for quality. The specified 7 day requirement and the 6 day quantity listed in Condition 3.8.3.A are taken from the Engineering Analysis associated with Event Report E-PAL-93-026B.

Additionally, sufficient lube oil supply must be available to ensure the capability to operate at full accident load for 7 days. This requirement is in addition to the lube oil contained in the engine sump. The specified 7 day requirement and the 6 day quantity listed in Condition 3.8.3.B are based on an assumed lube oil consumption of 1 gallon per hour.

These requirements, in conjunction with an ability to obtain replacement supplies within 7 days, support the availability of the DGs. DG day tank fuel requirements, and fuel oil transfer capability from the storage tank to the day tanks, are addressed in LCOs 3.8.1, and 3.8.2.

APPLICABILITY

The DGs are required by LCOs 3.8.1 and 3.8.2 to ensure the availability of the required AC power to shut down the reactor and maintain it in a safe shutdown condition following a loss of off-site power. Since stored diesel fuel oil and lube oil support LCOs 3.8.1 and 3.8.2, stored diesel fuel oil and lube oil are required to be within limits when either DG is required to be OPERABLE.

ACTIONS

A.1

In this Condition, the available DG fuel oil supply is less than the required 7 day supply, but enough for at least 6 days. This condition allows sufficient time to obtain additional fuel and to perform the sampling and 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 inventory prior to declaring the DGs inoperable.

B.1

In this Condition, the available DG lube oil supply is less than the required 7 day supply, but enough for at least 6 days. This condition allows sufficient time to obtain additional lube oil. A period of 48 hours is considered sufficient to complete restoration of the required inventory prior to declaring the DGs inoperable.

ACTIONS (continued)

C.1

Diesel fuel oil with viscosity, or water and sediment out of limits is not necessarily unacceptable for short term DG operation. Viscosity is important primarily because of its effect on the handling of the fuel by the pump and injector system; water and sediment provides an indication of fuel contamination. When the fuel oil stored in the Fuel Oil Storage Tank is determined to be out of viscosity, or water and sediment limits, but acceptable for short term DG operation, it will be restored to within limits within 7 days. (If the fuel oil stored in the Fuel Oil Storage Tank is determined to be unacceptable for even short term usage, the affected DGs must be declared inoperable.) The 7 day Completion Time allows for further evaluation, resampling, and reanalysis of the DG fuel oil.

D.1

With the stored fuel oil properties defined in the Fuel oil Testing Program not within the required limits, but acceptable for short term DG operation, a period of 31 days is allowed for restoring the stored fuel oil properties. This period provides sufficient time to determine if new fuel oil, when mixed with stored fuel oil, will produce an acceptable mixture, or if other methods to restore the stored fuel oil properties are required. 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.

E.1

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

BASES

SURVEILLANCE REQUIREMENTS

SR 3.8.3.1 (Fuel oil quantity check)

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

The 24 hour Frequency is specified to ensure that a sufficient supply of fuel oil is available, since the Fuel Oil Storage Tank is the fuel oil supply for the diesel fire pumps, heating boilers, and rad waste evaporators, in addition to the DGs.

SR 3.8.3.2 (Lube oil quantity check)

This Surveillance ensures that sufficient lube oil inventory is available to support at least 7 days of full accident load operation for one DG. The 175 gallon requirement is based on an estimated consumption of 1 gallon per hour.

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

SR 3.8.3.3 (Fuel oil quality check)

The tests listed below are a means of determining whether new fuel oil and stored fuel oil are of the appropriate grade and have not been contaminated with substances that would have an immediate, detrimental impact on diesel engine combustion.

Testing for viscosity, specific gravity, and water and sediment is completed for fuel oil delivered to the plant prior to its being added to the Fuel Oil Storage Tank. Fuel oil which fails the test, but has not been added to the Fuel Oil Storage Tank does not imply failure of this SR and requires no specific action. If results from these tests are within acceptable limits, the fuel oil may be added to the storage tank without concern for contaminating the entire volume of fuel oil in the storage tanks.

Fuel oil is tested for other of the parameters specified in ASTM D975 in accordance with the Fuel Oil Testing Program required by Specification 5.5.11. Fuel oil determined to have one or more measured parameters outside acceptable limits will be evaluated for its effect on DG operation. Fuel oil which is determined to be acceptable for short term DG operation, but outside limits will be restored to within limits in accordance with Condition D. Fuel oil which is determined to be unacceptable for even short term DG operation is cause for the DGs to be declared inoperable.

BASES

SURVEILLANCE REQUIREMENTS (continued)

SR 3.8.3.4 (Fuel Oil Storage Tank water check)

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 Storage Tank once every 92 days eliminates the necessary environment for bacterial survival. This is the most effective means of controlling microbiological fouling. In addition, it reduces 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 and acceptance criteria are established in the Fuel Oil Testing Program based, in part, on those recommended by RG 1.137. This SR is for preventative maintenance. The presence of water does not necessarily represent failure of this SR provided the accumulated water is removed in accordance with the requirements of the Fuel Oil Testing Program.

REFERENCES

1. Regulatory Guide 1.137
2. ANSI N195-1976, Appendix B
3. ASTM Standards, D975, Table 1

3.8 ELECTRICAL POWER SYSTEMS

B 3.8.4 DC Sources - Operating

BASES

BACKGROUND

The station DC electrical power system provides the AC power system with control power. It also provides control power to selected safety related equipment and power to the preferred AC Buses (via inverters). As required by 10 CFR 50, Appendix A, GDC 17, the DC electrical power system is designed to have sufficient independence, redundancy, and testability to perform its safety functions, assuming a single failure.

The 125 VDC electrical power system consists of two independent and redundant safety related Class 1E DC power sources. Each DC source consists of one 125 volt battery, two battery chargers, and the associated control equipment and interconnecting cabling.

Each station battery has two associated battery chargers, one powered by the associated AC power distribution system (the directly connected chargers) and one powered from the opposite AC power distribution system (the cross-connected chargers). The battery chargers are normally operated in pairs, either both direct connected chargers or both cross-connected chargers, to assure a diverse AC supply.

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

The DC power distribution system is described in the Bases for LCO 3.8.9, "Distributions System Operating".

Each battery has adequate storage capacity to carry the required load continuously for at least 4 hours and to perform three complete cycles of intermittent loads discussed in the FSAR, Chapter 8.

Each 125 volt battery is separately housed in a ventilated room apart from its charger and distribution centers. Each DC source is separated physically and electrically from the other DC source to ensure that a single failure in one source does not cause a failure in a redundant source.

BASES

BACKGROUND (continued)

The batteries for the DC power sources are sized to produce required capacity at 80% of nameplate rating, corresponding to warranted capacity at end of life cycles and the 100% design demand. The voltage limit is 2.13 volts per cell, which corresponds to a total minimum voltage output of 125.7 volts per battery discussed in the FSAR, Chapter 8. The criteria for sizing large lead storage batteries are defined in IEEE-485.

Each DC electrical power source has ample power output capacity for the steady state operation of connected loads during normal operation, while at the same time maintaining its battery fully charged. Each battery charger also has sufficient capacity to restore the battery from the design minimum charge to its fully charged state within 24 hours while supplying normal steady state loads discussed in the FSAR, Chapter 8.

APPLICABLE SAFETY ANALYSES

A description of the Safety Analyses applicable in MODES 1, 2, 3, and 4 is provided in the Bases for LCO 3.8.1 "AC Sources - Operating."

LCO

The DC power sources, each consisting of one battery, one directly connected battery charger 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 DC control power and Preferred AC power to shut down the reactor and maintain it in a safe condition.

An OPERABLE DC electrical power source requires its battery to be OPERABLE and connected to the associated DC bus. In order for the battery to remain OPERABLE, one charger must be in service.

The LCO specifies chargers D15 and D16 because those chargers are powered by the AC power distribution system and DG associated with the battery they supply. If only the cross-connected chargers were OPERABLE, and a loss of off-site power should occur concurrently with the loss of one DG, both safeguards trains would eventually become disabled. One train would be disabled by the lack of AC motive power; the other would become disabled when the battery, whose only OPERABLE charger is fed by the failed DG, became depleted.

BASES

APPLICABLE SAFETY ANALYSES (continued)

The required chargers, D15 and D16, must be OPERABLE, but need not actually be in service because the probability of a concurrent loss of offsite power and loss of one DG is low, battery charging current is not needed immediately after an accident, and the standby chargers may be placed in service quickly.

APPLICABILITY

The DC sources are required to be OPERABLE in MODES 1, 2, 3, or 4 to ensure that redundant sources of DC power are available to support engineered safeguards equipment and plant instrumentation in the event of an accident or transient. The DC sources also support the equipment and instrumentation necessary for power operation, plant heatups and cooldowns, and shutdown operation.

The DC source requirements for MODES 5 and 6 are addressed in LCO 3.8.5, "DC Sources - Shutdown."

ACTIONS

<u>A.1 and A.2</u>

With one of the required chargers (D15 or D16) inoperable, the cross-connected charger must be immediately placed in service, if it is not already in service, to maintain the battery in OPERABLE status. In order to limit the time when the DC source is not capable of continuously meeting the single failure criterion, the required charger must be restored to OPERABLE status within 7 days.

The 7 day completion time was chosen to allow trouble shooting, location of parts, and repair.

<u>B.1 and B.2</u>

With one battery inoperable, the associated DC system cannot meet its design. It lacks both the surge capacity and the independence from AC power sources which the battery provides if offsite power is lost. Placing the second battery charger in service provides two benefits: 1) restoration of the capacity to supply a sudden DC power demand, and 2) restoration of adequate DC power in the affected train as soon as <u>either</u> AC power distribution system is re-energized following a loss of offsite power.

BASES

ACTIONS (continued)

In order to restore the DC source to its design capability, the battery must be restored to OPERABLE status within 24 hours. The 24 hour Completion Time is a feature of the original Palisades licensing basis and reflects the availability to provide two trains of DC power from either AC distribution system. Furthermore, it provides a reasonable time to assess plant status as a function of the inoperable DC electrical power source and, if the battery is not restored to OPERABLE status, to prepare to effect an orderly and safe plant shutdown.

C.1 and C.2

If the inoperable DC electrical power source cannot be restored to OPERABLE status 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.

SURVEILLANCE REQUIREMENTS

SR 3.8.4.1 (Float voltage check)

Verifying battery terminal voltage while on float charge helps to ensure the effectiveness of the charging system and the ability of the batteries to perform their intended function. Float charge is the condition in which the charger is supplying the continuous current required to overcome the internal losses of a battery and maintain the battery in a fully charged state. The specified voltage is the product of the Table 3.8.6-1 Category C limit for an individual cell and the number of cells in the battery. It corresponds to the minimum acceptable setting of the low voltage alarm on the DC buses. The 7 day Frequency is consistent with manufacturer and IEEE-450 recommendations.

SR 3.8.4.2 (Terminal and connector condition check)

Visual inspection to detect corrosion of the battery terminals and connectors, or measurement of the resistance of each intercell and terminal connection, provides an indication of physical damage or abnormal deterioration that could potentially degrade battery performance.

The specified limit of 120% of the resistance at initial installation is in accordance with the manufacturers recommendations.

BASES

SURVEILLANCE REQUIREMENTS (continued)

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 (Battery inspection)

Visual inspection of the battery cells, cell plates, and 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, which recommends detailed visual inspection of cell condition and rack integrity on a yearly basis.

SR 3.8.4.4 and SR 3.8.4.5 (Cleaning and resistance)

Visual inspection and resistance measurements of intercell 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 Surveillance Frequencies of 12 months is consistent with IEEE-450, which recommends cell to cell and terminal connection resistance measurement on a yearly basis.

SR 3.8.4.6 (Charger test)

This SR requires that each battery charger be capable of supplying 180 amps at 125 volts for $\geq$ 8 hours. These requirements are based on the design capacity of the chargers. The chargers are rated at 200 amps; the specified 180 amps provides margin between the charger rating and the test requirement.

The Surveillance Frequency is acceptable, given the plant 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.

BASES

SURVEILLANCE REQUIREMENTS (continued)

SR 3.8.4.7 (Service test)

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 FSAR Chapter 8.

The Surveillance Frequency of 18 months is consistent with the recommendations of RG 1.32 and RG 1.129, 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.

Note 2 requires that the plant be in MODE 5 or 6, because performing the Surveillance requires disconnecting the battery from the DC distribution buses and connecting it to a test load resistor bank. This action makes the battery inoperable and completely unavailable for use.

SR 3.8.4.8 (Performance test)

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.

The modified performance discharge test is a simulated duty cycle consisting of just two rates; the one minute rate published for the battery or the largest current load of the duty cycle, followed by the test rate employed for the performance test, both of which envelope the duty cycle of the 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.

SURVEILLANCE REQUIREMENTS (continued)

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.

Either the battery performance discharge test or the modified performance discharge test is acceptable for satisfying SR 3.8.4.7; however, only the modified performance discharge test may be used to satisfy SR 3.8.4.8 while satisfying the requirements of SR 3.8.4.7 at the same time.

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

The Surveillance Frequency for this test is normally 60 months. If the battery shows degradation, or if the battery has reached 85% of its expected life and capacity is < 100% of the manufacturer's rating, the Surveillance Frequency is reduced to 12 months. However, if the battery shows no degradation but has reached 85% of its expected life, the Surveillance Frequency is only reduced to 24 months for batteries that retain capacity ≥ 100% of the manufacturer's rating. Degradation is indicated, according to IEEE-450, when the battery capacity drops by more than 10% relative to its capacity on the previous performance test or when it is ≥ 10% below the manufacturer's rating. These Frequencies are consistent with the recommendations in IEEE-450.

The reason for the restriction that the plant be in MODE 5 or MODE 6 is that performing the Surveillance requires disconnecting the battery from the DC distribution buses and connecting it to a test load resistor bank. This action makes the battery inoperable and completely unavailable for use.

BASES

REFERENCES

1. 10 CFR.50, Appendix A, GDC 17
2. FSAR, Chapter 8
3. IEEE-485-1983, June 1983
4. Regulatory Guide 1.93, December 1974
5. IEEE-450-1987
6. Regulatory Guide 1.32, February 1977
7. Regulatory Guide 1.129, December 1974

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	A description of the Safety Analyses applicable in MODE 5 and 6 is provided in the Bases for LCO 3.8.2 "AC Sources - Shutdown."
LCO	This LCO requires those, and only those, DC power sources which supply the DC distribution subsystems required by LCO 3.8.10, to be OPERABLE. Each DC source consists of one battery, one battery charger, and the corresponding control equipment and interconnecting cabling. This ensures the availability of sufficient DC power sources to maintain the plant in a safe manner and to mitigate the consequences of postulated events during shutdown (e.g., fuel handling accidents and loss of shutdown cooling).
APPLICABILITY	The DC power sources required to be OPERABLE in MODES 5 and 6, and during movement of irradiated fuel assemblies provide assurance that equipment and instrumentation is available to: a. Provide coolant inventory makeup, b. Mitigate a fuel handling accident, c. Mitigate shutdown events that can lead to core damage, d. Monitoring and maintaining the plant in a MODE 5 or 6. The DC source requirements for MODES 1, 2, 3, and 4 are addressed in LCO 3.8.4, "DC sources - Operating."

BASES

ACTIONS

A.1

Since the required DC source is only required to support features required by other LCOs, the option to declare those required features with no DC power available to be inoperable, assures that appropriate ACTIONS will be implemented in accordance with the affected LCOs.

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

ACTION A.1 may involve undesired and unnecessary administrative efforts, therefore, ACTIONS A.2 provide alternate, but sufficiently conservative, ACTIONS.

ACTIONS A.2 require suspension of CORE ALTERATIONS, movement of irradiated fuel assemblies, and operations involving positive reactivity additions. The suspension of CORE ALTERATIONS and movement of irradiated fuel assemblies does not preclude actions to place a fuel assembly in a safe location; the suspension of positive reactivity additions does not preclude actions to maintain or increase reactor vessel inventory provided the required SHUTDOWN MARGIN is maintained.

These ACTIONS minimize the probability or the occurrence of postulated events. It is further required to immediately initiate action to restore the required DC sources (and to continue this action until restoration is accomplished) in order to provide the necessary DC power to the plant safety systems.

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

BASES

SURVEILLANCE REQUIREMENTS

SR 3.8.5.1 (Shutdown DC power surveillance)

SR 3.8.5.1 requires the SRs from LCO 3.8.4 that are necessary for ensuring the OPERABILITY of the AC sources in MODE 5 and MODE 6.

The SRs from LCO 3.8.4 which are required are those which can be performed without effecting the OPERABILITY or reliability of the required DC source. With only one battery available, loading tests cannot be performed since their performance would render that battery inoperable during the test. This is the case for SRs 3.8.4.6, 3.8.4.7, and 3.8.4.8.

REFERENCES

None

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 is provided in the Bases for LCO 3.8.4, "DC Sources - Operating."

APPLICABLE SAFETY ANALYSES

A description of the Safety Analyses applicable in MODES 1, 2, 3, and 4 is provided in the Bases for LCO 3.8.1, "AC Sources - Operating"; in MODE 5 and MODE 6, in the Bases for LCO 3.8.2 "AC Sources - Shutdown."

LCO

Battery cell parameters must remain within acceptable limits to ensure availability of the required DC power to shut down the reactor and maintain it in a safe condition after an anticipated operational occurrence or a postulated DBA. Battery cell limits are conservatively established, allowing continued DC electrical system function even when Category A and B limits are not met.

The requirement to maintain the average temperature of representative cells above 70°F assures that the battery temperature is within the design band. Battery capacity is a function of battery temperature.

APPLICABILITY

The battery cell parameters are required solely for the support of the associated DC power sources. Therefore, they are only required when the DC power source is required to be OPERABLE. Refer to the Applicability discussions in the Bases for LCO 3.8.4, "DC Sources - Operating" and LCO 3.8.5, "DC Sources - Shutdown."

ACTIONS

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

With one or more cells in one or more batteries not within Category A or B limits but within the Category C limits, the battery is not fully charged but there is still sufficient capacity to perform the intended function. Therefore, the affected battery is not required to be declared to be inoperable 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. One hour provides time to inspect the electrolyte level and to confirm the float voltage of the pilot cells.

Verification that all cells meet the Category C limits (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.

Battery cell parameters must be restored to Category A and B limits within 31 days.

B.1

With the temperature of representative cells below the design temperature, or with one or more battery cells with parameters outside the Category C limits, sufficient capacity to supply the maximum expected load requirement is not assured and the corresponding battery must be declared inoperable.

Additionally, if battery cells cannot be restored to meeting Category A or B limits within 31 days, a serious difficulty with the battery is indicated and the battery must be declared to be inoperable.

SURVEILLANCE REQUIREMENTS

SR 3.8.6.1 (Pilot cell checks)

This SR verifies that Category A battery cell parameters are consistent with IEEE-450, which recommends regular battery inspections (at least one per month) including voltage, specific gravity, and electrolyte temperature of pilot cells. The monthly frequency specified is a feature of the initial Palisades license, and is the same as those other pilot cell tests specified in Surveillance 3.8.6.2.

SR 3.8.6.2 (Temperature checks)

This Surveillance verification that the average temperature of representative cells is > 70°F is consistent with a recommendation of IEEE-450, which states that the temperature of electrolytes in representative cells should be determined on a quarterly basis. However, a monthly frequency is specified which is a feature of the initial Palisades license, and is the same as those other pilot cell tests specified in Surveillance 3.8.6.1.

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

SR 3.8.6.3 (Connected cell checks)

The quarterly inspection of specific gravity and voltage is consistent with the recommendations of IEEE-450.

Table 3.8.6-1

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

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

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 A and B limits for the Palisades batteries are the same. The two Categories are maintained in the table to be consistent with IEEE 450 terminology and with the Standard Technical Specifications.

BASES

SURVEILLANCE REQUIREMENTS (continued)

The Category A and B limits specified for electrolyte level are based on manufacturer recommendations and are consistent with the guidance in IEEE-450, with the extra ¼ inch allowance above the high water level indication for operating margin to account for temperatures and charge effects. In addition to this allowance, footnote (a) to Table 3.8.6-1 permits the electrolyte level to be above the specified maximum level during equalizing charge, provided it is not overflowing. These limits ensure that the plates suffer no physical damage, and that adequate electron transfer capability is maintained in the event of transient conditions. IEEE-450 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 and B limit specified for float voltage is ≥ 2.13 volts per cell. This value is based on a recommendation of IEEE-450, which states that prolonged operation of cells < 2.13 volts can reduce their life expectancy.

The Category A and B limit specified for specific gravity for each pilot cell is ≥ 1.200. This value is characteristic of a charged cell with adequate capacity. According to IEEE-450, the specific gravity readings are based on a temperature of 77°F (25°C).

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 limit for float voltage is based on IEEE-450, which states that a cell voltage of 2.07 volts 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 ≥ 1.190 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.

BASES

SURVEILLANCE REQUIREMENTS (continued)

The footnotes to Table 3.8.6-1 are applicable to Category A, B, and C specific gravity. Footnote (b) to Table 3.8.6-1 requires the above mentioned correction for electrolyte level and temperature, with the exception that level correction is not required when battery charging current is < 2 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. Footnote (c) to Table 3.8.6-1 allows the float charge current to be used as an alternate to specific gravity for up to 7 days following a battery 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. IEEE-450-1980

3.8 **ELECTRICAL POWER SYSTEMS**

B 3.8.7 Inverters - Operating

BASES

BACKGROUND

The inverters are the normal source of power for the Preferred AC buses. The function of the inverter is to provide continuous AC electrical power to the Preferred AC buses, even in the event of an interruption to the normal AC power distribution system. A Preferred AC bus can be powered from the AC power distribution system via the Bypass Regulator if its associated inverter is out of service. An interlock prevents supplying more than one Preferred AC bus from the bypass regulator at any time. The station battery provides an uninterruptable power source for the instrumentation and controls for the Reactor Protective System (RPS) and the Engineered Safety Features (ESF).

APPLICABLE SAFETY ANALYSES

A description of the Safety Analyses applicable in MODES 1, 2, 3, and 4 is provided in the Bases for LCO 3.8.1 "AC Sources - Operating."

LCO

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

Maintaining the inverters OPERABLE ensures that the redundancy incorporated into the RPS and ESF instrumentation and controls is maintained. The four inverters ensure an uninterruptable supply of AC electrical power to the Preferred AC buses even if the 2400 volt safety related buses are de-energized.

An inverter is considered inoperable if it is not powering the associated Preferred AC bus, or if its output voltage or frequency is not within tolerances.

BASES

APPLICABILITY

The inverters are required to be OPERABLE in MODES 1, 2, 3, and 4 to ensure that redundant sources of Preferred AC power for instrumentation and control are available to support engineered safeguards equipment in the event of an accident or transient and for power operation, plant heatups and cooldowns, and shutdown operation.

Inverter requirements for MODE 5 and 6 are addressed LCO 3.8.8, "Inverters - Shutdown."

ACTIONS

A.1

With an inverter inoperable, its associated Preferred AC bus becomes inoperable until it is manually re-energized from the bypass regulator. An inoperable Preferred AC Bus is addressed in LCO 3.8.9.

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 Preferred AC bus de-energized. This ensures the Preferred AC bus is re-energized within 8 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 plant 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.

B.1 and B.2

If the inoperable devices or components cannot be restored to OPERABLE status 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.

BASES

SURVEILLANCE REQUIREMENTS

SR 3.8.7.1 (Inverter checks)

This Surveillance verifies that the inverters are functioning properly and Preferred AC 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 ESF connected to the Preferred AC 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

None

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

A description of the Safety Analyses applicable in MODE 5 and 6 is provided in the Bases for LCO 3.8.2 "AC Sources - Shutdown."

LCO

This LCO requires those, and only those, inverters necessary to support the Preferred AC buses required by LCO 3.8.10, to be OPERABLE.

This ensures the availability of sufficient Preferred AC electrical power to operate the plant in a safe manner and to mitigate the consequences of postulated events during shutdown (e.g., fuel handling accidents and loss of shutdown cooling).

An inverter is considered inoperable if it is not powering the associated Preferred AC bus, or if its voltage or frequency is not within tolerances.

APPLICABILITY

The inverters required to be OPERABLE in MODE 5 and 6, and during movement of irradiated fuel assemblies provide assurance that equipment and instrumentation is available to:

a. Provide coolant inventory makeup,

b. Mitigate a fuel handling accident,

c. Mitigate shutdown events that can lead to core damage,

d. Monitoring and maintaining the plant in MODE 5 or 6.

Inverter requirements for MODES 1, 2, 3, and 4 are addressed in LCO 3.8.7, "Inverters - Operating."

BASES

ACTIONS

A.1

An inverter would be considered inoperable if it were not available to supply its associated Preferred AC bus. Since the inverter and its associated Preferred AC Bus is only required to support features required by other LCOs, the option to declare those required features without inverter supplied Preferred AC power available to be inoperable, assures that appropriate ACTIONS will be implemented in accordance with the affected LCOs.

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

ACTION A.1 may involve undesired and unnecessary administrative efforts, therefore, ACTIONS A.2 provide alternate, but sufficiently conservative, ACTIONS.

ACTIONS A.2 require suspension of CORE ALTERATIONS, movement of irradiated fuel assemblies, and operations involving positive reactivity additions. The suspension of CORE ALTERATIONS and movement of irradiated fuel assemblies does not preclude actions to place a fuel assembly in a safe location; the suspension of positive reactivity additions does not preclude actions to maintain or increase reactor vessel inventory provided the required SHUTDOWN MARGIN is maintained.

These ACTIONS minimize the probability or 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 required inverter supplied Preferred AC power to the plant instrument and control 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 during which the plant safety systems may be without inverter supplied Preferred AC power.

BASES

SURVEILLANCE REQUIREMENTS

SR 3.8.8.1 (inverter checks)

A description of the basis for this SR is provided in the bases for SR 3.8.7.1.

REFERENCES

None

3.8 **ELECTRICAL POWER SYSTEMS**

B 3.8.9 Distribution Systems - Operating

BASES

BACKGROUND

The onsite Class 1E AC, DC, and Preferred AC bus electrical power distribution systems are divided into two redundant and independent electrical power distribution trains. Each electrical power distribution train is made up of several subsystems which include the safety related buses, load centers, motor control centers, and distribution panels shown in Table B 3.8.9-1.

The Class 1E 2400 volt safety related buses, Bus 1C and Bus 1D, are normally powered from offsite, but can be powered from the DGs, as explained in the Background section of the Bases for LCO 3.8.1, "AC Sources - Operating." Each 2400 volt safety related bus supplies one train of Class 1E the 480 volt distribution system. The buses and motor control centers which make up the Class 1E portion of the 480 Volt distribution system are listed in Table B 3.8.9-1.

The 120 volt Preferred AC buses are normally powered from the inverters. The alternate power supply for the buses is a constant voltage transformer, called the Bypass Regulator. Use of the Bypass regulator is governed by LCO 3.8.7, "Inverters - Operating." The bypass regulator is powered from the non-Class 1E instrument AC bus, Y-01. The Instrument AC bus is normally powered through an automatic bus transfer switch, an instrument AC transformer, and isolation fuses. Its normal power source is MCC-1. Loss of power to MCC-1 will cause automatic transfer of the Instrument AC bus to MCC-2.

There are two independent 125 volt DC electrical power distribution subsystems.

APPLICABLE SAFETY ANALYSES

A description of the Safety Analyses applicable in MODES 1, 2, 3, and 4 is provided in the Bases for LCO 3.8.1, "AC Sources - Operating."

BASES

LCO

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

Maintaining both trains of AC, DC, and Preferred AC bus electrical power distribution subsystems OPERABLE ensures that the redundancy incorporated into the plant design is not defeated. Therefore, a single failure within any electrical power distribution subsystem will not prevent safe shutdown of the reactor.

OPERABLE electrical power distribution subsystems require the buses, load centers, motor control centers, and distribution panels listed in Table B 3.8.9-1 to be energized to their proper voltages. In addition, tie breakers between redundant safety related AC power distribution subsystems must be open when a 2400 volt source is OPERABLE for each train. This prevents any electrical malfunction in any power distribution subsystem from propagating to the redundant subsystem. 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 2400 volt buses from being powered from the same offsite circuit or preclude cross connecting Class 1E 480 volt subsystems when 2400 volt power is available for only one train.

This LCO does not address the power source for the Preferred AC buses. The Preferred AC buses are normally powered from the associated inverter. An alternate source, the Bypass Regulator, is available to supply one Preferred bus at a time, to allow maintenance on an inverter. The proper alignment of the inverted output breakers is addressed under the inverter LCOs. Therefore a Preferred AC Bus may be considered operable when powered from either the associated inverter or the Bypass Regulator as long as the voltage and frequency of the supply is correct.

BASES

APPLICABILITY

The electrical power distribution subsystems are required to be OPERABLE in MODES 1, 2, 3, and 4 to ensure that AC, DC, and Preferred AC power is available to the redundant trains and channels of safeguards equipment, instrumentation, and controls required to support engineered safeguards equipment in the event of an accident or transient.

Electrical power distribution subsystem requirements for MODE 5 and 6 are addressed in LCO 3.8.10, "Distribution Systems - Shutdown."

ACTIONS

A.1

With one or more required AC buses, load centers, motor control centers, or distribution panels, except Preferred AC buses, in one train inoperable, the redundant 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 an additional failure in the power distribution systems 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.

B.1

With one Preferred AC bus inoperable, the remaining OPERABLE Preferred AC buses are capable of supporting the minimum safety functions necessary to shut down the plant 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 Preferred AC bus must be restored to OPERABLE status within 8 hours by powering it from the associated inverter or from the Bypass Regulator.

B.2

This 8 hour limit is more conservative than Completion Times allowed for the vast majority of components that are without adequate Preferred AC power and is a feature of the original Palisades licensing basis.

ACTIONS (continued)

C.1

With a DC bus in one train inoperable, the remaining DC electrical power distribution subsystems are capable of supporting the minimum safety functions necessary to shut down the reactor and maintain it in a safe shutdown condition, assuming no single failure. The overall reliability is reduced, however, because a single failure in the remaining DC electrical power distribution subsystem could result in the minimum required ESF functions not being supported. Therefore, the required DC buses must be restored to OPERABLE status within 8 hours by powering the bus from the associated battery or charger.

This 8 hour limit is more conservative than Completion Times allowed for the vast majority of components which would be without power and is a feature of the original Palisades licensing basis.

D.1 and D.2

If the inoperable distribution subsystem cannot be restored to OPERABLE status 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.

E.1

Condition E corresponds to a degradation in the electrical distribution system that, together with another existing equipment failure, 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 continued operation. LCO 3.0.3 must be entered immediately to commence a controlled shutdown.

BASES

SURVEILLANCE REQUIREMENTS

SR 3.8.9.1 (AC bus alignment check)

This surveillance verifies that the required AC, DC, and Preferred AC bus electrical power distribution subsystems 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.

For those buses which have undervoltage alarmed in the control room, correct voltage may be verified by the absence of an undervoltage alarm.

For those buses which have only one possible power source and have undervoltage alarmed in the control room, correct breaker alignment by the absence of an undervoltage alarm.

A Preferred AC Bus may be considered correctly aligned when powered from either the associated inverter or from the bypass regulator. A mechanical interlock prevents connecting two or more Preferred AC Buses to the Bypass Regulator. LCO 3.8.7 and SR 3.8.7.1 address the condition of supplying a Preferred AC Bus from the bypass regulator.

The 7 day Frequency takes into account the redundant capability of the AC, DC, and Preferred AC bus electrical power distribution subsystems, and other indications available in the control room that alert the operator to subsystem malfunctions.

REFERENCES

None

Table B 3.8.9-1
Safeguards Electrical Distribution Trains

TYPE	VOLTAGE	LEFT TRAIN	RIGHT TRAIN
AC Power Distribution Subsystems	2400	Bus 1C Bus 1D	
	480	Bus 11	Bus 12
	480	Bus 19	Bus 20
	480	MCC 1	MCC 2
	480	MCC 7	MCC 8
	480	MCC 21	MCC 22
	480	MCC 23	MCC 24
	480	MCC 25	MCC 26
DC Power Distribution Subsystems	125	Bus D10-L	Bus D20-L
	125	Bus D10-R	Bus D20-R
	125	Pnl D11A	Pnl D21A
	125	Pnl D11-1	Pnl D21-1
	125	Pnl D11-2	Pnl D21-2
Preferred AC Subsystems	120	Bus Y-10	Bus Y-20
	120	Bus Y-30	Bus Y-40

3.8 **ELECTRICAL POWER SYSTEMS**

B 3.8.10 Distribution Systems - Shutdown

BASES

BACKGROUND

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

APPLICABLE SAFETY ANALYSES

A description of the Safety Analyses applicable in MODE 5 and 6 is provided in the Bases for LCO 3.8.2, "AC Sources - Shutdown."

LCO

This LCO requires those, and only those, AC, DC, and Preferred AC distribution subsystems to be OPERABLE which are necessary to support equipment required by other LCOs.

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

APPLICABILITY

The electrical power distribution subsystems required to be OPERABLE in MODE 5 and MODE 6, and during movement of irradiated fuel assemblies, provide assurance that equipment and instrumentation is available to:

a. Provide coolant inventory makeup,

b. Mitigate a fuel handling accident,

c. Mitigate shutdown events that can lead to core damage,

d. Monitoring and maintaining the plant in MODE 5 or 6.

The electrical power distribution subsystem requirements for MODES 1, 2, 3, and 4 are addressed in LCO 3.8.9, "Distribution Systems - Operating."

BASES

ACTIONS

A.1

Since the distribution systems are only required to support features required by other LCOs, the option to declare those affected required features to be inoperable, assures that appropriate ACTIONS will be implemented in accordance with the affected LCOs.

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

ACTION A.1 may involve undesired and unnecessary administrative efforts, therefore, ACTIONS A.2 provide alternate, but sufficiently conservative, ACTIONS.

ACTIONS A.2 require suspension of CORE ALTERATIONS, movement of irradiated fuel assemblies, and operations involving positive reactivity additions, and declaration that affected shutdown cooling trains are inoperable. The suspension of CORE ALTERATIONS and movement of irradiated fuel assemblies does not preclude actions to place a fuel assembly in a safe location; the suspension of positive reactivity additions does not preclude actions to maintain or increase reactor vessel inventory provided the required SHUTDOWN MARGIN is maintained.

These ACTIONS minimize the probability or the occurrence of postulated events. It is further required to immediately initiate action to restore the required distribution subsystems (and to continue this action until restoration is accomplished) in order to provide the necessary electrical power to the plant safety systems.

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 during which the plant safety systems may be without sufficient power.

SURVEILLANCE REQUIREMENTS

SR 3.8.10.1 (AC bus alignment check)

A description of the basis for this SR is provided in the bases for SR 3.8.9.1.

REFERENCES

None

ATTACHMENT 3

CONSUMERS POWER COMPANY
PALISADES PLANT
DOCKET 50-255

STS CONVERSION TECHNICAL SPECIFICATION CHANGE REQUEST

3.8 ELECTRICAL POWER SYSTEMS PART

Comparison of Existing and Revised Technical Specifications

Palisades Tech Spec Requirement List. Corrected through Amendment 170

A list of the existing Palisades Tech Specs (TS) correlated to Palisades Revised Technical Specifications (RTS).

First Column; Existing Palisades Tech Spec (TS) number

Each numbered TS item is listed in the left-most column. Items which contain more than one requirement are listed once for each requirement.

Second Column; Palisades Revised Tech Spec (RTS) number

The nearest corresponding numbered RTS item is listed in the second column. If the item does not appear in RTS, it is noted as 'Deleted' or 'Relocated.'

Deleted is used where an item has been eliminated as a tech spec, ie deleting, iaw GL 84-15, the requirement to test a D.G. when an ECCS pump in the opposite train becomes inoperable.

Relocated is used where an item has been moved to a controlled program or document because it does not meet the "Criteria" of 10 CFR 50.36(2)(c)(ii).

Where an item is relocated or deleted, the number of the associated RTS section has been added to allow sorting the list by section number. Relocated items, such as heavy load restrictions, which are not associated with any particular RTS section are arbitrarily assigned the number 5.0.

Third Column; TS Item Description

An abbreviation of the TS requirement appears in the third column. Each item is identified as: LCO, ACTION, SR, Admin, Exception, etc. Some items are implied, rather than explicit, ie a LCO is implied when an ACTION exists without a stated LCO.

Description Key;	TS requirement type:	Column 3 syntax:
	Safety Limit	SL: Safety limit; Applicable conditions
	Surveillance Requirement	SR: Equipment to be tested; Test description; Frequency
	Limiting Safety Setting	LSS: RPS Trip Channel & required setting
	Limiting Condition for Operation	LCO: Equipment to be operable; Applicable conditions
	Action	ACTN: Condition requiring action; Required action; Completion time
	Administrative Requirement	ADMN: Administrative requirement
	Permitted Instrument Bypass	Byps: Bypassable component; conditions when bypass permitted
	Defined Term	DEF: Name of defined item
	Exception to other Requirement	XCPT: Excepted spec or condition; Applicable conditions
	Descriptive material	DESC: Subject matter
	Table	TBL: Table

Forth Column; Classification of Changes:

Each change is identified as ADMINISTRATIVE, RELOCATED, MORE RESTRICTIVE, or LESS RESTRICTIVE.

Fifth Column; Discussion of Changes:

Each change is discussed briefly.

TS Number	RTS Number	TS requirement description	Classification and Description of Changes	
3.7	3.8	Electrical Systems		
3.7.1.a	3.8.1.a	LCO: Sta Pwr Xfmr 1-2; >300°F	LESS RESTRICTIVE:	This change is less restrictive because it is less specific about which off-site circuits are required. Proposed LCO 3.8.1 replaces existing 3.7.1 a & b. It is more general and requires 2 qualified offsite sources. Bases for proposed LCO state that Station power transformer 1-2 may only be used as a required source in MODE 5 or 6. Applicability of the proposed LCO extended from >300°F to MODES 1 - 4, iaw STS.
3.7.1.b	3.8.1.a	LCO: Startup Xfmr 1-2; >300°F	MORE RESTRICTIVE:	The applicable conditions when Startup Transformer 1-2 is required have been extended from above 300°F to MODES 1 - 4. Proposed LCO 3.8.1 replaces existing 3.7.1 a & b. It is more general and requires 2 qualified offsite sources. Qualifying circuits at PAL (during operation) are Safeguards Transformer 1-1 and Startup Transformer 1-2. Applicability extended from >300°F to MODES 1 - 4, iaw STS.
3.7.1.c	3.8.9	LCO: Eng Safeguards Buses 1C and 1D; >300°F	MORE RESTRICTIVE:	Applicability extended through MODE 4 iaw STS. RTS LCO 3.8.9 requires all buses required by TS LCO 3.7.1.a through g, and also requires buses which were listed in TSCR of 3/25/86. The required buses are listed in RTS table 3.7.9-1.
3.7.1.d	3.8.9	LCO: 480 V Distribution Buses 11 & 12; >300°F	MORE RESTRICTIVE:	See 3.7.1.c comment, above.
3.7.1.e	3.8.9	LCO: MCC No 1, 2, 7, and 8; >300°F	MORE RESTRICTIVE:	See 3.7.1.c comment, above.
3.7.1.f	3.8.9	LCO: 125 V D-C Buses 1 and 2; >300°F	MORE RESTRICTIVE:	See 3.7.1.c comment, above.
3.7.1.g	3.8.9	LCO: Four preferred A-C Buses; >300°F	MORE RESTRICTIVE:	See 3.7.1.c comment, above.
3.7.1.h	3.8.4	LCO: 2 station Batteries; >300°F	MORE RESTRICTIVE:	Applicability extended through MODE 4 iaw STS. Restricted acceptable chargers to the directly connected chargers.
3.7.1.h	3.8.9	LCO: The DC distribution systems; >300°F	MORE RESTRICTIVE:	Applicability extended through MODE 4 iaw STS.
3.7.1.h	3.8.4	LCO: 1 battery charger per bus; >300°F	MORE RESTRICTIVE:	Applicability extended through MODE 4 iaw STS.
3.7.1.i	3.8.1.b	LCO: DG 1-1 & 1-2; >300°F	MORE RESTRICTIVE:	Applicability extended through MODE 4 iaw STS.
3.7.1.i	3.8.1.5	LCO: 2500 gal fuel per day tank; >300°F	MORE RESTRICTIVE:	Applicability extended iaw STS. Requirement moved to SR. RTS requires day tank check whenever DG is required to be operable.

TS Number	RTS Number	TS requirement description	Classification and Description of Changes	
3.7.1.i	3.8.3.1	LCO: 16000 gal in storage tank; >300°F	MORE RESTRICTIVE:	Applicability extended iaw STS. Requirement moved to SR. RTS requires day tank check whenever DG is required to be operable. Required inventory increased iaw DG accident loading analyses and DG fuel oil consumption testing.
3.7.1.j	3.8 Relocated	LCO: Switchyard Battery; >300°F	RELOCATED:	Switchyard equipment requirements relocated to the Operating Requirements Manual. The operation of equipment in the switchyard is not assumed in the safety analysis, and does not meet any of the criteria of 10 CFR 50.36.
3.7.1.j	3.8 Relocated	LCO: Switchyard D-C system; >300°F	RELOCATED:	See 3.7.1.j comment, above.
3.7.1.j	3.8 Relocated	LCO: 1 swyd battery charger; >300°F	RELOCATED:	See 3.7.1.j comment, above.
3.7.1.k	3.8 Relocated	LCO: Swyd 240V A-C Panels 1 & 2 and Dist sys; >300°F	RELOCATED:	See 3.7.1.j comment, above.
3.7.1.l	3.8 Relocated	LCO: 2400 V Bus 1E; >300°F	RELOCATED:	The requirement to have Bus 1E energized above 300°F has been relocated to the Operating Requirements Manual. Bus 1E is not a safety grade bus. Its operability is not assumed in any safety analysis, and it does not meet any of the criteria of 10 CFR 50.36.
3.7.2	3.8 LCOs	ACTN: Required action not met	LESS RESTRICTIVE:	Proposed conditions and actions do not include the existing limitation on one condition at a time. Specific Conditions and Actions are listed in 3.7.2.a through m, below.
3.7.2.a	3.8.1.A	ACTN: Sta Pwr Xfmr inop; restore w/in 24 hrs	LESS RESTRICTIVE:	AOT extended to 72 hrs iaw STS. No feature at PAL makes the AOT approved for STS inappropriate.
3.7.2.a	3.8 Deleted	ACTN: Sta Pwr Xfmr inop; test both DGs	LESS RESTRICTIVE:	No equivalent requirement exists in STS. Current guidance suggests this extra testing and the reduced DG availability which results is inadvisable. Deleted iaw STS and GL 84-15.
3.7.2.b	3.8.1.A	ACTN: SU Xfmr inop; notify NRC of >24 hrs outage	MORE RESTRICTIVE:	Proposed AOT limits operation to 72 hrs; existing AOT allows unlimited operation provided report is submitted. Reporting requirement replaced with restoration requirement. No similar reporting requirement in STS; Proposed LCO requires 2 circuits from off-site, and limits operation to 72 hrs with <2 circuits.
3.7.2.b	3.8 Deleted	ACTN: SU Xfmr inop; Test both DGs	LESS RESTRICTIVE:	Deleted this additional testing iaw STS and GL 84-15.
3.7.2.c	3.8.9.A	ACTN: Bus 1C inop; Restore w/in 8 hrs	ADMINISTRATIVE:	Requirement unchanged.

Comparison of existing Palisades Tech Specs and Proposed Palisades Tech Specs. (03/28/96)

TS Number	RTS Number	TS requirement description	Classification and Description of Changes	
3.7.2.c	5.5.13	ACTN: Bus 1C inop; No inop equip on 1D	ADMINISTRATIVE:	This function of verifying that there is no loss of function is accomplished by the Safety Function Determination Program.
3.7.2.c	3.8 Deleted	ACTN: Bus 1C inop; Test opposite DG	LESS RESTRICTIVE:	Deleted this additional testing iaw STS and GL 84-15.
3.7.2.c	3.8.9.A	ACTN: Bus 1D inop; Restore w/in 8 hrs	ADMINISTRATIVE:	Requirement unchanged.
3.7.2.c	5.5.13	ACTN: Bus 1D inop; No inop equip on 1C	ADMINISTRATIVE:	This function of verifying that there is no loss of function is accomplished by the Safety Function Determination Program.
3.7.2.c	3.8 Deleted	ACTN: Bus 1D inop; Test opposite DG	LESS RESTRICTIVE:	Deleted this additional testing iaw STS and GL 84-15.
3.7.2.d	3.8.9.A	ACTN: Bus 11 inop; Restore w/in 8 hrs	ADMINISTRATIVE:	Requirement unchanged.
3.7.2.d	5.5.13	ACTN: Bus 11 inop; No inop equip on 12	ADMINISTRATIVE:	This function of verifying that there is no loss of function is accomplished by the Safety Function Determination Program.
3.7.2.d	3.8.9.A	ACTN: Bus 12 inop; Restore w/in 8 hrs	ADMINISTRATIVE:	Requirement unchanged.
3.7.2.d	5.5.13	ACTN: Bus 12 inop; No inop equip on 11	ADMINISTRATIVE:	This function of verifying that there is no loss of function is accomplished by the Safety Function Determination Program.
3.7.2.e	3.8.9.A	ACTN: MCC 1&7 inop; Restore w/in 8 hrs	ADMINISTRATIVE:	Requirement unchanged.
3.7.2.e	5.5.13	ACTN: MCC 1&7 inop; No inop equip on good MCCs	ADMINISTRATIVE:	This function of verifying that there is no loss of function is accomplished by the Safety Function Determination Program.
3.7.2.e	3.8.9.A	ACTN: MCC 1&2 inop; Restore w/in 8 hrs	ADMINISTRATIVE:	Requirement unchanged.
3.7.2.e	5.5.13	ACTN: MCC 1&2 inop; No inop equip on good MCCs	ADMINISTRATIVE:	This function of verifying that there is no loss of function is accomplished by the Safety Function Determination Program.
3.7.2.f	3.8.9.C	ACTN: 125VDC Bus 1 inop; Restore w/in 8 hrs	ADMINISTRATIVE:	Requirement unchanged.
3.7.2.f	5.5.13	ACTN: 125VDC Bus 1 inop; No inop equip on Bus 1	ADMINISTRATIVE:	This function of verifying that there is no loss of function is accomplished by the Safety Function Determination Program.
3.7.2.f	3.8.9.C	ACTN: 125VDC Bus 2 inop; Restore w/in 8 hrs	ADMINISTRATIVE:	Requirement unchanged.

TS Number	RTS Number	TS requirement description	Classification and Description of Changes	
3.7.2.f	5.5.13	ACTN: 125VDC Bus 2 inop; No inop equip on Bus 2	ADMINISTRATIVE:	This function of verifying that there is no loss of function is accomplished by the Safety Function Determination Program.
3.7.2.f	3.8 Relocated	ACTN: 125VDC Bus 2 inop; Provide emerg lighting	RELOCATED:	Emergency lighting requirements relocated to the Operating Requirements Manual. Emergency lighting is not addressed in accident analyses, nor in STS. It does not meet any of the criterion in 10 CFR 50.36.
3.7.2.g	3.8.9 B	ACTN: 1 Pref AC bus inop; Restore w/in 8 hrs	ADMINISTRATIVE:	Requirement unchanged.
3.7.2.g	5.5.13	ACTN: 1 Pref AC bus inop; No inop equip on op buses	ADMINISTRATIVE:	This function of verifying that there is no loss of function is accomplished by the Safety Function Determination Program.
3.7.2.h	3.8.4 B.2	ACTN: 1 battery inop; Restore w/in 24 hrs	ADMINISTRATIVE:	Requirement unchanged.
3.7.2.h	3.8.4 B.1	ACTN: 1 battery inop; Run both chgrs on affected bus	ADMINISTRATIVE:	Requirement unchanged.
3.7.2.i	3.8.1.B.3.2	ACTN: 1 DG inop; Test other DG	LESS RESTRICTIVE:	RTS and STS Action 3.8.1 B.3.1 allows an alternative; verification that DG is OPERABLE w/o actual start. Verification that the fault is not common is modeled after STS.
3.7.2.i	3.8.1.b	ACTN: 1 DG inop; Controls on other DG in auto	ADMINISTRATIVE:	If the difficulty with the inop DG involved lineup of controls, Action 3.8.1.B.3.1 would require verifying lineup of controls on the OPERABLE DG.
3.7.2.i	3.8.1.B.4	Actn: Restore DG w/in 7 days/month (for both)	ADMINISTRATIVE:	Requirement unchanged.
3.7.2.i	3.8.1.B.2	ACTN: 1 DG inop; No inop equip on other side	LESS RESTRICTIVE:	The Action wording is changed to that used in STS. The proposed wording allows 4 hrs in Condition 3.8.1.B with inoperable required equipment where the existing requirement allows no time. There is no design feature at PAL which would make the action approved for STS to be inappropriate for PAL.
3.7.2.j	3.8 Relocated	ACTN: Swyd 240 VAC pnl inop; Keep its ACBs operable	RELOCATED:	See 3.7.1.j comment, above.
3.7.2.j	3.8 Relocated	ACTN: Swyd 240 VAC pnl & ACBs inop; Fix w/in 24 hrs	RELOCATED:	See 3.7.1.j comment, above.
3.7.2.j	3.8 Relocated	ACTN: Swyd 240 VAC pnl & ACBs inop; Keep ACBs open	RELOCATED:	See 3.7.1.j comment, above.
3.7.2.k	3.8 Relocated	ACTN: Swyd batt inop; Restore w/in 24 hrs	RELOCATED:	See 3.7.1.j comment, above.
3.7.2.k	3.8 Relocated	ACTN: Swyd batt inop; Both chgrs must be operable	RELOCATED:	See 3.7.1.j comment, above.

TS Number	RTS Number	TS requirement description	Classification and Description of Changes	
3.7.2.1	3.8 Relocated	ACTN: 2400 VAC Bus 1E inop; Restore w/in 24 hrs	RELOCATED:	See 3.7.1.1 comment, above.
3.7.2.m	3.8 Relocated	ACTN: Swyd 125 VDC pnl inop; Keep its ACBs operable	RELOCATED:	See 3.7.1.j comment, above.
3.7.2.m	3.8 Relocated	ACTN: Swyd 125 VDC pnl & ACBs inop; Fix w/in 24 hrs	RELOCATED:	See 3.7.1.j comment, above.
3.7.2.m	3.8 Relocated	ACTN: Swyd 125 VDC pnl & ACBs inop; Keep ACBs open	RELOCATED:	See 3.7.1.j comment, above.
3.7.3	3.8.2	LCO: Bus 1C & 1D AC sources, ≤300°F	ADMINISTRATIVE:	Proposed LCO 3.8.2 requires one offsite source and 1 DG when in MODES 5 & 6. Since an operable offsite source, at PAL, is capable of supplying both Bus 1C and Bus 1D, the proposed requirement for AC sources is equivalent to the existing TS. Proposed LCO 3.8.10 requires AC buses which support required equipment to be operable. These two proposed LCOs contain all of the requirements of existing LCO 3.7.3. The existing LCO is applicable ≤300°F; proposed LCOs 3.8.2 and 3.8.10 are applicable in MODES 5 and 6. Proposed LCOs 3.8.1 and 3.8.9 require the AC sources and buses in MODE 4 (≤300°F and above MODE 5).
3.7.3 A	3.8.2 A.2.1 3.8.2.B.1	ACTN: Source inop; Suspend refueling ops; Immediately	ADMINISTRATIVE:	Requirement unchanged.
3.7.3 B	3.8.2 A.2.2 3.8.2.B.2	ACTN: Source inop; Suspend movement of irradiated fuel	ADMINISTRATIVE:	Requirement unchanged.
3.7.3 C	3.8 Relocated	ACTN: Source Inop; Suspend crane operation; Immediately	RELOCATED:	This action omitted from proposed TS. Heavy Load considerations are to be handled in plant procedures rather than in TS.
3.7.3 D	3.8 Deleted	ACTN: Source inop; Suspend PCS draining; Immediately	LESS RESTRICTIVE:	This action was added to the existing TS due to its existence in an early draft of the STS. Since that time the action has been determined as inappropriate for PWRs and eliminated from STS.
3.7.3 E	3.8.2 A.2.4 3.8.2.B.4	ACTN: Source inop; Initiate action to restore source	ADMINISTRATIVE:	Requirement unchanged.

TS Number	RTS Number	TS requirement description	Classification	Description of Changes
3.17.2.5	3.8.1 F.1	ACTN: sequencer inop; declare DG inop; Immediately	ADMINISTRATIVE:	Requirement Unchanged. The sequencers are addressed as a required part of the Diesel Generators.
3.17.2T#4a	3.8.1	LCO: 2 DBA Sequencers	ADMINISTRATIVE:	The sequencers are addressed in the RTS electrical chapter as a functional part of the Diesel Generator. LCO 3.8.1 provides both Actions and SRs for the sequencers.
3.17.2T#4b	3.8.1	LCO: 2 Shutdown Sequencers	ADMINISTRATIVE:	The sequencers are addressed in the RTS electrical chapter as a functional part of the Diesel Generator. LCO 3.8.1 provides both Actions and SRs for the sequencers.
4.2.2.8	3.8.3.1	SR: DG Fuel Supply; inventory; Daily	ADMINISTRATIVE:	Requirement unchanged.

TS Number	RTS Number	TS requirement description		Classification and Description of Changes	
4.7	3.8		Emergency Power System Periodic Tests		
4.7.1	3.8.1		Diesel Generators		
4.7.1.a	3.8.1.2	SR:	DGs; start manually; 1 Mo	ADMINISTRATIVE:	The timing requirement was reworded to more closely match STS, but to retain the existing requirement to be "ready for loading" within 10 seconds. No change is proposed for the testing frequency.
4.7.1.a	3.8 Relocated	SR:	DGs; alternate tested start ckt; 1 Mo	RELOCATED:	The requirement to test alternate circuits is not included in the proposed wording. Since the DG is not assumed to be single failure proof, the detail of verifying that both of the starting circuits function will be left to the testing procedure, as is done in STS.
4.7.1.a	3.8.1.2	SR:	DGs; verify start time <10 sec; 1 Mo	ADMINISTRATIVE:	Requirement unchanged.
4.7.1.a	3.8.1.3	SR:	DGs; Test load to 2400 Kw; 1 Mo	MORE RESTRICTIVE:	The loading requirement is changed to assure that the DG can supply peak accident loads.
4.7.1.b	3.8.1.14	SR:	DBA DG auto loading; integrated test; Refueling	MORE RESTRICTIVE:	Deleted allowance to test only selected motors. Frequency changed to 18 mo; added requirements on voltage, frequency, and run time iaw STS.
4.7.1.b	3.8.1.13 & 14	LCO:	DBA DG auto loading capability w/in 30 sec	ADMINISTRATIVE:	The 30 sec requirement is replaced by SR 3.8.1.13 verifying design sequencer timing and SR 3.8.1.14 verifying actual loading of equipment onto DG. Essentially unchanged.
4.7.1.c	3.8 Relocated	SR:	DGs; Inspect iaw Alco instructions; Refueling	RELOCATED:	This is a maintenance requirement rather than an operability verification; the equivalent requirement was deleted from STS. The requirement has been relocated to the FSAR.
4.7.1.d	3.8.1.18	SR:	Verify DG [auto connected] loads <750A at 2400V	ADMINISTRATIVE:	Reworded for clarity.
4.7.1.e	3.8.1.7	SR:	Fuel Xfer pumps; verify operable; 1 Mo	LESS RESTRICTIVE:	Frequency changed to 92 days iaw STS and ISI testing of other pumps.
4.7.2.a	3.8.6.1 & 3	SR:	Sta Batt's; Record each cell voltage; 1 Mo	LESS RESTRICTIVE:	Frequency for each cell changed to 92 days iaw STS. Pilot cells required monthly.
4.7.2.a	3.8.6.1	SR:	Sta Batt's; Record 1 pilot cell s.g.; 1 Mo	ADMINISTRATIVE:	Requirement unchanged.

TS Number	RTS Number	TS requirement description	Classification and Description of Changes	
4.7.2.a	3.8.6.2	SR: Sta Batt's; Record 1 pilot cell temp; 1 Mo	ADMINISTRATIVE:	Former 4.7.2.a (temperature of single pilot cell) and 4.7.2.b (temperature of every fifth cell) combined using STS words of "Representative cells". Shorter testing interval (1 month) retained.
4.7.2.b	3.8.6.3	SR: Sta Batt's; Record each cell gravity; 3 Mo	ADMINISTRATIVE:	Requirement unchanged.
4.7.2.b	3.8.6.2	SR: Sta Batt's; Record each 5th cell temp; 3 Mo	ADMINISTRATIVE:	Former 4.7.2.a (temperature of single pilot cell) and 4.7.2.b (temperature of every fifth cell) combined using STS words of "Representative cells". Shorter testing interval (1 month) retained.
4.7.2.b	3.8.6.3	SR: Sta Batt's; Record level & water added; 3 Mo	LESS RESTRICTIVE:	Deleted requirement to record water added.
4.7.2.c	3.8.4.7	SR: Sta Batt's; Service test; Refueling	MORE RESTRICTIVE:	Frequency changed to 18 months iaw STS.
4.7.2.d	3.8.4.8	SR: Sta Batt's; performance test; 1/3 refueling	ADMINISTRATIVE:	Frequency changed to 5 years iaw STS. These frequencies are effectively the same, with 5 years having a positive upper bound.
4.7.2.d	3.8.4.7	XCPT: SR 4.7.2.d (performance test) OK 4 SR 4.7.2.c	ADMINISTRATIVE:	Requirement unchanged.
4.7.3	3.8 Relocated	SR: Emerg Light outside CB; verify operable; 1 year	RELOCATED:	Relocated to the Operating Requirements Manual.
4.7.3	3.8 Relocated	SR: Emerg Light in CB; verify operable; before head off	RELOCATED:	Relocated to the Operating Requirements Manual.
4.17.2T#4a-cft	3.8.1.13	SR: DBA Sequencers; Chnl Func Test; 92 days	ADMINISTRATIVE:	Requirement unchanged. Moved to electrical section as part of DG operability.
4.17.2T#4a-cal	3.8.1.13	SR: DBA Sequencers; Chnl Cal; 18 mo	ADMINISTRATIVE:	Requirement unchanged. Moved to electrical section as part of DG operability.
4.17.2T#4b-cft	3.8.1.13	SR: Shutdown Sequencers; Chnl Func Test; 18 mo	ADMINISTRATIVE:	Requirement unchanged. Moved to electrical section as part of DG operability.
4.17.2T#4b-cal	3.8.1.13	SR: Shutdown Sequencers; Chnl Cal; 18 mo	ADMINISTRATIVE:	Requirement unchanged. Moved to electrical section as part of DG operability.

ATTACHMENT 4

CONSUMERS POWER COMPANY
PALISADES PLANT
DOCKET 50-255

STS CONVERSION TECHNICAL SPECIFICATION CHANGE REQUEST

3.8 ELECTRICAL POWER SYSTEMS PART

STS Pages Marked to Show the Differences Between RTS and STS

3.8 ELECTRICAL POWER SYSTEMS

3.8.1 AC Sources - Operating

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

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

b. Two ~~d~~Diesel ~~g~~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 (Offsite Source Check) 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)~~
	~~AND~~		(continued)

ACTIONS

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

ACTIONS

CONDITION	REQUIRED ACTION		COMPLETION TIME
B. (continued)	B.4	Restore ~~[required]~~ DG to OPERABLE status.	~~72 hours~~ Such that the total time when any required DG is inoperable does not exceed 7 days (total for both) during any calendar month. ~~AND~~ ~~6 days from discovery of failure to meet LCO~~
C. Two ~~[required]~~ offsite circuits inoperable.	C.1	Declare required feature~~(s)~~ inoperable when ~~its~~ their redundant required feature~~(s)~~ is inoperable.	12 hours from discovery of Condition C concurrent with inoperability of redundant required feature~~(s)~~
	AND		
	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 ~~[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
E. Two ~~[required]~~ DGs inoperable.	E.1 Restore one ~~[required]~~ DG to OPERABLE status.	2 hours
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]~~ or both ~~[~~automatic load sequencers~~]~~ inoperable.	F.1 ~~Restore [required] [automatic load sequencer] to OPERABLE status.~~ Declare affected DGs inoperable.	~~[12] hours~~ Immediately

(continued)

ACTIONS (continued)

CONDITION	REQUIRED ACTION	COMPLETION TIME
G. Fuel Oil Transfer Pump P-18A inoperable.	G.1 Declare DG 1-2 inoperable.	24 hours
H. Fuel Oil Transfer Pump P-18B inoperable.	H.1 Restore P-18B to OPERABLE status.	7 days
I. Both Fuel Oil Transfer pumps inoperable.	I.1 Restore one Fuel Oil Transfer pump to OPERABLE status.	8 hours
~~G~~J. Required Action and Associated Completion Time of Condition A, B, C, D, ~~[or]~~ E~~[~~, ~~or~~ F,~~]~~ G, H, OR I not met.	~~G.1~~J.1 Be in MODE 3. AND ~~G.2~~J.2 Be in MODE 5.	6 hours 36 hours
~~H~~K. Three or more ~~[~~required~~]~~ AC sources inoperable.	~~H.1~~K.1 Enter LCO 3.0.3.	Immediately

SURVEILLANCE REQUIREMENTS

SURVEILLANCE		FREQUENCY
SR 3.8.1.1	Verify correct ~~breaker~~ alignment and ~~indicated power availability~~ voltage 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 conditions and ~~achieves~~ is ready for loading in ≤ 10 seconds, and achieves steady state voltage ≥ ~~[3740]~~2280 V and ≤ ~~[4580]~~2520 V, and frequency ≥ ~~[~~59.5~~]~~ Hz and ≤ ~~[~~61.2~~]~~ Hz.	~~As specified in Table 3.8.1-1~~ 31 days

(continued)

SURVEILLANCE REQUIREMENTS (continued)

SURVEILLANCE		FREQUENCY
SR 3.8.1.3	------------------NOTE~~S~~------------------ ~~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; for ≥ 15 minutes at a load above its peak accident loading, and for the remainder of the test at a load ≥ ~~[4500]~~2300 kW and ≤ ~~[5000]~~2500 kW.	~~As specified in Table 3.8.1-1~~ 31 days
SR 3.8.1.4	Verify each DG starting air tank pressure is ≥ 200 psig.	31 days
SR 3.8.1.4~~5~~	Verify each DG day tank ~~[and engine mounted tank]~~ contains ≥ ~~[220] gal~~2500 gallons of fuel oil.	31 days
SR 3.8.1.6	Verify each fuel oil transfer pump and the fuel oil transfer system controls operate to transfer fuel oil from the fuel oil storage tank to each DG day tank and engine mounted tank.	92 days
~~SR 3.8.1.5~~	~~Check for and remove accumulated water from each day tank [and engine mounted tank].~~	~~[31] days~~

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 ≥ [58.8] Hz and ≤ [61.2] Hz.~~	~~184~~ days

(continued)

SR 3.8.1.~~8~~7	-------------------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~~ the safety related buses from the normal ~~offsite circuit to each alternate [required] offsite circuit.~~ AC source to Startup Transformer 1-2.	[18 months]

(continued)

SURVEILLANCE REQUIREMENTS (continued)

SURVEILLANCE		FREQUENCY
SR 3.8.1.~~9~~8	---NOTE~~S~~--- ~~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]~~68 Hz; b. Within ~~[~~3~~]~~ seconds following load rejection, the voltage is ≥ ~~[3740]~~2280 V and ≤ ~~[4580]~~2640 V; and c. Within ~~[~~3~~]~~ seconds following load rejection, the frequency is ≥ ~~[58.8~~59.5~~]~~ Hz and ≤ ~~[61.2]~~61.5 Hz.	~~[~~18 months~~]~~
SR 3.8.1.~~10~~9	~~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]~~4000 V during and following a load rejection of ≥ ~~[4500]~~2300 kW and ≤ ~~[5000]~~2500 kW.	~~[~~18 months~~]~~

(continued)

SURVEILLANCE REQUIREMENTS (continued)

	SURVEILLANCE	FREQUENCY
SR 3.8.1.1~~1~~0	-------------------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. ~~e~~Energizes permanently connected loads in ≤ ~~[~~10~~]~~ seconds~~,~~; 2. ~~e~~Energizes auto-connected shutdown loads through ~~[~~automatic load sequencer~~],~~; 3. ~~m~~Maintains steady state voltage ≥ ~~[3740]~~2280 V and ≤ ~~[4580]~~2520 V~~,~~; 4. ~~m~~Maintains steady state frequency ≥ ~~[58.8~~59.5~~]~~ Hz and ≤ ~~[~~61.2~~]~~ Hz~~,~~; and 5. ~~s~~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 or 2. However, credit may be taken for unplanned events that satisfy this SR.~~ ~~Verify on an actual or simulated Engineered Safety Feature (ESF) actuation signal each DG auto starts from standby condition and:~~ ~~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] Hz and ≤ [61.2] Hz;~~ ~~c. Operates for ≥ 5 minutes;~~ ~~d. Permanently connected loads remain energized from the offsite power system; and~~ ~~e. Emergency loads are energized [or auto connected through the automatic load sequencer] from the offsite power system.~~	~~[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; [and]~~ ~~b. Generator differential current[;~~ ~~c. Low lube oil pressure;~~ ~~d. High crankcase pressure; and~~ ~~e. Start failure relay].~~	~~[18 months]~~
SR 3.8.1.~~14~~11	NOTE~~S~~ ~~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] hours~~ 100 minutes loaded ~~≥ [5250] kW and ≤ [5500] kW;~~ above its peak accident load; and b. For the remaining hours of the test loaded ≥ ~~[4500]~~2300 kW and ≤ ~~[5000]~~2500 kW.	~~[~~18 months~~]~~

(continued)

SURVEILLANCE REQUIREMENTS (continued)

SURVEILLANCE		FREQUENCY
~~SR 3.8.1.15~~	~~NOTES~~ ~~1. This Surveillance shall be performed within 5 minutes of shutting down the DG after the DG has operated ≥ [2] hours loaded ≥ [4500] kW and ≤ [5000]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] Hz and ≤ [61.2] Hz.~~	~~[18 months]~~
SR 3.8.1.~~16~~12	------------------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~~ Can be synchronized with offsite power source while loaded with ~~emergency loads~~ its associated 2400 volt bus upon a simulated restoration of offsite power; b. ~~Transfers~~ Can transfer loads to offsite power source; and c. ~~Returns~~ Can be returned to ready-to-load operation.	~~[~~18 months~~]~~

SURVEILLANCE REQUIREMENTS (continued)

	SURVEILLANCE	FREQUENCY
~~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]~~
SR 3.8.1.~~18~~13	------------------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% of design interval] for each emergency [and shutdown] load sequencer.~~ Verify the time of each sequenced load is within 0.1 seconds of the design timing for each automatic load sequencer.	~~[~~18 months~~]~~

(continued)

SURVEILLANCE REQUIREMENTS (continued)

SURVEILLANCE		FREQUENCY
SR 3.8.1.~~19~~14	-------------------NOTE~~S~~----------------- ~~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. ~~e~~Energizes permanently connected loads in ≤ ~~[~~10~~]~~ seconds~~,~~; 2. ~~e~~Energizes auto-connected emergency loads through automatic ~~[~~load sequencer~~],~~; 3. ~~a~~Achieves steady state voltage ≥ ~~[3740]~~2280 V and ≤ ~~[4580]~~2520 V~~,~~; 4. ~~a~~Achieves steady state frequency ≥ ~~[58.8~~59.5~~]~~ Hz and ≤ ~~[~~61.2~~] Hz,~~; and 5. ~~s~~Supplies permanently connected ~~[and auto connected] emergency~~ loads for ≥ ~~[~~5~~]~~ minutes.	~~[~~18 months~~]~~

(continued)

SURVEILLANCE REQUIREMENTS (continued)

SURVEILLANCE		FREQUENCY
SR 3.8.1.15	Verify, by analytical means, that diesel generator steady state automatically connected electric loads do not exceed the continuous rating of 750 amp at 2400 volts.	18 months
~~SR 3.8.1.20~~	~~NOTE~~ ~~All DG starts may be preceded by an engine prelube period.~~ ~~Verify, when started simultaneously from standby condition, each DG achieves, in ≤ [10] seconds, voltage ≥ [3740] V and ≤ [4580] V, and frequency ≥ [58.8] Hz and ≤ [61.2] Hz.~~	~~10 years~~

~~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.~~]

3.8 **ELECTRICAL POWER SYSTEMS**

3.8.2 AC Sources—Shutdown

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

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

b. One ~~d~~Diesel ~~g~~Generator (DG) capable of supplying one train of the onsite Class 1E AC electrical power distribution subsystem~~(s)~~ required by LCO 3.8.10.

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

ACTIONS

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 of electrical power distribution 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
	AND		
	A.2.3	Initiate action to suspend operations involving positive reactivity additions.	Immediately
	AND		
	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
	AND		
	B.2	Suspend movement of irradiated fuel assemblies.	Immediately
	AND		
	B.3	Initiate action to suspend operations involving positive reactivity additions.	Immediately
	AND		
	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 following SRs ~~of Specification 3.8.1, "AC Sources—Operating," except SR 3.8.1.8, SR 3.8.1.17, and SR 3.8.1.20,~~ are applicable: SR 3.8.1.1, Offsite Source Check SR 3.8.1.2, DG Starting Test SR 3.8.1.4, DG Starting Air Check SR 3.8.1.5, DG Day Tank Level Check SR 3.8.1.6, Fuel Transfer Check SR 3.8.1.15, DG Load Verification	In accordance with applicable SRs

3.8 ELECTRICAL POWER SYSTEMS

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

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

APPLICABILITY: When ~~associated~~ any 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~~ With stored fuel oil ~~level~~ inventory < ~~[33,000]~~ 23,700 gallons and > ~~[28,285]~~ 20,110 gallons ~~in storage tank~~.	A.1 Restore stored fuel oil ~~level~~ inventory to within limits.	48 hours
B. ~~One or more DGs with~~ With stored lube oil inventory < ~~[500]~~175 gallons and > ~~[425]~~150 gallons.	B.1 Restore stored lube oil inventory to within limits.	48 hours
C. ~~One or more DGs~~ with stored fuel oil ~~total particulates~~ viscosity, or water and sediment not within limits.	C.1 Restore stored fuel oil ~~total particulates~~ viscosity, and water and sediment to within limits.	7 days

(continued)

ACTIONS (continued)

CONDITION	REQUIRED ACTION	COMPLETION TIME
D. ~~One or more DGs~~ with ~~new~~ stored fuel oil properties not within limits for reasons other than Condition C.	D.1 Restore stored fuel oil properties to within limits.	~~30~~31 days
~~E. One or more DGs with starting air receiver pressure < [225] psig and ≥ [125] psig.~~	~~E.1 Restore starting air receiver pressure to ≥ [225] psig.~~	~~48 hours~~
~~F~~E Required Action and associated Completion Time not met. OR ~~One or more DGs with~~ With stored ~~diesel~~ fuel ~~oil,~~ or lube oil~~, or starting air subsystem~~ not within limits for reasons other than Condition A, B, ~~C,~~ or D~~, or E~~.	~~F~~E.1 Declare ~~associated~~ both DGs inoperable.	Immediately

SURVEILLANCE REQUIREMENTS

	SURVEILLANCE	FREQUENCY
SR 3.8.3.1	Verify ~~each~~ the fuel oil storage tank contains ≥ ~~[33,000]~~ 23,700 gallons of fuel oil.	~~31 days~~ 24 hours
SR 3.8.3.2	Verify ~~lubricating~~ lube oil inventory is ≥ ~~[500]~~175 gallons.	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 air start receiver pressure is ≥ [225] psig.~~	~~31 days~~
SR 3.8.3.~~5~~4	Check for and remove excess accumulated water from ~~each~~ the ~~F~~fuel ~~O~~oil ~~S~~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~~

3.8 ELECTRICAL POWER SYSTEMS

3.8.4 DC Sources - Operating

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

a. Station battery D01 and charger D15; and

b. Station battery D02 and charger D16.

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

ACTIONS

CONDITION	REQUIRED ACTION	COMPLETION TIME
A. One required charger inoperable.	A.1 Place cross-connected charger for affected battery in service. AND A.2 Restore required charger to OPERABLE status.	Immediately 7 days
~~A~~B. One ~~DC electrical power subsystem~~ battery inoperable.	B.1 Place both chargers in service for the affected battery. AND ~~A.1~~B.2 Restore ~~DC electrical power subsystem~~ battery to OPERABLE status.	Immediately ~~2 hours~~ 24 hours
~~B~~C. Required Action and associated Completion Time not met.	~~B~~C.1 Be in MODE 3. AND ~~B~~C.2 Be in MODE 5.	6 hours 36 hours

SURVEILLANCE REQUIREMENTS

SURVEILLANCE		FREQUENCY
SR 3.8.4.1	Verify battery terminal voltage is ≥ ~~[129/258]~~ 123 V on float charge.	7 days
SR 3.8.4.2	Verify no visible corrosion at battery terminals and connectors. OR Verify each battery connection resistance ~~[is ≤ [1E 5ohm] 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].~~ is ≤ 120% of the resistance measured during installation.	92 days
SR 3.8.4.3	~~Verify~~ Inspect battery cells, cell plates, and racks ~~show no~~ for visual indication of physical damage or abnormal deterioration.	~~[~~12~~]~~ 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.	~~[~~12~~]~~ months
SR 3.8.4.5	Verify each 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].~~ is ≤ 120% of the resistance measured during installation.	~~[~~12~~]~~ months
SR 3.8.4.6	~~NOTE~~ ~~This Surveillance shall not be performed in MODE 1, 2, 3, or 4. However, credit may betaken for unplanned events that satisfy this SR.~~ Verify each required battery charger supplies ≥ ~~[400]~~180 amps at ≥ ~~[~~125~~/250]~~ V for ≥ ~~[~~8~~]~~ hours.	~~[~~18 months~~]~~

SURVEILLANCE REQUIREMENTS (continued)

SURVEILLANCE		FREQUENCY
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 ≥ ~~[~~80~~]~~% 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~~]~~% of the expected life with capacity < 100% of manufacturer's rating AND 24 months when battery has reached ~~[~~85~~]~~% of the expected life with capacity ≥ 100% of manufacturer's rating

3.8 ELECTRICAL POWER SYSTEMS

3.8.5 DC Sources - Shutdown

LCO 3.8.5 The DC electrical power ~~subsystem~~ sources 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.

ACTIONS

CONDITION	REQUIRED ACTION	COMPLETION TIME
A. One or more required DC electrical power ~~subsystems~~ source 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.	
	<u>AND</u>	

Immediately

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

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~~ SR 3.8.4.1, Float Voltage Check SR 3.8.4.2, Connector Condition Check SR 3.8.4.3, Battery Physical Inspection SR 3.8.4.4, Connector Cleaning and Coating SR 3.8.4.5, Connector Resistance Check	In accordance with applicable SRs

3.8 ELECTRICAL POWER SYSTEMS

3.8.6 Battery Cell Parameters

LCO 3.8.6 The Battery cell parameters for the ~~Train A and Train B batteries~~ Station Batteries D01 and D02 shall be within the limits of Table 3.8.6-1 and the average temperature of representative cells shall be ≥ 70°F.

APPLICABILITY: When associated DC electrical power ~~subsystems are~~ source is 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 cell~~[s]~~ 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]~~70°F. OR One or more batteries with one or more battery cell parameters not within Category C ~~values~~ 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~~31 days
SR 3.8.6.~~2~~3	Verify battery cell parameters meet Table 3.8.6-1 Category B limits.	92 days AND ~~Once within 24 hours after battery discharge < [110] V~~ ~~AND~~ ~~Once within 24 hours after battery overcharge > [150] V~~
SR 3.8.6.~~3~~2	Verify average electrolyte temperature of representative cells is ≥ ~~[60]~~70°F.	~~92~~31 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	≥ 2.13 V	≥ 2.13 V	> 2.07 V
Specific Gravity(b)(c)	≥ [1.200]	~~≥ [1.195]~~ ≥ 1.200	Not more than 0.020 below average connected cells <u>AND</u> Average of all connected cells ~~≥ [1.195]~~ ≥ 1.190

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

(b) Corrected for electrolyte temperature 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 D06, D07, D08, and D09 shall be OPERABLE.

~~NOTE~~

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

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

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

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~~ Preferred AC 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.	6 hours
	AND		
	B.2	Be in MODE 5.	36 hours

SURVEILLANCE REQUIREMENTS

SURVEILLANCE		FREQUENCY
SR 3.8.7.1	Verify correct inverter voltage, ~~[~~frequency,~~]~~ and alignment to ~~required~~ Preferred AC ~~vital~~ buses.	7 days

3.8 **ELECTRICAL POWER SYSTEMS**

3.8.8 Inverters - Shutdown

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

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

ACTIONS

CONDITION	REQUIRED ACTION	COMPLETION TIME
A. One or more ~~{required}~~ inverters inoperable.	A.1 Declare affected required feature~~(s)~~ inoperable.	Immediately
	OR	
	A.2.1 Suspend CORE ALTERATIONS.	Immediately
	AND	
	A.2.2 Suspend movement of irradiated fuel assemblies.	Immediately
	AND	
	A.2.3 Initiate action to suspend operations involving positive reactivity additions.	Immediately
	AND	
	A.2.4 Initiate action to restore required inverters to OPERABLE status.	Immediately

SURVEILLANCE REQUIREMENTS

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

3.8 **ELECTRICAL POWER SYSTEMS**

3.8.9 Distribution Systems - Operating

LCO 3.8.9 ~~Train A and Train B~~ The left and right trains of AC, DC, and Preferred AC ~~vital bus~~ electrical power distribution subsystems shall be OPERABLE.

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

ACTIONS

CONDITION	REQUIRED ACTION	COMPLETION TIME
A. One AC electrical power distribution subsystem 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 Preferred AC ~~vital~~ bus inoperable.	B.1 Restore Preferred AC ~~vital~~ bus ~~subsystem~~ to OPERABLE status.	~~2~~8 hours ~~AND~~ ~~16 hours from discovery of failure to meet LCO~~
C. One DC electrical power distribution subsystem inoperable.	C.1 Restore DC electrical power distribution subsystem to OPERABLE status.	~~2~~8 hours ~~AND~~ ~~16 hours from discovery of failure to meet LCO~~

(continued)

ACTIONS (continued)

CONDITION	REQUIRED ACTION		COMPLETION TIME
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 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 Preferred AC ~~vital bus~~ electrical power distribution subsystems.	7 days

3.8 ELECTRICAL POWER SYSTEMS

3.8.10 Distribution Systems - Shutdown

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

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

ACTIONS

CONDITION	REQUIRED ACTION	COMPLETION TIME
A. One or more required AC, DC, or Preferred AC ~~vital bus~~ electrical power distribution subsystems inoperable.	A.1 Declare ~~associated supported~~ 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 actions to restore required AC, DC, and Preferred AC ~~vital bus~~ electrical power distribution subsystems to OPERABLE status.	Immediately
	AND		
	A.2.5	Declare ~~associated~~ affected required shutdown cooling ~~sub~~system~~(s)~~ inoperable and not in operation.	Immediately

SURVEILLANCE REQUIREMENTS

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

ATTACHMENT 5

CONSUMERS POWER COMPANY
PALISADES PLANT
DOCKET 50-255

STS CONVERSION TECHNICAL SPECIFICATION CHANGE REQUEST

3.8 ELECTRICAL POWER SYSTEMS PART

STS Bases Pages Marked to Show the Differences Between RTS and STS

B 3.8 **ELECTRICAL POWER SYSTEMS**

B 3.8.1 AC Sources - Operating

BASES

BACKGROUND

The ~~unit~~ plant 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 1-1 and 1-2 (DGs)~~)~~. As required by 10 CFR 50, Appendix A, GDC 17 (Ref. 1), the design of the AC electrical power system provides independence and redundancy to ensure an available source of power to the Engineered Safety Feature (ESF) systems.

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

~~Offsite power is supplied to the unit switchyard(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 transformers], to the 4.16 kV ESF buses. A detailed description of the offsite power network and the circuits to the Class 1E ESF buses is found in the FSAR, Chapter [8] (Ref. 2).~~

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

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

BASES

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

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

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

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

The AC power system at Palisades consists of a 345 kV switchyard, three circuits connecting the plant with offsite power (station power, startup, and safeguards transformers), the on-site distribution system, and two DGs. The on-site distribution system is divided into safety related (Class 1-E) and non-safety related portions.

BASES

The switchyard interconnects six transmission lines from the off-site transmission system and the output line from the Palisades main generator. These lines are connected in a "breaker and a half" scheme between the front (F) and Rear (R) buses such that any single off-site line may supply the Palisades station loads when the plant is shutdown.

Two circuits supplying Palisades 2400 volt buses from off-site are fed directly from a switchyard buses through the startup and safeguards transformers. They are available both during operation and during shutdown. The third circuit supplies the plant loads by "back feeding" through the main generator output circuit and station power transformers after the generator has been disconnected by a motor operated disconnect.

The station power transformers are connected into the main generator output circuit. Station power transformers 1-1 and 1-2 connect to the generator 22 kV output bus. Station power transformer 1-3 connects to the generator output line on the high voltage side of the main transformer. Station power transformers 1-1 and 1-3 supply non-safety related 4160 volt loads during plant power operation and during backfeeding operations. Station power transformer 1-2 can supply both safety related and non-safety related 2400 volt loads during plant power operation or backfeeding operation.

The three startup transformers are connected to a common 345 kV overhead line from the switchyard R bus. Startup transformers 1-1 and 1-3 supply 4160 volt non-safety related station loads, and startup transformer 1-2 can supply both safety related and non-safety related 2400 volt loads. The startup transformers are available during operation and shutdown.

Safeguards transformer 1-1 is connected to the switchyard F bus. It feeds station 2400 volt loads through an underground line. It is available to supply for these loads during operation and shutdown.

BASES

The onsite distribution system consists of seven main distribution buses (4160 volt buses 1A, 1B, 1F, and 1G, and 2400 volt buses 1C, 1D, and 1E) and supported lower voltage buses, Motor Control Centers (MCCs), and lighting panels. The 4160 volt buses and 2400 volt bus 1E are not safely related. Buses 1C and 1D and their supported buses and MCCs form two independent, redundant, safety related distribution trains. Each distribution train supplies one train of engineered safety features equipment.

In the event of a generator trip, all loads supplied by the station power transformers are automatically transferred to the startup transformers. Loads supplied by the safeguards transformer are unaffected by a plant trip. If power is lost to the safeguards transformer, the 2400 volt loads will automatically transfer to startup transformer 1-1. If the startup transformers are not energized when either of these transfers occur, their output breakers will be blocked from closing and the 2400 volt safety related buses will be energized by the DGs.

The two DGs each supply one 2400 volt bus. They provide backup power in the event of loss of off-site power, or loss of power to the associated 2400 volt bus. The continuous rating of the diesel generators is 2500 kW, with 110 percent overload permissible for 2 hours in any 24 hour period. The required fuel in the Fuel Oil Storage Tank and the DG Day Tank will supply one DG for a minimum period of 7 days assuming accident loading conditions and fuel conservation practices.

If either 2400 volt bus, 1C or 1D, experiences a sustained undervoltage, the associated DG is started, the affected bus is separated from its offsite power sources, major loads are stripped from that bus and its supported buses, the DGs are connected to the bus, and ECCS or shutdown loads are started by an automatic load sequencer.

The DGs share a common fuel oil storage and transfer system. A single buried Fuel Oil Storage Tank is used to maintain the required fuel oil inventory. Testing has shown that each DG consumes about 2.6 gallons of fuel oil per minute at 2400 kW. Each day tank is required to contain at least 2500 gallons. Therefore, each fuel oil day tank contains sufficient fuel for more than 15 hours of full load (2500 kW) operation. Beyond that time, a fuel oil transfer pump is required for continued DG operation.

BASES

Two fuel oil transfer pumps are provided. The fuel oil transfer pumps are necessary for long term operation of the DGs. Either fuel oil transfer pump is capable of supplying either DG. However, each fuel oil transfer pump is not capable, with normally available switching, of being powered from either DG. DG 1-1 can power either fuel oil transfer pump, but DG 1-2 can only power P-18A.

Fuel oil transfer pump P-18A is powered from MCC-8, which is normally connected to Bus 1D (DG 1-2) through Station Power Transformer 12 and Load Center 12. In an emergency, P-18A can be powered from Bus 1C (DG 1-1) by cross connecting Load Centers 11 and 12.

Fuel oil transfer pump P-18B is powered from MCC-1, which is normally connected to Bus 1C (DG 1-1) through Station Power Transformer 19 and Load Center 19. P-18B cannot be powered, using installed equipment, from Bus 1D (DG 1-2).

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

The safety analyses do not explicitly address AC electrical power. They do, however, assume that the Engineered Safety Features (ESF) are available. The OPERABILITY of the ESF functions is supported by the AC Power Sources.

The design requirements are for each assumed safety function to be available under the following conditions:

a. The occurrence of an accident or transient,

b. The resultant consequential failures,

c. A worst case single active failure,

d. Loss of all offsite or all onsite AC power, and

BASES

e. The most reactive control rod fails to insert.

One proposed mechanism for the loss of off-site power is a perturbation of the transmission grid because of the loss of the plant's generating capacity. A loss of off-site power as a result of a generator trip can only occur in MODE 1, with the generator connected to the grid. However, it is also assumed in analysis for events in MODE 2, such as a steam line break or control rod ejection at zero power. No specific mechanism for initiating a loss of off-site power when the plant is not on the line is discussed in the FSAR.

In most cases, it is conservative to assume that off-site power is lost concurrent with the accident and that the single failure is that of a diesel generator. That would leave only one train of safeguards equipment to cope with the accident, the other being disabled by the loss of AC power. Those analyses which assume that a loss of off-site power and failure of a single diesel generator accompany the accident also assume 10 seconds for the DG to start and connect to the bus, and additional time for the sequencer to start each safeguards load.

The same assumptions are not conservative for all accident analyses. When analyzing the effects of a steam or feed line break, the loss of the condensate and feedwater pumps would reduce the steam generator inventory, so a loss of off-site power is not assumed.

In MODES 5 and 6, loss of off-site power is treated as an initiating event.

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

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

~~b. A worst case single failure.~~

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

BASES

LCO

Two qualified circuits between the offsite transmission network and the onsite Class 1E Electrical Power Distribution System and ~~separate and~~ an independent DG~~s~~ for each safeguards 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.

General Design Criterion 17 requires, in part, that: "Electric power from the transmission network to the onsite electric distribution system shall be supplied by two physically independent circuits (not necessarily on separate rights of way) designed and located so as to minimize to the extent practical the likelihood of their simultaneous failure under operating and postulated accident and environmental conditions."

The qualified offsite circuits available are Safeguards Transformer 1-1 and Startup Transformer 1-2. Station Power Transformer 1-2 is not qualified as a required source for LCO 3.8.1 since it is not independent of the other two offsite circuits. This LCO does not prohibit use of Station Power Transformer to power the 2400 safety related buses, but the two qualified sources must be OPERABLE.

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

Each offsite circuit must be capable of maintaining ~~rated~~ acceptable frequency and voltage, and accepting required loads during an accident, while ~~connected to the ESF buses~~ while supplying the 2400 volt safety related 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 transformer, which, in turn, powers the #2 ESF bus through its normal feeder breaker.~~

BASES

Following a loss of offsite power, Each DG must be capable of starting, ~~accelerating to rated speed and voltage,~~ and connecting to its respective ~~ESF~~ 2400 volt bus on detection of bus undervoltage. This will be accomplished within ~~[~~10~~]~~ seconds after receipt of a DG start signal.. 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~~2400 volt safety related buses. ~~These capabilities are required to be met from a variety of initial conditions such as DG in standby with the engine hot and DG in standby with the engine at ambient conditions. Additional DG capabilities must be demonstrated to meet required Surveillances, e.g., capability of the DG to revert to standby status on an ECCS signal while operating in parallel test mode.~~

Proper sequencing of loads~~,~~ and ~~[including~~ tripping of nonessential loads~~,] is a~~ are required functions 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~~

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

BASES

The AC sources are required to be OPERABLE in MODES 1, 2, 3, and 4 to ensure that redundant sources of off-site and on-site AC power are available to support engineered safeguards equipment in the event of an accident or transient. The AC sources also support the equipment necessary for power operation, plant heatups and cooldowns, and shutdown operation.

The AC ~~power~~ sources requirements for MODES 5 and 6 are ~~covered~~ addressed 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.~~

~~A.2~~

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

BASES

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

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

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

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

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

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

BASES

A.~~3~~2

According to the recommendations of Regulatory Guide (RG) 1.93 (Ref. ~~6~~2), operation may continue in Condition A for a period that should not exceed 72 hours. With one offsite circuit inoperable, the reliability of the offsite system is degraded, and the potential for a loss of offsite power is increased, with attendant potential for a challenge to the ~~unit~~ plant safety systems. In this Condition, however, the remaining OPERABLE offsite circuit and DGs are adequate to supply electrical power to the onsite Class 1E Distribution System.

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

~~The second Completion Time for Required Action A.3 establishes a limit on the maximum time allowed for any combination of required AC power sources to be inoperable during any single contiguous occurrence of failing to meet the LCO. If Condition A is entered while, for instance, a DG is inoperable, and that DG is subsequently returned OPERABLE, the LCO may already have been not met for up to 72 hours. This could lead to a total of 144 hours, since initial failure to meet the LCO, to restore the offsite circuit. At this time, a DG could again become inoperable, the circuit restored OPERABLE, and an additional 72 hours (for a total of 9 days) allowed prior to complete restoration of the LCO. The 6 day Completion Time provides a limit on the time allowed in a specified condition after discovery of failure to meet the LCO. This limit is considered reasonable for situations in which Conditions A and B are entered concurrently. The "AND" connector between the 72 hour and 6 day Completion 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.~~

BASES

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.

~~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

The requirement to declare required features inoperable carries with it the requirement to take those actions required by the LCO for that required equipment, as stipulated by LCO 3.0.6.

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.

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~~ Completion Time "clock." In this Required Action, the Completion Time only begins on discovery that both:

BASES

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 supporting or supported features, or both, that are associated with the OPERABLE DG, results in starting the Completion Time for ~~the~~ Required Action B.2. 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~~ plant 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 (test starting of the OPERABLE DG) does not have to be performed. If the cause of inoperability exists on other DG(s), the other DG(s) would be declared inoperable upon discovery and Condition 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 not exist on the remaining DG(s), performance of SR 3.8.1.2 suffices to provide assurance of continued OPERABILITY of that DG.

BASES

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]~~system ~~will~~ would normally 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 Regulatory Guide 1.93 (Ref. 6), operation may continue in Condition B for a period that should not exceed 72 hours.~~

In Condition B, the remaining OPERABLE DG and offsite circuits are adequate to supply electrical power to the onsite Class 1E Distribution System for a limited period. ~~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 Completion Time, which limits the time when any required DG is not OPERABLE to 7 days (total for both DGs) in any calendar month, is a feature of the original Palisades licensing basis.

~~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 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 9 days) allowed prior to complete restoration of the LCO. The 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 and B are entered concurrently. The "AND" connector between the 72 hour and 6 day Completion Times means that both~~

BASES

~~Completion Times apply simultaneously, and the more restrictive Completion Time must be met.~~

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

C.1 and C.2

The requirement to declare required features inoperable carries with it the requirement to take those actions required by the LCO for that required equipment, as stipulated by LCO 3.0.6.

Required Action C.1, which applies when two required 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~~ recommends 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.~~

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.

BASES

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.

C.2

According to the recommendations of 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~~ plant 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.

BASES

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

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.

According to the recommendations of RG 1.93, operation may continue in Condition D for a period that should not exceed 12 hours.

BASES

E.1

With ~~Train A and Train B~~ both DGs inoperable, there are no remaining standby AC sources. Thus, with an assumed loss of offsite electrical power, ~~insufficient standby~~ no AC sources ~~are~~ would be 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.

According to ~~Reference 6~~the recommendations of RG 1.93, with both DGs inoperable, operation may continue for a period that should not exceed 2 hours.

F.1

The sequencer~~(s)~~ is an essential support system to ~~[both the offsite circuit~~ 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]automatic load 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.~~ With the sequencer inoperable, the DG is unable to perform its specified function, and must thereby be immediately declared to be inoperable.

BASES

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

G.1, H.1, and I.1

Since DG 1-2 cannot power fuel oil transfer pump P-18B, without P-18A, DG 1-2 becomes dependant on offsite power or DG 1-1 for its fuel supply (beyond the 15 hours it will operate on the day tank), and does not meet the LCO requirement for independence. Since the condition is not as severe as the DG itself being inoperable, 24 hours is allowed to restore the fuel oil transfer pump to operable status prior to declaring the DG inoperable.

Without P-18B, either DG can still provide power to the remaining fuel oil transfer pump, neither DG is directly affected. Continued operation with a single remaining fuel oil transfer pump, however, must be limited since an additional single active failure (P-18A) could disable the onsite power system. Because the loss of P-18B is less severe than the loss of one DG, a 7 day Completion Time is allowed.

If both fuel oil transfer pumps are inoperable, the onsite AC sources are limited to about 15 hours duration. Since this condition is not as severe as both DGs being inoperable, 8 hours is allowed to restore one fuel oil transfer pump to OPERABLE status.

BASES

~~G.1 and G.2~~ J.1 and J.2

If the inoperable AC ~~electrical~~ power sources cannot be restored to OPERABLE status within the required Completion Time, the ~~unit~~ plant must be brought to a MODE in which the LCO does not apply. To achieve this status, the ~~unit~~ 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 ~~unit~~ plant conditions from full power conditions in an orderly manner and without challenging ~~unit~~ plant systems.

~~H.1~~ K.1

Condition ~~H~~K 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 (RG) 1.9 ~~(Ref. 3), Regulatory Guide 1.108 (Ref. 9),~~ and ~~Regulatory Guide~~ RG 1.137 ~~(Ref. 10), as addressed in the FSAR~~.

BASES

Where the SRs discussed herein specify voltage and frequency tolerances for the DG operated in the "Unit" mode, the following is applicable. The minimum steady state output voltage of ~~[3740] V~~2280 volts is ~~90%~~95% of the nominal ~~4160 V output voltage~~2400 volt generator rating. This value is above the setting of the primary undervoltage relays (127-1 and 127-2) and above the minimum analyzed acceptable bus voltage.~~, which is specified in 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~~volt 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~~2520 volts is 105% of the nominal generator rating. It is also below the maximum voltage rating of the safeguards motors, 2530 volts.~~ 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~~59.5 Hz and 61.2 Hz, respectively. The minimum value assures that ESF pumps provide sufficient flow to meet the accident analyses. The maximum value is ~~These values are~~ equal to ~~± 2%~~102% of the 60 Hz nominal frequency and ~~are~~ is derived from the recommendations given in ~~Regulatory Guide~~ RG 1.9 ~~(Ref. 3)~~.

Higher maximum tolerances are specified for final steady state voltage and frequency following a loss of load test, because that test must be performed with the DG controls in the "Parallel" mode. Since "Parallel" mode operation introduces both voltage and speed droop, the DG final conditions will not return to the nominal "Unit" mode settings.

SR 3.8.1.1 (Offsite source check)

~~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.~~

BASES

This SR assures that the required offsite circuits are OPERABLE. Each offsite circuit must be energized from associated switchyard bus through its disconnect switch to be OPERABLE.

Since each required offsite circuit transformer has only one possible source of power, the associated switchyard bus, and since loss of voltage to either the switchyard bus or the transformer is alarmed in the control room, correct alignment and voltage may be verified by the absence of these alarms.

The 7 day Frequency is adequate since breaker position is not likely to change without the operators 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~~ (DG starting test)

~~These SRs~~ This SR helps to ensure the availability of the standby electrical power supply to mitigate DBAs and transients and to maintain the ~~unit~~ plant 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 by an engine prelube period.~~

The monthly testing starting of the DG provides assurance that the DG would start and be ready for loading in the time period assumed in the safety analyses. The monthly test, however does not, and is not intended to, test all portions of the circuitry necessary for automatic starting and loading. The operation of the bus undervoltage relays and their auxiliary relays which initiate DG starting, the control relay which initiates DG breaker closure, and the DG breaker closure itself are not verified by this test. Verification of automatic operation of these components requires deenergizing the associated 2400 volt bus and cannot be done during plant operation. For this test, the 10 second timing is started when the DG receives a start signal, and ends when the DG voltage sensing relays actuate.

BASES

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 for a DG mean the diesel is not running, but its ~~engine~~ coolant and oil ~~are being continuously circulated and~~ temperature is being maintained consistent with manufacturer recommendations.

Three relays sense the terminal voltage on each DG. These relays, in conjunction with a load shedding relay actuated by bus undervoltage, initiate automatic closing of the DG breaker. During monthly testing, the actuation of the three voltage sensing relays is used as the timing point to determine when the DG is ready for loading.

~~In order to reduce stress and wear on diesel engines, some manufacturers recommend a modified start in which the starting speed of DGs is limited, warmup is limited to this lower speed, and the DGs are gradually accelerated to synchronous speed prior to loading. 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 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 (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.~~

BASES

The 31 day Frequency for performance of SR 3.8.1.2 agrees with the original licensing basis for the Palisades plant, and is consistent with the recommendations of Generic Letter 94-01.

SR 3.8.1.3 (DG loading test)

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 for at least 15 minutes. 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~~.

~~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).~~ the original Palisades licensing basis and with the recommendations of Generic Letter 94-01.

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.~~ a Note ~~2~~which 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.~~

BASES

SR ~~3.8.3.4~~3.8.1.4 (DG starting air pressure check)

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]~~ successful 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 3.8.1.45 (DG day tank level check)

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 specified level is ~~expressed as an equivalent volume in gallons, and is selected to ensure~~ adequate ~~fuel oil~~ for a minimum of 15 hours of DG operation at full load.

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~~ plant operators would be aware of any ~~large~~ uses of the DG ~~fuel oil~~ during this period.

BASES

~~SR 3.8.1.5~~

~~Microbiological fouling is a major cause of fuel oil degradation. There are numerous bacteria that can grow in fuel oil and cause fouling, but all must have a water environment in order to survive. Removal of water from the fuel oil day [and engine mounted] tanks once every [31] days eliminates the necessary environment for bacterial survival. This is the most effective means of controlling microbiological fouling. In addition, it eliminates the potential for water entrainment in the fuel oil during DG operation. Water may come from any of several sources, including condensation, ground water, rain water contaminated fuel oil, and from breakdown of the fuel oil by bacteria. Frequent checking for and removal of accumulated water minimizes fouling and provides data regarding the watertight integrity of the fuel oil system.~~

~~The Surveillance Frequencies are established by Regulatory Guide 1.137 (Ref. 10). This SR is for preventive maintenance. The presence of water does not necessarily represent failure of this SR provided the accumulated water is removed during the performance of this Surveillance.~~

SR 3.8.1.6 (Fuel Transfer system checks)

This ~~Surveillance~~ SR demonstrates that each ~~required~~ fuel ~~oil~~ transfer pump and the fuel oil transfer system controls operate~~s~~ and control transfer~~s~~ of fuel ~~oil~~ from ~~its associated~~ the Fuel Oil Storage Tank ~~storage tank~~ to ~~its associated~~ each day tank and engine mounted 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.~~

This SR provides assurance that the following portions of the fuel oil transfer system is OPERABLE:

Fuel oil transfer Pumps
Day and engine mounted tank filling solenoid valves
Day and engine mounted tank automatic level controls

BASES

Disabling failures of a fuel pump or its controls result in that pump being inoperable. Disabling failures of a solenoid valve or its controls result in the associated DG being inoperable. Failures of the automatic level controls must be evaluated to determine which Condition should be entered.

The 92 day Frequency corresponds to the testing requirements for pumps as contained in the ASME Code, Section XI. Additional assurance of fuel oil transfer system OPERABILITY is provided during the monthly starting and loading tests for each DG when the fuel oil system will function to maintain level in the day and engine mounted tanks.

~~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, 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 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~~7 (Fast transfer verification)

~~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.~~

Transfer of the safety related buses (Buses 1-C and 1-D) from the normal AC power source, that used during power operation, to the offsite circuit which meets the GDC 17 "immediately available" criterion (Startup Transformer 1-2) demonstrates the OPERABILITY of the "immediately available" circuit and of the fast transfer circuitry for use with that normal AC source.

BASES

The ~~{18 month}~~ Frequency of the Surveillance is based on engineering judgment, taking into consideration the ~~unit~~ plant 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~~8 (DG largest load rejection test)

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 without exceeding predetermined voltage and frequency and while maintaining a specified margin to the overspeed trip. ~~[For this unit, the single load for each DG and its horsepower rating is as follows:]~~ This Surveillance may be accomplished ~~by:~~ with the DG in the "Parallel" mode.

~~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.~~

BASES

An acceptable method is to parallel the DG with the grid and load the DG to a load equal to or greater than its single largest post-accident load. The DG breaker is tripped while its voltage and frequency (or speed) are being recorded. The time, voltage, and frequency tolerances specified in this SR are derived from the recommendations of RG 1.9, Revision 3 (RG 1.9).

RG 1.9 recommends that the increase in diesel speed during the transient does not exceed 75% of the difference between synchronous speed and the overspeed trip setpoint, or 15% above synchronous speed, whichever is lower. The Palisades DGs have a synchronous speed of 900 rpm and an overspeed trip setting range of 1060 to 1105 rpm. Therefore, the maximum acceptable transient frequency for this SR is 68 Hz.

~~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 (Ref. 9.~~

The minimum steady state voltage is specified to provide adequate margin for the switchgear and for both the 2400 and 480 volt safeguards motors; the maximum steady state voltage is 2400 +10% volts as recommended by RG 1.9.

BASES

The minimum acceptable frequency is specified to assure that the safeguards pumps powered from the DG would supply adequate flow to meet the safety analyses. The maximum acceptable steady state frequency is slightly higher than the +2% (61.2 Hz) recommended by RG 1.9 because the test must be performed with the DG controls in the Parallel mode. The increased frequency allowance of 0.3 Hz is based on the expected speed differential associated with performance of the test while in the "Parallel" mode.

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, the Note ~~2~~ requires that, if synchronized to offsite power, testing must be performed using a power factor ≤ ~~[~~0.9~~]~~. This power factor is chosen to be representative of the actual design basis inductive loading that the DG would experience.

~~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.~~

BASES

SR 3.8.1.~~10~~9 (DG full load rejection test)

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 and generator load response under ~~the simulated test conditions~~ a complete loss of load. ~~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.

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

The ~~[~~18 month~~]~~ Frequency is consistent with the recommendation of ~~Regulatory Guide 1.108 (Ref. 9)~~ RG 1.9 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;~~

BASES

~~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~~10 (Loss of off-site power without SIS test)

As ~~required by Regulatory Guide 1.108 (Ref. 9), paragraph 2.a.(1)~~ RG 1.9, 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 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.~~

BASES

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

The requirement to energize permanently connected loads is met when the DG breaker closes, energizing its associated 2400 volt bus. Permanently connected loads are those which are not disconnected from the bus by load shedding relays. They are energized when the DG breaker closes. It is not necessary to monitor each permanently connected load. The DG auto-start and breaker closure time of 10 seconds is derived from requirements of the accident analysis to respond to a design basis large break LOCA. For this test, the 10 second timing is started when the DG receives a start signal, and ends when the DG breaker closes.

The requirement to verify that auto-connected shutdown loads are energized refers to those loads which are actuated by the Normal Shutdown Sequencer. Each load should be started to assure that the DG is capable of accelerating these loads at the intervals programmed for the Normal Shutdown Sequence. The sequenced pumps may be operating on recirculation flow.

The requirements to maintain steady state voltage and frequency apply to the "steady state" period after all sequenced loads have been started. This period need only be long enough to achieve and measure steady voltage and frequency.

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 supply permanently connected loads for ≥ 5 minutes, refers to the duration of the DG connection to the associated safeguards bus. It is not intended to require that sequenced loads be operated throughout the 5 minute period. It is not necessary to monitor each permanently connected load.

BASES

The requirement to verify the connection and supply of permanently and automatically connected loads is intended to demonstrate the DG loading logic. This testing may be accomplished in any series of sequential, overlapping, or total steps so that the required connection and loading sequence is verified.

The Frequency of 18 months is consistent with the recommendations of RG 1.9.

This SR is modified by ~~two~~ a Note~~s~~. ~~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 the Note ~~2~~ is that performing the Surveillance would remove a required offsite circuit from service, perturb the electrical distribution system, and challenge safety systems. However, 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.~~

BASES

~~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.~~

~~This SR is modified by two Notes. The reason for Note 1 is to minimize wear and tear on the DGs during testing. For the purpose of this testing, the DGs must be started from standby conditions, that is, with the engine coolant and oil continuously circulated and temperature maintained consistent with manufacturer recommendations. The reason for Note 2 is that during operation with the reactor critical, performance of this Surveillance could cause perturbations to the electrical distribution systems that could challenge continued steady state operation and, as a result, unit safety systems. Credit may be taken for unplanned events that satisfy this SR.~~

BASES

~~SR 3.8.1.13~~

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

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

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

~~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~~

BASES

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

SR 3.8.1.~~14~~11 (DG 24 hour load test)

~~Regulatory Guide 1.108 (Ref. 9), paragraph 2.a.(3), requires~~ RG 1.9 recommends 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 and the remainder of the time at a load equivalent to the continuous duty rating of the DG. The 100 minutes required by the SR satisfies the intent of the recommendations of the Regulatory Guide, but allows some tolerance between the time requirement and the DG rating. Without this tolerance, the load would have to be reduced at precisely 2 hours to satisfy the SR without exceeding the manufacturer's rating of the DG.

The DG starts for this Surveillance can be performed either from standby or hot conditions. ~~The provisions for prelubricating and warmup, discussed in SR 3.8.1.2, and for gradual loading, discussed in SR 3.8.1.3, are applicable to this SR.~~

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

The ~~[~~18 month~~]~~ Frequency is consistent with the recommendations of RG 1.9. ~~Regulatory Guide 1.108 (Ref. 7), paragraph 2.a.(3), takes into consideration unit conditions required to perform the Surveillance, and is intended to be consistent with expected fuel cycle lengths.~~

BASES

This Surveillance is modified by ~~two Notes~~ a Note which. ~~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.~~

~~SR 3.8.1.15~~

~~This Surveillance demonstrates that the diesel engine can restart from a hot condition, such as subsequent to shutdown from normal Surveillances, and achieve the required voltage and frequency within [10] seconds. The [10] second time is derived from the requirements of the accident analysis to respond to a design basis large break LOCA. The [18 month] Frequency is consistent with the recommendations of Regulatory Guide 1.108 (Ref. 9, paragraph 2.a.(5).~~

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

BASES

SR 3.8.1.~~16~~12 (DG load transfer to offsite)

As ~~required~~ recommended by ~~Regulatory Guide 1.108 (Ref. 9, paragraph 2.a.(6)~~RG 1.9, 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 and autoclose signal on bus undervoltage, and the load sequence timers are reset.~~ The test is performed while the DG is supplying its associated 2400 volt bus, but not necessarily carrying the sequenced accident loads. 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, the automatic load sequencer is reset, and the DG controls are returned to "Unit".

The Frequency of ~~[~~18 months~~]~~ is consistent with the recommendations of RG 1.9. ~~Regulatory Guide 1.108 (Ref. 9), paragraph 2.a.(6), and takes into consideration unit conditions required to perform the Surveillance.~~

This SR is modified by a Note. The reason for the Note is that performing the Surveillance would remove a required offsite circuit from service, perturb the electrical distribution system, and challenge safety systems. However, 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).~~

BASES

~~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 1.108 (Ref. 9), paragraph 2.a.(8); takes into consideration unit conditions required to perform the Surveillance; and is intended to be consistent with expected fuel cycle lengths.~~

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

SR 3.8.1.~~18~~13 (Sequencer timing check)

~~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 1 provides a summary of the automatic loading of ESF buses.~~

BASES

If power is lost to bus 1C or 1D, 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 by concurrent motor starting currents. The 0.1 second 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 ensures that safety analysis assumptions regarding ESF equipment time delays are met. Logic Drawing E-17 Sheet 4 provides a summary of the automatic loading of safety related buses.

The Frequency of ~~[~~18 months~~]~~ is consistent with the recommendations of RG 1.9 ~~Regulatory Guide 1.108 (Ref. 9), paragraph 2.a.(2)~~; takes into consideration ~~unit~~ plant 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. However, 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.~~

BASES

SR 3.8.1.~~19~~14 (Loss of offsite power with SIS test)

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~~ PCS, 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 requirement to energize permanently connected loads is met when the DG breaker closes, energizing its associated 2400 volt bus. Permanently connected loads are those which are not disconnected from the bus by load shedding relays. They are energized when the DG breaker closes. It is not necessary to monitor each permanently connected load. The DG auto-start and breaker closure time of 10 seconds is derived from requirements of the accident analysis to respond to a design basis large break LOCA. For this test, the 10 second timing is started when the DG receives a start signal, and ends when the DG breaker closes.

The requirement to verify that auto-connected shutdown loads are energized refers to those loads which are actuated by the DBA Sequencer. Each load should be started to assure that the DG is capable of accelerating these loads at the intervals programmed for the DBA Sequence. The sequenced pumps may be operating on recirculation flow or in other testing mode. The requirements to maintain steady state voltage and frequency apply to the "steady state" period after all sequenced loads have been started. This period need only be long enough to achieve and measure steady voltage and frequency.

BASES

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 supply permanently connected loads for ≥ 5 minutes, refers to the duration of the DG connection to the associated 2400 volt bus. It is not intended to require that sequenced loads be operated throughout the 5 minute period. It is not necessary to monitor each permanently connected load.

The Frequency of [18 months] takes into consideration ~~unit~~ plant 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~~ a Note~~s~~. ~~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 for DGs.~~ The reason for the Note ~~2~~ is that performing the Surveillance would remove a required offsite circuit from service, perturb the electrical distribution system, and challenge safety systems. However, credit may be taken for unplanned events that satisfy this SR.

<u>SR 3.8.1.15</u> (DG load verification)

This item is intended to provide assurance that the electrical loads which are automatically connected to the DG during an accident sequence do not exceed its continuous rating. The test may be accomplished by analytical means rather than by physical testing, and addresses running current of the loads rather than starting current. The requirement to perform the test each 18 months is based on the required frequency of an equivalent requirement in the former CE STS, NUREG 0212.

~~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.~~

BASES

~~The 10 year Frequency is consistent with the recommendations of Regulatory Guide 1.108 (Ref. 9).~~

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

~~Diesel Generator Test Schedule~~

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

~~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 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.~~

BASES

~~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~~5. Regulatory Guide 1.9, Rev. ~~[~~3~~]~~, ~~[~~date~~]~~.

~~4. FSAR, Chapter [6].~~

~~5. FSAR, Chapter [15].~~

~~6~~2. Regulatory Guide 1.93, Rev. ~~[ ]~~, ~~[~~date~~]~~.

~~7~~3. Generic Letter 84-15, July 2, 1984.

~~8~~4. 10 CFR 50, Appendix A, GDC 18.

~~9~~6. Regulatory Guide 1.108, Rev. ~~[~~1~~]~~, ~~[~~August 1977~~]~~.

~~10~~7. Regulatory Guide 1.137, Rev. ~~[ ]~~, ~~[~~date~~]~~.

~~11. ANSI C84.1 1982.~~

~~12~~9. ASME, Boiler and Pressure Vessel Code, Section XI.

~~13~~10. IEEE Standard 308-~~[~~1978~~]~~.

11. Palisades Logic Drawing E-17, Sheet 4.

8. Generic Letter 94-01, May 31, 1994.

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:~~

~~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.~~

The safety analyses do not explicitly address electrical power. They do, however, assume that various electrically powered and controlled equipment is available. Electrical power is necessary to terminate and mitigate the effects of many postulated events which could occur in MODE 5 or 6.

Analyzed events which might occur during MODE 5 or 6 are Loss of PCS inventory or Loss of PCS Flow, (which in MODE 5 or 6 would be grouped as a Loss of Shutdown Cooling event), and radioactive releases (Fuel Handling Accident, Cask Drop, Radioactive Gas Release, Etc.).

BASES

In general, when the ~~unit~~ plant is shut down, the Technical Specifications requirements ensure that the ~~unit~~ plant 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~~ primary coolant temperature and pressure, and the corresponding stresses result in the probabilities of occurrence being significantly reduced~~ or eliminated~~, and in minimal consequences.~~ These deviations from DBA analysis assumptions and design requirements during shutdown conditions are allowed by the LCO for required systems.~~

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

BASES

~~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 the NRC Policy Statement.~~

LCO

~~One offsite circuit capable of supplying the onsite Class 1E power distribution subsystem(s) of LCO 3.8.10, "Distribution Systems - Shutdown," ensures that all required loads are powered from offsite power. An OPERABLE DG, associated with a distribution system train required to be OPERABLE by LCO 3.8.10, ensures a diverse power source is available to provide electrical power support, assuming a loss of the offsite circuit. Together, OPERABILITY of the required offsite circuit and DG ensures the availability of sufficient AC sources to operate the unit in a safe manner and to mitigate the consequences of 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.~~

~~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.~~

BASES

~~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 conditions.~~

~~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.~~

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

This LCO requires one offsite circuit to be OPERABLE. One OPERABLE offsite circuit ensures that all required loads may be powered from offsite power. Since only one offsite AC source is required, independence is not a criterion. Any of the three offsite supplies, Safeguards Transformer 1-1, Station Power Transformer 1-2, or Startup Transformer 1-2 is acceptable as a qualified circuit.

An OPERABLE DG, associated with a distribution subsystem required to be OPERABLE by LCO 3.8.10, ensures a diverse power source is available to provide electrical power support, assuming a loss of the offsite circuit.

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

BASES

The DG must be capable of starting, accelerating to rated speed and voltage, connecting to its respective 2400 volt bus on detection of bus undervoltage, and accepting required loads. Proper "Normal Shutdown" loading sequence, and tripping of nonessential loads, is a required function for DG OPERABILITY. A Service Water Pump must be started soon after the DG to assure continued DG operability. The DBA loading sequence is not required to be OPERABLE since the Safety Injection Signal is disabled during MODE 5 operation.

APPLICABILITY

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

~~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 sources required to be OPERABLE in MODES 5 and 6 and during movement of irradiated fuel assemblies provide assurance that equipment and instrumentation is available to:

a. Provide coolant inventory makeup,

b. Mitigate a fuel handling accident,

c. Mitigate shutdown events that can lead to core damage,

d. Monitoring and maintaining the plant in a Mode 5 or 6.

The AC ~~power~~ source requirements for MODES 1, 2, 3, and 4 ~~are covered~~ are addressed in LCO 3.8.1, "AC Sources - Operating."

BASES

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.~~

An offsite circuit would be considered inoperable if it were not available to supply the 2400 volt safety related bus or buses required by LCO 3.8.10. Since the required offsite AC source is only required to support features required by other LCOs, the option to declare those required features with no offsite power available to be inoperable, assures that appropriate ACTIONS will be implemented in accordance with the affected LCOs.

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

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

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

BASES

ACTION A.1 may involve undesired and unnecessary administrative efforts, therefore, ACTIONs A.2 provide alternate, but sufficiently conservative, ACTIONs.

With the required DG inoperable, the minimum required diversity of AC power sources is not available.

ACTIONs A.2 and B.1 require suspension of CORE ALTERATIONS, movement of irradiated fuel assemblies, and operations involving positive reactivity additions. The suspension of CORE ALTERATIONS and movement of irradiated fuel assemblies does not preclude actions to place a fuel assembly in a safe location; the suspension of positive reactivity additions does not preclude actions to maintain or increase reactor vessel inventory provided the required SHUTDOWN MARGIN is maintained.

These ACTIONS minimize the probability or the occurrence of postulated events. It is further required to immediately initiate action to restore the required AC sources (and to continue this action until restoration is accomplished) in order to provide the necessary AC power to the plant 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~~ plant safety systems may be without sufficient power.

~~Pursuant to~~ LCO 3.0.6 states that the Conditions of a supported system need not be entered solely due to the inoperability of a required support system unless otherwise noted in the support system Actions. Therefore, without a Note, the Distribution System's ACTIONS ~~are not~~ would not necessarily be entered even if all AC sources to it are inoperable, resulting in de-energization. Therefore, the Required Actions of Condition A are modified by a Note to indicate that when Condition A is entered with no AC power to ~~any required~~ one ESF bus, the applicable 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~~ required AC source, whether or not a train is de-energized. LCO 3.8.10 provides the appropriate restrictions for the situation involving a de-energized train.

BASES (continued)

SURVEILLANCE REQUIREMENTS

SR 3.8.2.1 (Shutdown AC power surveillance)

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~~ MODES 5 and 6. ~~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.~~

~~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.~~

The SRs from LCO 3.8.1 which are required are those which both support a feature required in MODE 5 or 6 and can be performed without effecting the OPERABILITY or reliability of the required sources.

With only one DG available, many tests cannot be performed since their performance would render that DG inoperable during the test. This is the case for tests which require DG loading: SRs 3.8.1.3, 3.8.1.8, 3.8.1.9, 3.8.1.10, 3.8.1.11, 3.8.1.12, 3.8.1.13, and 3.8.1.14.

With only one DG and only one offsite circuit available, SRs 3.8.1.7 cannot be performed.

REFERENCES None

B 3.8 **ELECTRICAL POWER SYSTEMS**

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

BASES

BACKGROUND

~~Each~~ The diesel generators (DGs) ~~is~~ are provided with a storage tank having a required fuel oil ~~capacity~~ inventory sufficient to operate ~~that~~ one diesel for a period of 7 days, while the DG is supplying maximum post~~- loss of coolant~~ accident loads. ~~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 DG~~s~~ for longer than the time to replenish the onsite supply from outside sources.

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

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. Implicit in this LCO is the requirement to assure, though not necessarily by testing, the capability to transfer the lube oil from its storage location to the DG oil sump, while the DG is running.

BASES

~~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).~~

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.~~

A description of the Safety Analyses applicable during MODES 1, 2, 3, and 4 is provided in the Bases for LCO 3.8.1 "AC Sources - Operating"; during MODES 5 and 6, in the Bases for LCO 3.8.2 "AC Sources - Shutdown."

~~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.~~

BASES

LCO

Stored diesel fuel oil is required to have sufficient supply for 7 days of full accident load operation. It is also required to meet specific standards for quality. The specified 7 day requirement and the 6 day quantity listed in Condition 3.8.3.A are taken from the Engineering Analysis associated with Event Report E-PAL-93-026B. Additionally, sufficient ~~lubricating~~ lube oil supply must be available to ensure the capability to operate at full accident load for 7 days. This requirement is in addition to the lube oil contained in the engine sump. The specified 7 day requirement and the 6 day quantity listed in Condition 3.8.3.B are based on an assumed lube oil consumption of 1 gallon per hour. ~~This~~ These requirements, 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 LCOs 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)~~ DGs are required by LCOs 3.8.1 and 3.8.2 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~~ following a loss of offsite power. Since stored diesel fuel oil~~,~~ and lube oil~~, and starting air subsystems~~ support LCOs 3.8.1 and ~~LCO~~ 3.8.2, stored diesel fuel oil~~, and~~ lube oil ~~and starting air~~ are required to be within limits when ~~the associated~~ either DG is required to be OPERABLE.

BASES

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.~~

A.1

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

In this Condition, the available DG fuel oil supply is less than the required 7 day supply, but enough for at least 6 days. This condition allows sufficient time to obtain additional fuel and to perform the sampling and 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 inventory prior to declaring the DGs inoperable.

BASES

B.1

~~With lube oil inventory < 500 gal, sufficient lubricating oil to support 7 days of continuous DG operation at full load conditions may not be available. However, the Condition is restricted to lube oil volume reductions that maintain at least a 6 day supply. This restriction allows sufficient time to obtain the requisite replacement volume. A period of 48 hours is considered sufficient to complete 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.~~

In this Condition, the available DG lube oil supply is less than the required 7 day supply, but enough for at least 6 days. This condition allows sufficient time to obtain additional lube oil. A period of 48 hours is considered sufficient to complete restoration of the required inventory prior to declaring the DGs inoperable.

C.1

~~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.~~

BASES

Diesel fuel oil with viscosity, or water and sediment out of limits is not necessarily unacceptable for short term DG operation. Viscosity is important primarily because of its effect on the handling of the fuel by the pump and injector system; water and sediment provides an indication of fuel contamination. When the fuel oil stored in the Fuel Oil Storage Tank is determined to be out of viscosity, or water and sediment limits, but acceptable for short term DG operation, it will be restored to within limits within 7 days. (If the fuel oil stored in T-10 is determined to be unacceptable for even short term usage, the affected DGs must be declared inoperable.) The 7 day Completion Time allows for further evaluation, resampling, and re-analysis of the DG fuel oil.

D.1

With the ~~new~~ stored fuel oil properties defined in the ~~Bases for SR 3.8.3.4~~ Fuel Oil Testing Program not within the required limits, but acceptable for short term DG operation, a period of ~~30~~31 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~~ if new fuel oil, when mixed with ~~previously~~ stored fuel oil, ~~remains~~ will produce an acceptable mixture, or if other methods to restore the stored fuel oil properties are required. 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.

~~E.1~~

~~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.~~

BASES

~~F.1~~E.1

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

SURVEILLANCE REQUIREMENTS

SR 3.8.3.1 (fuel oil quantity check)

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

The ~~31 day~~24 hour Frequency is ~~adequate~~ specified to ensure that a sufficient supply of fuel oil is available, since the Fuel Oil Storage Tank is the fuel oil supply for the diesel fire pumps, heating boilers, and rad waste evaporators, in addition to the emergency diesel generators. ~~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 (Lube oil quantity check)

This Surveillance ensures that sufficient lube oil inventory is available to support at least 7 days of full accident load operation for each DG. The ~~[500]~~175 gallon requirement is based on ~~the DG manufacturer consumption values for the run time of the DG~~ an estimated consumption of 1 gallon per hour. ~~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 accident load operation without the level reaching the manufacturer recommended minimum level.~~

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

SR 3.8.3.3 (Fuel oil quality check)

BASES

The tests listed below are a means of determining whether new fuel oil and stored fuel oil are ~~is~~ of the appropriate grade and ~~has~~ have not been contaminated with substances that would have an immediate, detrimental impact on diesel engine combustion.

Testing for viscosity, specific gravity, and water and sediment is completed for fuel oil delivered to the plant prior to its being added to the Fuel Oil Storage Tank. Fuel oil which fails the test, but has not been added to the Fuel Oil Storage Tank does not imply failure of this SR and requires no specific action. If results from these tests are within acceptable limits, the fuel oil may be added to the storage tank~~s~~ 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.~~

Fuel oil is tested for other of the parameters specified in ASTM D975 in accordance with the Fuel Oil Testing Program required by TS Section 5.5.11. Fuel oil determined to have one or more measured parameters outside acceptable limits will be evaluated for its effect on DG operation. Fuel oil which is determined to be acceptable for short term DG operation, but outside limits will be restored to within limits in accordance with Condition D. Fuel oil which is determined to be unacceptable for even short term DG operation is cause for the affected DGs to be declared inoperable.

~~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~~

~~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).~~

BASES

~~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 may be performed in accordance with ASTM D1552 [ ] (Ref. 6) or ASTM D2622 [ ] (Ref. 6). The 31 day period is acceptable because the fuel oil properties of interest, even if they were not within stated limits, would not have an immediate effect on DG operation. This Surveillance ensures the availability of high quality fuel oil for the DGs.~~

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

~~Particulate concentrations should be determined in accordance with ASTM D2276 [ ], Method A (Ref. 6). This method involves a gravimetric determination of total particulate concentration in the fuel oil and has a limit of 10 mg/l. It is acceptable to obtain a field sample for subsequent laboratory testing in lieu of field testing. [For those designs in which the total stored fuel oil volume is contained in two or more interconnected tanks, each tank must be considered and tested separately.]~~

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

BASES

SR 3.8.3.~~5~~4 (Fuel Oil Storage Tank water check)

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~~ Fuel Oil Storage Tank 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~~ reduces 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 and acceptance criteria are established in the Fuel Oil Testing Program based, in part, on those recommended 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~~ in accordance with the requirements of the Fuel Oil Testing Program.

~~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.~~

BASES

REFERENCES

~~1. FSAR, Section [9.5.4.2].~~

~~2~~1. Regulatory Guide 1.137.

~~3~~2. ANSI N195-1976, Appendix B.

~~4. FSAR, Chapter [6].~~

~~5. FSAR, Chapter [15].~~

~~6. ASTM Standards: D4057 [ ]; D975 [ ]; D4175 [ ]; D1552 [ ]; D2622 [ ]; S2276, Method A.~~

~~7~~3. 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 power to the 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] V~~ volt DC electrical power system consists of two independent and redundant safety related Class 1E DC electrical power ~~subsystems ([Train A and Train B])~~ sources. Each ~~subsystem~~ DC source consists of ~~[two]~~ one 125 ~~VDC batteries [(each battery [50]% capacity)], the associated battery charger(s) for each~~ volt battery, two battery chargers, and ~~all~~ the associated control equipment and interconnecting cabling.

Each station battery has two associated battery chargers, one powered by the associated AC power distribution system (the directly connected chargers) and one powered from the opposite AC power distribution system (the cross-connected chargers). The battery chargers are normally operated in pairs, either both direct connected chargers or both cross-connected chargers, to assure a diverse AC supply.

~~The 250 VDC source is obtained by use of the two 125 VDC batteries connected in series. Additionally there is [one] spare battery charger per subsystem, which provides backup service in the event that the preferred battery charger is out of service. If the spare battery charger is substituted for one of the preferred battery chargers, then the requirements of independence and redundancy between subsystems are maintained.~~

During normal operation, the ~~[~~125~~/250] V~~ volt DC load is powered from the battery chargers with the batteries floating on the system. In case of loss of normal power ~~to~~ from the battery charger, the DC load ~~is automatically~~ continues to be powered from the station batteries.

BASES

~~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 buses.~~

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~~."

Each battery has adequate storage capacity to carry the required load continuously for at least ~~2~~4 hours and to perform three complete cycles of intermittent loads discussed in the FSAR, Chapter ~~[8]~~ ~~(Ref. 4)~~.

Each 125~~/250 VDC~~ volt battery is separately housed in a ventilated room apart from its charger and distribution centers. Each ~~subsystem~~ DC source is ~~located in an area~~ separated physically and electrically from the other ~~subsystem~~ DC source to ensure that a single failure in one ~~subsystem~~ source does not cause a failure in a redundant ~~subsystem~~ source. ~~There is no sharing between redundant Class 1E subsystems, such as batteries, battery chargers, or distribution panels.~~

The batteries for ~~Train A and Train B~~ the DC ~~electrical~~ power ~~subsystems~~ sources are sized to produce required capacity at 80% of nameplate rating, corresponding to warranted capacity at end of life cycles and the 100% design demand. ~~Battery size is based on 125% of required capacity and, after selection of an available commercial battery, results in a battery capacity in excess of 150% of required capacity.~~ The voltage limit is 2.13 ~~V~~volt per cell, which corresponds to a total minimum voltage output of ~~128 V~~ 125.7 volts 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)~~.

BASES

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

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 (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.~~

A description of the Safety Analyses applicable during MODES 1, 2, 3, and 4 is provided in the Bases for LCO 3.8.1 "AC Sources - Operating."

~~The DC sources satisfy Criterion 3 of the NRC Policy Statement.~~

BASES

LCO

The DC electrical power ~~subsystems~~ sources, each ~~subsystem~~ consisting of ~~[two] batteries~~ one battery, one directly connected battery charger ~~[for each battery]~~ and the corresponding control equipment and interconnecting cabling supplying power to the associated bus within the train are required to be OPERABLE to ensure the availability of ~~the required~~ DC control power and Preferred AC 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).~~

An OPERABLE DC electrical power source requires its battery to be OPERABLE and connected to the associated DC bus. In order for the battery to remain OPERABLE, one charger must be in service.

The LCO specifies chargers D15 and D16 because those chargers are powered by the AC power distribution system and DG associated with the battery they supply. If only the cross-connected chargers were OPERABLE, and a loss of off-site power should occur concurrently with the loss of one DG, both safeguards trains would eventually become disabled. One train would be disabled by the lack of AC motive power; the other would become disabled when the battery, whose only OPERABLE charged is fed by the failed DG, became depleted.

The required chargers, D15 and D16, must be OPERABLE, but need not actually be in service because the probability of a concurrent loss of offsite power and loss of one DG is low, battery charging current is not needed immediately after an accident, and the standby chargers may be placed in service quickly.

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:~~

BASES

~~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 sources are required to be OPERABLE in MODES 1, 2, 3, and 4 to ensure that redundant sources of DC power are available to support engineered safeguards equipment and plant instrumentation in the event of an accident or transient. The DC sources also support the equipment and instrumentation necessary for power operation, plant heatups and cooldowns, and shutdown operation.

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

ACTIONS

A.1 and A.2

With one of the required chargers (D15 or D16) inoperable, the cross-connected charger must be immediately placed in service, if it is not already in service, to maintain the battery in OPERABLE status. In order to limit the time when the DC source is not capable of continuously meeting the single failure criterion, the required charger must be restored to OPERABLE status within 7 days.

The 7 day completion time was chosen to allow trouble shooting, location of parts, and repair.

~~A~~B.1 and B.2

~~Condition A represents one train with a loss of ability to completely respond to an events, 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.~~

BASES

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

With one battery inoperable, the associated DC system cannot meet its design. It lacks both the surge capacity and the independence from AC power sources which the battery provides if offsite power is lost. Placing the second battery charger in service provides two benefits: 1) restoration of the capacity to supply a sudden DC power demand, and 2) provides for restoration of adequate DC power in the affected train as soon as <u>either</u> AC power distribution source is re-energized following a loss of offsite power.

In order to restore the DC source to its design capability, the battery must be restored to OPERABLE status within 24 hours. The 24 hour Completion Time is a feature of the original Palisades licensing basis and reflects the availability to provide two trains of DC power from either AC distribution system. Furthermore, it provides a reasonable time to assess plant status as a function of the inoperable DC electrical power source and, if the battery is not restored to OPERABLE status, to prepare to effect an orderly and safe plant shutdown.

BASES

~~BC~~.1 and ~~BC~~.2

If the inoperable DC electrical power ~~subsystem~~ source cannot be restored to OPERABLE status within the required Completion Time, the ~~unit~~ plant must be brought to a MODE in which the LCO does not apply. To achieve this status, the ~~unit~~ 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 ~~unit~~ plant conditions from full power conditions in an orderly manner and without challenging ~~unit~~ plant systems. ~~The Completion Time to bring the unit to MODE 5 is consistent with the time required in Regulatory Guide 1.93 (Ref. 8).~~

SURVEILLANCE REQUIREMENTS

SR 3.8.4.1 (Float voltage check)

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)~~ recommendations.

SR 3.8.4.2 (Terminal and connector condition check)

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

~~The 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.~~

BASES

The specified limit of 120% of the resistance at initial installation is in accordance with the manufacturers recommendations.

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 (Battery inspection)

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.

SR 3.8.4.4 and SR 3.8.4.5 (Cleaning and resistance)

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.

~~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.~~

BASES

~~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.~~

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.

SR 3.8.4.6 (Charger test)

This SR requires that each battery charger be capable of supplying ~~[400]~~180 amps and ~~[250/~~125~~] V~~volts for ≥ ~~[~~8~~]~~ hours. These requirements are based on the design capacity of the chargers. The chargers are rated at 200 amps; the specified 180 amps provides margin between the charger rating and the test requirement. ~~as specified in (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~~ plant 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.~~

SR 3.8.4.7 (Service test)

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 FSAR Chapter 8 ~~Reference 4~~.

BASES

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),~~ RG 1.32 and RG 1.129, 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~~.

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

~~A modified 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.~~

Note 2 requires that the plant be in MODE 5 or 6 because performing the Surveillance requires disconnecting the battery from the DC distribution buses and connecting it to a test load resistor bank. This action makes the battery inoperable and completely unavailable for use.

BASES

SR 3.8.4.8 (Performance test)

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.

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

A modified 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.

~~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~~7; however, only the modified performance discharge test may be used to satisfy SR 3.8.4.~~8~~7 while satisfying the requirements of SR 3.8.4.~~7~~6 at the same time.

BASES

The acceptance criteria for this Surveillance are consistent with the recommendations of 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 capacity of 80% shows that the battery rate of deterioration is increasing, even if there is ample capacity to meet the load requirements.

The Surveillance Frequency for this test is normally 60 months. If the battery shows degradation, or if the battery has reached 85% of its expected life and capacity is < 100% of the manufacturer's rating, the Surveillance Frequency is reduced to 12 months. However, if the battery shows no degradation but has reached 85% of its expected life, the Surveillance Frequency is only reduced to 24 months for batteries that retain capacity ≥ 100% of the manufacturer's rating. Degradation is indicated, according to IEEE-450 ~~(Ref. 9)~~, when the battery capacity drops by more than 10% relative to its capacity on the previous performance test or when it is ≥ ~~[~~10%~~]~~ below the manufacturer's rating. These Frequencies are consistent with the recommendations in IEEE-450 ~~(Ref. 9)~~.

~~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. However, the Note acknowledges that credit may be taken for unplanned events that satisfy this SR.~~

The reason for the restriction that the plant be in MODE 5 or MODE 6 is that performing the Surveillance requires disconnecting the battery from the DC distribution buses and connecting it to a test load resistor bank. This action makes the battery inoperable and completely unavailable for use.

REFERENCES

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

~~2. Regulatory Guide 1.6, March 10, 1971.~~

~~3. IEEE 308 [1978].~~

~~4~~2. FSAR, Chapter ~~[~~8~~]~~.

~~5~~3. IEEE-485-~~[~~1983~~]~~, June 1983.

BASES

~~6. FSAR, Chapter [6].~~

~~7. FSAR, Chapter [15].~~

~~8~~4. Regulatory Guide 1.93, December 1974.

~~9~~5. IEEE-450-~~[~~1987~~]~~.

~~10~~6. Regulatory Guide 1.32, February 1977.

~~11~~7. Regulatory Guide 1.129, December 1974.

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 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:~~

~~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.~~

BASES

A description of the Safety Analyses applicable during MODES 5 and 6 is provided in the Bases for LCO 3.8.2 "AC Sources - Shutdown."

~~The DC sources satisfy Criterion 3 of the NRC Policy Statement.~~

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 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).~~

This LCO requires those, and only those, DC power sources which supply the DC distribution subsystems required by LCO 3.8.10, to be OPERABLE. Each DC source consists of one battery, one battery charger, and the corresponding control equipment and interconnecting cabling. This ensures the availability of sufficient DC power sources to maintain the plant in a safe manner and to mitigate the consequences of postulated events during shutdown (e.g., fuel handling accidents and loss of shutdown cooling).

APPLICABILITY

~~The DC electrical power sources required to be OPERABLE in MODES 5 and 6, and during movement of irradiated fuel assemblies 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.~~

BASES

The DC electrical power sources required to be OPERABLE in MODES 5 and 6, and during movement of irradiated fuel assemblies provide assurance that equipment and instrumentation is available to:

a. Provide coolant inventory makeup,

b. Mitigate a fuel handling accident,

c. Mitigate shutdown events that can lead to core damage,

d. Monitoring and maintaining the plant in MODE 5 or 6.

The DC ~~electrical power~~ source requirements for MODES 1, 2, 3, and 4 ~~are covered~~ are addressed in LCO 3.8.4, "DC sources - Operating."

ACTIONS

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

~~If two 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 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.~~

BASES

A.1

Since the required DC source is only required to support features required by other LCOs, the option to declare those required features with no DC power available to be inoperable, assures that appropriate ACTIONS will be implemented in accordance with the affected LCOs.

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

ACTION A.1 may involve undesired and unnecessary administrative efforts, therefore, ACTIONs A.2 provide alternate, but sufficiently conservative, ACTIONs.

ACTIONs A.2 require suspension of CORE ALTERATIONS, movement of irradiated fuel assemblies, and operations involving positive reactivity additions. The suspension of CORE ALTERATIONS and movement of irradiated fuel assemblies does not preclude actions to place a fuel assembly in a safe location; the suspension of positive reactivity additions does not preclude actions to maintain or increase reactor vessel inventory provided the required SHUTDOWN MARGIN is maintained.

These ACTIONS minimize the probability or the occurrence of postulated events. It is further required to immediately initiate action to restore the required DC sources (and to continue this action until restoration is accomplished) in order to provide the necessary DC power to the plant 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 ~~subsystem~~ sources should be completed as quickly as possible in order to minimize the time during which the ~~unit~~ plant safety systems may be without sufficient control and Preferred AC power.

SURVEILLANCE REQUIREMENTS

SR 3.8.5.1 (Shutdown DC power surveillance)

~~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.~~

BASES

~~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.~~

SR 3.8.5.1 requires the SRs from LCO 3.8.4 that are necessary for ensuring the OPERABILITY of the AC sources in MODES 5 and 6.

The SRs from LCO 3.8.4 which are required are those which can be performed without effecting the OPERABILITY or reliability of the required DC source. With only one battery available, loading tests cannot be performed since their performance would render that battery inoperable during the test. This is the case for SRs 3.8.4.6, 3.8.4.7, and 3.8.4.8.

REFERENCES

~~1. FSAR, Chapter [6].~~

~~2. FSAR, Chapter [15].~~

None.

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 FSAR, Chapter [6] (Ref. 1) and Chapter [15] (Ref. 2), assume Engineered Safety Feature systems are OPERABLE. The DC electrical power system provides normal and emergency DC electrical power for the 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.~~

A description of the Safety Analyses applicable in MODES 1, 2, 3, and 4 is provided in the Bases for LCO 3.8.1 "AC Sources - Operating"; in MODES 5 and 6, in the Bases for LCO 3.8.2 "AC Sources - Shutdown."

~~Battery cell parameters satisfy Criterion 3 of the NRC Policy Statement.~~

LCO

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

BASES

The requirement to maintain the average temperature of representative cells above 70°F assures that the battery temperature is within the design band. Battery capacity is a function of battery temperature.

APPLICABILITY

The battery cell parameters are required solely for the support of the associated DC electrical power ~~subsystem~~ sources. Therefore, ~~battery electrolyte is~~ they are only required when the DC power source is required to be OPERABLE. Refer to the Applicability discussions in the Bases for LCO 3.8.4, "DC Sources - Operating" and LCO 3.8.5, "DC Sources - Shutdown."

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)~~ Category A or B 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~~ declared to be 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.~~

BASES (continued)

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.~~

~~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.~~

Battery cell parameters must be restored to Category A and B limits within 31 days.

B.1

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

With the temperature of representative cells below the design temperature, or with one or more battery cells with parameters outside the Category C limits, sufficient capacity to supply the maximum expected load requirement is not assured and the corresponding battery must be declared inoperable.

BASES (continued)

Additionally, if battery cells cannot be restored to meeting Category A or B limits within 31 days, a serious difficulty with the battery is indicated and the battery must be declared to be inoperable.

SR 3.8.6.1 (Pilot cell checks)

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. The monthly frequency specified is a feature of the initial Palisades license, and is the same as those other pilot cell tests specified in Surveillance 3.8.6.2.

SR 3.8.6.~~2~~3 (Connected cell checks)

The quarterly inspection of specific gravity and voltage is consistent with IEEE-450 ~~(Ref. 3). In addition, within 24 hours of a battery discharge < [110] V or a battery overcharge > [150] V, the battery must be demonstrated to meet Category B limits. Transients, such as motor starting transients, which may momentarily cause battery voltage to drop to ≤ [110] V, do not constitute a battery discharge provided the battery terminal voltage and float current return to pre-transient values. This inspection is also 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~~2 (Temperature checks)

This Surveillance verification that the average temperature of representative cells is > ~~[60]~~70°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. However, a monthly frequency is specified which is a feature of the initial Palisades license, and is the same as those other pilot cell tests specified in Surveillance 3.8.6.1.

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

BASES (continued)

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~~ fully charged 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.

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

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

The Category A and B 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).

BASES (continued)

~~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.~~

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~~ limit for float voltage is based on IEEE-450 ~~(Ref. 3)~~, which states that a cell voltage of 2.07 ~~V~~volts or below, under float conditions and not caused by elevated temperature of the cell, indicates internal cell problems and may require cell replacement.

BASES (continued)

The Category C limit of average specific gravity ≥ ~~[1.195]~~ ~~1.190~~ is based on manufacturer recommendations (0.020 below the manufacturer recommended fully charged, nominal specific gravity). In addition to that limit, it is required that the specific gravity for each connected cell must be no less than 0.020 below the average of all connected cells. This limit ensures that the effect of a highly charged or new cell does not mask overall degradation of the battery.

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

Because of specific gravity gradients that are produced during the recharging process, delays of several days may occur while waiting for the specific gravity to stabilize. A stabilized charger current is an acceptable alternative to specific gravity measurement for determining the state of charge. This phenomenon is discussed in IEEE-450 ~~(Ref. 3)~~. Footnote (c) to Table 3.8.6-1 allows the float charge current to be used as an alternate to specific gravity for up to ~~[~~7~~]~~ days following a 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.~~

REFERENCES

~~1. FSAR, Chapter [6].~~

~~2. FSAR, Chapter [15].~~

~~3~~1. IEEE-450-~~[~~1980~~]~~.

B 3.8 **ELECTRICAL POWER SYSTEMS**

B 3.8.7 Inverters - Operating

BASES

BACKGROUND

The inverters are the ~~preferred~~ normal source of power for the Preferred AC ~~vital buses because of the stability and reliability they achieve~~. The function of the invertor is to provide continuous AC electrical power to the ~~vital~~ Preferred AC buses, even in the event of an interruption to the normal AC power distribution system. ~~The inverters can be powered from an internal AC source/rectifier or from the station battery.~~ A Preferred AC bus can be powered from the AC distribution system via the bypass regulator if its associated invertor is out of service. An interlock prevents supplying more than one Preferred AC bus from the bypass regulator at any time. The station battery provides an uninterruptible power source for the instrumentation and controls for the Reactor Protective System (RPS) and the Engineered Safety Features ~~Actuation System~~ (ESF~~AS~~). ~~Specific details on inverters and their operating characteristics are found in the FSAR, Chapter [8] (Ref. 1).~~

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:~~

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

~~b. A worst case single failure.~~

BASES

A description of the Safety Analyses applicable during MODES 1, 2, 3, and 4 is provided in the Bases for LCO 3.8.1 "AC Sources - Operating."

~~Inverters are a part of the distribution system and, as such, satisfy Criterion 3 of the NRC Policy Statement.~~

LCO

The inverters ensure the availability of Preferred 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 ESF~~AS~~ instrumentation and controls is maintained. The four inverters ~~[(two per train)]~~ ensure an uninterruptible supply of AC electrical power to the Preferred AC ~~vital~~ buses even if the ~~4.16 kV~~2400 volt safety related buses are de-energized.

~~OPERABLE inverters require the associated vital bus to be powered by the invertor with output voltage and frequency within tolerances, and power input to the invertor 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 uniterruptible power supply.~~

An invertor is considered inoperable if it is not powering the associated Preferred AC bus, or if its output voltage or frequency is not within tolerances.

BASES

~~This LCO is modified by a Note that allows [one/two] inverters 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 invertor 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 invertor(s) were not disconnected, the resulting voltage condition might damage the invertor(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.~~

~~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.~~

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.~~

The inverters are required to be OPERABLE in MODES 1, 2, 3, and 4 to ensure that redundant sources of Preferred AC power for instrumentation and control are available to support engineered safeguards equipment in the event of an accident or transient and for power operation, plant heatups and cooldowns, and shutdown operation.

BASES

Invertor requirements for MODES 5 and 6 ~~are covered~~ are addressed ~~in the Bases for~~ LCO 3.8.8, "Inverters - Shutdown."

ACTIONS

A.1

With an ~~required~~ invertor inoperable, its associated Preferred AC ~~vital~~ bus becomes inoperable until it is ~~[~~manually~~]~~ re-energized from ~~its [Class 1E constant voltage source transformer or invertor using internal AC source]~~the bypass regulator. An inoperable Preferred AC Bus is addressed in LCO 3.8.9.

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 Preferred AC ~~vital~~ bus de-energized. This ensures the Preferred AC ~~vital~~ bus is re-energized within ~~2~~8 hours.

Required Action A.1 allows 24 hours to fix the inoperable invertor and return it to service. The 24 hour limit is based upon engineering judgment, taking into consideration the time required to repair an invertor and the additional risk to which the ~~unit~~ plant is exposed because of the invertor 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 invertor source to the AC vital buses is the preferred source for powering instrumentation trip setpoint devices.~~

BASES

B.1 and B.2

If the inoperable devices or components cannot be restored to OPERABLE status within the required Completion Time, the ~~unit~~ plant must be brought to a MODE in which the LCO does not apply. To achieve this status, the ~~unit~~ 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 ~~unit~~ plant conditions from full power conditions in an orderly manner and without challenging ~~unit~~ plant systems.

SURVEILLANCE REQUIREMENTS

SR 3.8.7.1 (Invertor checks)

This Surveillance verifies that the inverters are functioning properly ~~with all required circuit breakers closed~~ and Preferred AC ~~vital~~ buses energized from the invertor. The verification of proper voltage and frequency output ensures that the required power is readily available for the instrumentation of the RPS and ESF~~AS~~ connected to the Preferred 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 invertor malfunctions.

REFERENCES

~~1. FSAR, Chapter [8].~~

~~2. FSAR, Chapter [6].~~

~~3. FSAR, Chapter [14].~~

None.

B 3.8 ELECTRICAL POWER SYSTEMS

B 3.8.8 Inverters - Shutdown

BASES

BACKGROUND

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

APPLICABLE SAFETY ANALYSES

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

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

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

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

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

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

A description of the Safety Analyses applicable during MODES 5 and 6 is provided in the Bases for LCO 3.8.2 "AC Sources - Shutdown."

~~The inverters were previously identified as part of the distribution system and, as such, satisfy Criterion 3 of the NRC Policy Statement.~~

BASES

LCO

~~The 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 buses even if the 4.16 kV safety buses are de energized. OPERABILITY of the inverters requires that the vital bus be powered by the invertor. This ensures the availability of sufficient invertor 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).~~

This LCO requires those, and only those, inverters necessary to support the Preferred AC buses required by LCO 3.8.10, to be OPERABLE.

This ensures the availability of sufficient Preferred AC electrical power to operate the plant in a safe manner and to mitigate the consequences of postulated events during shutdown (e.g., fuel handling accidents and loss of shutdown cooling).

An invertor is considered inoperable if it is not powering the associated Preferred AC bus, or if its voltage or frequency is not within tolerances.

APPLICABILITY

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

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

~~b. Systems needed to mitigate a fuel handling accident 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.~~

BASES

The inverters required to be OPERABLE in MODES 5 and 6, and during movement of irradiated fuel assemblies provide assurance that equipment and instrumentation is available to:

a. Provide coolant inventory makeup,

b. Mitigate a fuel handling accident,

c. Mitigate shutdown events that can lead to core damage,

d. Monitoring and maintaining the plant in MODE 5 or 6.

Invertor requirements for MODES 1, 2, 3, and 4 ~~are covered~~ are addressed in LCO 3.8.7, "Inverters - Operating."

ACTIONS

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

~~If two trains are required by LCO 3.8.10, "Distribution Systems - Shutdown," the remaining OPERABLE inverters may be capable of supporting sufficient required features to allow continuation of CORE ALTERATIONS, 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 invertor(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 invertor power to the unit safety systems.~~

BASES

A.1

An invertor would be considered inoperable if it were not available to supply its associated Preferred AC bus. Since the invertor and its associated Preferred AC Bus is only required to support features required by other LCOs, the option to declare those required features without invertor supplied Preferred AC power available to be inoperable, assures that appropriate ACTIONS will be implemented in accordance with the affected LCOs.

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

ACTION A.1 may involve undesired and unnecessary administrative efforts, therefore, ACTIONs A.2 provide alternate, but sufficiently conservative, ACTIONs.

ACTIONs A.2 require suspension of CORE ALTERATIONS, movement of irradiated fuel assemblies, and operations involving positive reactivity additions. The suspension of CORE ALTERATIONS and movement of irradiated fuel assemblies does not preclude actions to place a fuel assembly in a safe location; the suspension of positive reactivity additions does not preclude actions to maintain or increase reactor vessel inventory provided the required SHUTDOWN MARGIN is maintained.

These ACTIONS minimize the probability or 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 required invertor supplied Preferred AC power to the plant instrument and control 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~~ plant safety systems may be without power or powered from ~~a constant voltage source transformer~~ the bypass regulator.

BASES

SURVEILLANCE REQUIREMENTS

SR 3.8.8.1 (invertor checks)

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

A description of the basis for this SR is provided in the bases for SR 3.8.7.1.

REFERENCES

~~1. FSAR, Chapter [6].~~

~~2. FSAR, Chapter [15].~~

None.

B 3.8 ELECTRICAL POWER SYSTEMS

B 3.8.9 Distribution Systems - Operating

BASES

BACKGROUND

The onsite Class 1E AC, DC, and Preferred AC ~~vital~~ bus electrical power distribution systems are divided ~~by train~~ into ~~[two]~~ redundant and independent ~~AC, DC, and AC vital bus~~ electrical power distribution subsystems. Each electrical power distribution train is made up of several subsystems which include the safety related buses, load centers, motor control centers, and distribution panels shown in Table B 3.8.9-1.

~~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. 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, motor control centers, and distribution panels shown in Table B 3.8.9-1.~~

The Class 1E 2400 volt safety related buses, Bus 1C and Bus 1D, are normally powered from offsite, but can be powered from the DGs, as explained in the Background section of the Bases for LCO 3.8.1, "AC Sources - Operating."

Each 2400 volt safety related bus supplies one train of Class 1E the 480 volt distribution system. The buses and motor control centers which make up the Class 1E portion of the 480 volt distribution system are listed in Table B 3.8.9-1.

BASES

The 120 ~~V~~volt Preferred AC ~~vital~~ buses are ~~arranged in two load groups per train and are~~ normally powered from the inverters. The alternate power supply for the Preferred AC ~~vital~~ buses ~~are Class 1E~~is a constant voltage ~~source~~ transformer~~s~~, the Bypass Regulator.~~powered from the same train as the associated invertor, and its use~~ Use of the Bypass regulator is governed by LCO 3.8.7, "Inverters - Operating." ~~Each constant voltage source transformer is powered from a Class 1E AC bus.~~The bypass regulator is powered from the non-Class 1E instrument AC bus, Y-01. The Instrument AC bus is normally powered, through an automatic bus transfer switch, an instrument AC transformer, and isolation fuses. Its normal power source is MCC-1. Loss of power to MCC-1 will cause automatic transfer of the Instrument AC bus to MCC-2.

There are two independent 125~~/250 V~~ volt DC electrical power distribution subsystems~~ (one for each train)~~.

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

APPLICABLE SAFETY ANALYSES

~~The initial conditions of Design Basis Accident (DBA) and transient analyses in the 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.~~

~~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.~~

BASES

A description of the Safety Analyses applicable during MODES 1, 2, 3, and 4 is provided in the Bases for LCO 3.8.1 "AC Sources - Operating."

~~The distribution systems satisfy Criterion 3 of the NRC Policy Statement.~~

LCO

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

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

OPERABLE ~~AC~~ electrical power distribution subsystems require the ~~associated~~ buses, load centers, motor control centers, and distribution panels listed in Table B 3.8.9-1 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 [invertor via inverted DC voltage, invertor using internal AC source, or Class 1E constant voltage transformer].~~

BASES

In addition, tie breakers between redundant safety related AC~~, DC, and AC vital bus~~ power distribution subsystems~~, if they exist,~~ must be open when a 2400 volt source is OPERABLE for each train. 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~~2400 volt buses from being powered from the same offsite circuit or preclude crossconnecting Class 1E 480 volt systems when 2400 volt power is available for only one train.

This LCO does not address the power source for the Preferred AC buses. The Preferred AC buses are normally powered from the associated invertor. An alternate source, the Bypass Regulator, is available to supply one Preferred bus at a time, to allow maintenance on an invertor. The proper alignment of the inverted output breakers is addressed under the invertor LCOs. Therefore a Preferred AC Bus may be considered operable when powered from either the associated invertor or the Bypass Regulator as long as the voltage and frequency of the supply is correct.

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.~~

The electrical power distribution subsystems are required to be OPERABLE in MODES 1, 2, 3, and 4 to ensure that AC, DC, and Preferred AC power is available to the redundant trains and channels of safeguards equipment, controls and instrumentation required to support engineered safeguards equipment in the event of an accident or transient.

BASES

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

ACTIONS

A.1

With one or more required AC buses, load centers, motor control centers, or distribution panels, except Preferred 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~~ an additional failure in the ~~remaining~~ power distribution subsystems could result in the minimum required ESF functions not being supported. Therefore, the required AC buses, load centers, motor control centers, and distribution panels must be restored to OPERABLE status within 8 hours.

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

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

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

BASES

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

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

B.1

With one Preferred AC ~~vital~~ bus inoperable, the remaining OPERABLE Preferred AC ~~vital~~ buses are capable of supporting the minimum safety functions necessary to shut down the ~~unit~~ plant 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]~~ Preferred AC ~~vital~~ bus must be restored to OPERABLE status within ~~2~~8 hours by powering ~~the bus~~ it from the associated ~~[~~invertor ~~via inverted DC, invertor using internal AC source, or Class 1E constant voltage transformer]~~or from the bypass regulator.

~~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.~~

BASES

This ~~2~~8 hour limit is more conservative than Completion Times allowed for the vast majority of components that are without adequate ~~vital~~ Preferred AC power and is a feature of the original Palisades licensing basis. ~~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:~~

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

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

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

~~The 2 hour Completion Time takes into account the importance to safety of restoring the AC vital bus to OPERABLE status, the redundant capability afforded by the other OPERABLE vital AC 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.~~

BASES

~~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 subsystems are capable of supporting the minimum safety functions necessary to shut down the reactor and maintain it in a safe shutdown condition, assuming no single failure. The overall reliability is reduced, however, because a single failure in the remaining DC electrical power distribution subsystem could result in the minimum required ESF functions not being supported. Therefore, the ~~[~~required~~]~~ DC buses must be restored to OPERABLE status within ~~2~~8 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.~~

This ~~2~~8 hour limit is more conservative than Completion Times allowed for the vast majority of components which would be without power and is a feature of the original Palisades licensing basis. ~~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;~~

BASES

~~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.~~

D.1 and D.2

If the inoperable distribution subsystem cannot be restored to OPERABLE status within the required Completion Time, the ~~unit~~ plant must be brought to a MODE in which the LCO does not apply. To achieve this status, the ~~unit~~ 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 ~~unit~~ plant conditions from full power conditions in an orderly manner and without challenging ~~unit~~ plant systems.

BASES

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

SURVEILLANCE REQUIREMENTS

SR 3.8.9.1 (AC bus alignment check)

This Surveillance verifies that the AC, DC, and Preferred 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~~. For those buses which have undervoltage alarmed in the control room, correct voltage may be verified by the absence of an undervoltage alarm. For those buses which have only one possible power source and have undervoltage alarmed in the control room, correct breaker alignment by the absence of an undervoltage alarm. A Preferred AC Bus may be considered correctly aligned when powered from either the associated invertor or from the bypass regulator. A mechanical interlock prevents connecting two or more Preferred AC Buses to the Bypass Regulator. LCO 3.8.7 and SR 3.8.7.1 address the condition of supplying a Preferred AC Bus from the bypass regulator.

The 7 day Frequency takes into account the redundant capability of the AC, DC, and Preferred AC ~~vital~~ bus electrical power distribution subsystems, and other indications available in the control room that alert the operator to subsystem malfunctions.

REFERENCES

~~1. FSAR, Chapter [6].~~

BASES

~~2. FSAR, Chapter [15].~~

~~3. Regulatory Guide 1.93, December 1974.~~

None.

~~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.~~

Table B 3.8.9-1
Safeguards Electrical Distribution Trains

TYPE	VOLTAGE	LEFT TRAIN	RIGHT TRAIN
AC Power Distribution Subsystems	2400	Bus 1C	Bus 1D
	480	Bus 11	Bus 12
	480	Bus 19	Bus 20
	480	MCC 1	MCC 2
	480	MCC 7	MCC 8
	480	MCC 21	MCC 22
	480	MCC 23	MCC 24
	480	MCC 25	MCC 26
DC Power Distribution Subsystems	125	Bus D10-L	Bus D20-L
	125	Bus D10-R	Bus D20-R
	125	Pnl D11A	Pnl D21A
	125	Pnl D11-1	Pnl D21-1
	125	Pnl D11-2	Pnl D21-2
Preferred AC Subsystems	120	Bus Y-10	Bus Y-20
	120	Bus Y-30	Bus Y-40

B 3.8 **ELECTRICAL POWER SYSTEMS**

B 3.8.10 Distribution Systems - Shutdown

BASES

BACKGROUND

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

APPLICABLE SAFETY ANALYSES

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

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

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

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

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

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

A description of the Safety Analyses applicable during MODES 5 and 6 is provided in the Bases for LCO 3.8.2 "AC Sources - Shutdown."

BASES

~~The AC and DC electrical power distribution systems satisfy Criterion 3 of the NRC Policy Statement.~~

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.~~

This LCO requires those, and only those, AC, DC, and Preferred AC distribution subsystems to be OPERABLE which are necessary to support equipment required by other LCOs.

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

APPLICABILITY ~~The AC and DC electrical power distribution subsystems required to be OPERABLE in MODES 5 and 6, and during movement of irradiated fuel assemblies, 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 electrical power distribution subsystems required to be OPERABLE in MODES 5 and 6, and during movement of irradiated fuel assemblies, provide assurance that equipment and instrumentation is available to:

a. Provide coolant inventory makeup,

BASES

b. Mitigate a fuel handling accident,

c. Mitigate shutdown events that can lead to core damage,

d. Monitoring and maintaining the plant in MODE 5 or 6.

~~The AC, DC, and AC vital bus~~ Electrical power distribution subsystem requirements for MODES 1, 2, 3, and 4 ~~are covered~~ are addressed in LCO 3.8.9, "Distribution Systems - Operating."

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 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 and DC electrical power distribution subsystems and to continue this action until restoration is accomplished in order to provide the necessary power to the unit safety systems.~~

~~Notwithstanding performance of the above conservative Required Actions, a required 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.~~

BASES

A.1

Since the distribution systems are only required to support features required by other LCOs, the option to declare those affected required features to be inoperable, assures that appropriate ACTIONS will be implemented in accordance with the affected LCOs.

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

ACTION A.1 may involve undesired and unnecessary administrative efforts, therefore, ACTIONs A.2 provide alternate, but sufficiently conservative, ACTIONs.

ACTIONs A.2 require suspension of CORE ALTERATIONS, movement of irradiated fuel assemblies, and operations involving positive reactivity additions, and declaration that affected shutdown cooling trains are inoperable. The suspension of CORE ALTERATIONS and movement of irradiated fuel assemblies does not preclude actions to place a fuel assembly in a safe location; the suspension of positive reactivity additions does not preclude actions to maintain or increase reactor vessel inventory provided the required SHUTDOWN MARGIN is maintained.

These ACTIONS minimize the probability or the occurrence of postulated events. It is further required to immediately initiate action to restore the required distribution subsystems (and to continue this action until restoration is accomplished) in order to provide the necessary electrical power to the plant safety systems.

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 during which the ~~unit~~ plant safety systems may be without sufficient power.

BASES

SURVEILLANCE REQUIREMENTS

SR 3.8.10.1 (AC bus alignment check)

~~This Surveillance verifies that the AC, DC, and Preferred 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.~~

A description of the basis for this SR is provided in the bases for SR 3.8.9.1.

REFERENCES

~~1. FSAR, Chapter [6].~~

~~2. FSAR, Chapter [15].~~

None.

ATTACHMENT 6

CONSUMERS POWER COMPANY
PALISADES PLANT
DOCKET 50-255

STS CONVERSION TECHNICAL SPECIFICATION CHANGE REQUEST

3.8 ELECTRICAL POWER SYSTEMS PART

Comparison of Revised and Standard Technical Specifications

Palisades Revised Tech Spec Requirement List. (03/28/96)

A listing of the proposed Palisades Revised Tech Specs (RTS) correlated to the CE Standard Tech Specs (STS).

First Column; Proposed Palisades Revised Tech Spec (RTS) number
Each RTS item is listed in the left-most column.
If a STS item has been omitted from RTS, the word 'Omitted' is used.

Second Column; CE Standard Tech Spec (STS) number
The corresponding STS item is listed in the second column.
If a RTS item does not appear in STS, it is noted as 'Added'.

Third Column; Existing Palisades Tech Spec (TS) number
The closest TS item is listed in the third column.
If a RTS item does not appear in TS, it is noted as 'New'.

Fourth Column; RTS Item Description
An abbreviation of the RTS item appears in the third column.
Each item is identified as: LCO, ACTION, SR, ADMIN, Exception, etc.
In cases where a STS item was omitted from RTS, the description is of the STS item.

Description Key:	RTS requirement type:	Column 4 syntax:
	Safety Limit	SL: Safety limit; Applicable conditions
	Limiting Condition for Operation	LCO: LCO Description; Applicable conditions
	Condition	COND: Description of non-conforming condition
	Action	ACTN: Required action; Completion time
	Surveillance Requirement	SR: Test description; Frequency
	Table	TABL: Title
	Administrative Requirement	ADMN: Administrative requirement
	Defined Term	DEF: Name of defined term

Fifth Column; Comments and Explanations of Differences between RTS and STS.
A brief explanation of differences between RTS and STS is provided in the fifth column.

Other abbreviations used in the listing are:

NA:	Not Applicable
CFT:	Channel Functional Test
CHNL:	Channel

RTS Number	STS Number	TS Number	RTS (STS) requirement Description	Explanation of Differences

Global differences between the proposed Palisades Technical Specifications and the Standard Technical Specifications for CE plants, Nureg 1432:

The following changes are not discussed in the explanation of differences for each TS requirement.

1) Bracketed values have been replaced with appropriate values for Palisades. Typically, the basis for these values is provided in the bases document.

2) Each required action of the form "Perform SR X.X.X.X . . ." has been altered by a parenthetical summary of the SR requirements. This change allows a reader to understand the required actions without constantly turning pages to locate the referenced SR.

3) Terminology has been changed to reflect Palisades usage:

"RWT"	becomes	"SIRWT"	Safety Injection Refueling Water Tank
"CEA"	becomes	"Control Rod" or "Rod"	Palisades uses cruciform control rods rather than the multifingered "Control Element Assemblies" of later CE plants.
"RCS"	becomes	"PCS"	Palisades terminology is "Primary Coolant System" rather than "Reactor Coolant System"
"SIAS"	becomes	"SIS"	Palisades terminology is "Safety Injection Signal" rather than "Safety Injection Actuation Signal"
"AC Vital bus"	becomes	"Preferred AC bus"	Palisades terminology.
"PAMI"	becomes	"AMI"	Accident Monitoring Instrumentation, Palisades terminology
"ESFAS"	becomes	"ESF Instrumentation"	There is no stand-alone ESFAS system or cabinet at Palisades; ESF instruments actuate the ESF functions
"DG LOVS"	becomes	"DG UV Start"	Palisades Terminology
"Remote Shutdown System"	becomes	"Alternate Shutdown System"	Palisades Terminology
"Power Rate of Change-High"	becomes	"High Startup Rate"	Palisades Terminology

RTS Number	STS Number	TS Number	RTS (STS) requirement Description	Explanation of Differences
3.8	3.8	3.7/4.7	ELECTRICAL POWER DISTRIBUTION	
3.8.1.a	3.8.1.a	3.7.1.a&b	LCO: Two off-site circuits OPERABLE, MODES 1-4	Unchanged.
3.8.1.b	3.8.1.b	3.7.1.i	LCO: Two DGs OPERABLE, MODES 1-4	Unchanged.
Omitted	3.8.1.c	3.17.2#4	LCO: Two sequencers operable, MODES 1-4	Omitted this part of the LCO iaw reviewers note. Palisades sequencers affect only DG loading. Proposed Condition F (sequencer inoperable) requires declaring DG inoperable, immediately.
3.8.1 A	3.8.1 A	3.7.2.a&b	COND: one off-site circuit inoperable	Unchanged.
3.8.1 A.1	3.8.1 A.1	New	ACTN: Perform SR 3.8.1.1	Unchanged.
Omitted	3.8.1 A.2	NA	ACTN: (Declare features inoperable; 24 hrs)	Each Palisades offsite circuit is capable of supplying both trains of Class 1E power distribution. Therefore, the loss of only one offsite circuit cannot result in the loss of offsite power to either train.
3.8.1 A.2	3.8.1 A.3	3.7.2.a&b	ACTN: Restore offsite circuit to OPERABLE; 72 hrs	Completion time of "AND 6 days etc" omitted. This completion time is intended to limit the time (to the sum of the AOTs for conditions A and B) when the LCO was not met and avoid repetitious entries into conditions A and B. The Palisades AOT (an existing license condition) for having a required DG inoperable is "7 days per month, total for both". This AOT not only makes the omitted 6 day AOT inappropriate, but, by itself, accomplishes the prohibition of repetitious entries into conditions A and B.
3.8.1 B	3.8.1 B	3.7.2.i	COND: One DG inoperable	Unchanged.
3.8.1 B.1	3.8.1 B.1	3.7.2.i	ACTN: Perform SR 3.8.1.1; 1 hr	Unchanged
3.8.1 B.2	3.8.1 B.2	New	ACTN: Declare supported features inoperable; 4 hrs	Unchanged.
3.8.1 B.3.1	3.8.1 B.3.1	New	ACTN: Check for common cause; 24 hrs	Unchanged.
3.8.1 B.3.2	3.8.1 B.3.2	3.7.2.i	ACTN: Perform SR 3.8.1.2; 24 hrs	Unchanged.
3.8.1 B.4	3.8.1 B.4	3.7.2.i	ACTN: Restore DG to OPERABLE, 7 days/ mo (both)	Retained DG AOT from existing license in lieu of the STS 72 hours; omitted Completion time of "AND 6 days etc". See discussion for Action 3.8.1 A.2, above.
3.8.1 C	3.8.1 C	3.0.3	COND: Two offsite circuits inoperable	Unchanged

RTS Number	STS Number	TS Number	RTS (STS) requirement Description	Explanation of Differences
3.8.1 C.1	3.8.1 C.1	New	ACTN: Declare supplied features inoperable, 12 hours	Unchanged
3.8.1 C.2	3.8.1 C.2	3.0.3	ACTN: Restore one offsite circuit, 24 hours	Unchanged
3.8.1 D	3.8.1 D	3.0.3	COND: one DG & one off-site circuit inoperable	Unchanged.
Omitted	3.8.1 D	NA	NOTE: (Enter LCO 3.8.9)	See discussion following STS action 3.8.1 A.2, above.
3.8.1 D.1	3.8.1 D.1	3.0.3	ACTN: Restore offsite circuit, 12 hours	Unchanged.
3.8.1 D.2	3.8.1 D.2	3.0.3	ACTN: Restore DG, 12 hours	Unchanged.
3.8.1 E	3.8.1 D	3.0.3	COND: two DGs inoperable	Unchanged.
3.8.1 E.1	3.8.1 E.1	3.0.3	ACTN: Restore 1 DG, 2 hours	Unchanged.
3.8.1 F	3.8.1 F	3.17.2.5	COND: Sequencer inoperable	Changed to "one or both"; modified action accordingly. This condition is retained from existing license to assure that it is understood that the sequencer is necessary to support DG operability during MODES 1 - 4.
3.8.1 F.1	3.8.1 F.1	3.17.2.5.a	ACTN: Declare associated DG inoperable, immediately	Palisades sequencers affect only DG loading. They do not affect starting of ESS equipment when offsite power is available. Rather than delete Condition F, as reviewers note would allow, The existing TS action to immediately declare the DG inoperable was moved here.
3.8.1 G	Added	New	COND: P-18A inoperable	Added new condition to address Palisades unique DG fuel transfer system
3.8.1 G.1	Added	New	ACTN: Declare DG 1-2 inoperable, 24 hours	DG 1-2 cannot power fuel transfer pump P-18B; therefore, with P-18A inoperable, DG 1-2 is not independent and does not meet LCO 3.8.1.b.
3.8.1 H	Added	New	COND: P-18B inoperable	Added new condition to address Palisades unique DG fuel transfer system
3.8.1 H.1	Added	New	ACTN: Restore P-18B; 7 Days	With P-18B inoperable, either DG can power the remaining pump, P-18A. Since having only one fuel oil transfer pump operable would not meet the single failure criterion, continued operation must be limited by a specified completion time. The condition is less severe than an inoperable DG, for which 7 days is allowed, so 7 days was chosen as a proposed completion time.

RTS Number	STS Number	TS Number	RTS (STS) requirement Description	Explanation of Differences
3.8.1 I	Added	New	COND: Both Fuel Oil pumps inoperable	Added new condition to address Palisades unique DG fuel transfer system
3.8.1 I.1	Added	New	ACTN: Restore 1 Fuel Oil pump; 8 hours	With two fuel oil transfer pumps inoperable, both DGs are limited in their ability to meet a demand. However since each DG has 2500 gallons in its day tank (more than 15 hours at full load) the condition is not as severe as having both DGs completely inoperable, where two hours are allowed.
3.8.1.J	3.8.1 G	3.7.2	COND: required actions not met in time;	Unchanged.
3.8.1 J.1	3.8.1 G.1	3.7.2	ACTN: Be in MODE 3; 6 hours	Unchanged.
3.8.1 J.2	3.8.1 G.2	3.7.2	ACTN: Be in MODE 5; 36 hours	Unchanged.
3.8.1 K	3.8.1 H	3.0.3	COND: 3 AC sources inoperable	Unchanged.
3.8.1 K.1	3.8.1 H.1	3.0.3	ACTN: Enter 3.0.3, immediately	Unchanged.
3.8.1.1	3.8.1.1	New	SR: offsite circuit lineup check	Reworded to reflect Palisades configuration. Palisades offsite sources are fed directly from a main switchyard bus through motor operated disconnect switches; no circuit breakers are involved. Installed instrumentation is available for voltage, but not for available power.
3.8.1.2	3.8.1.2&7	4.7.1.a	SR: DG starting & timing check	Combined SRs 3.8.1.2 & 3.8.1.7 since Palisades does not have any capability for other than a normal "fast start". No modified starting is used for any testing. The SR wording and Frequency were changed to retain monthly testing as is in the existing license. Retained existing wording regarding starting time requirement. Therefore, notes 1 and 3 were omitted. Note 2 was also omitted since Palisades engines have a continuous prelube and preheat.

RTS Number	STS Number	TS Number	RTS (STS) requirement Description	Explanation of Differences
3.8.1.3	3.8.1.3	4.7.1.a	SR: DG loading test	Portions of the maximum expected DG accident loading, when including potential operator connected loads as well as automatically connected loads, exceed the continuous DG rating of 2500 kw. Therefore, a short period of loading above the analyzed accident loading was added to the monthly test to assure that the DG can produce the necessary power. Longer duration loading is proposed in the 18 month 24 hour loading SR. The Frequency was changed to retain monthly testing as is in the existing license. Notes were omitted; Note 1 simply provides permission for gradual loading which is not prohibited by any requirement, and is common practice. Note 2 is included in the introduction to the 3.8.1 SRs. Note 3 is unnecessary since, at Palisades, a DG is considered inoperable when it is paralleled to the grid for loading; both DGs would not be voluntarily made inoperable. Note 4 is unnecessary because it is physically necessary to meet the acceptance criteria of STS SR 3.8.1.2 before a DG could be paralleled and loaded.
3.8.1.4	3.8.3.4	New	SR: DG starting air pressure check; 31 days	Moved air system requirements to LCO 3.8.1 from LCO 3.8.3 because Palisades DG design does not include the 5 start requirement. With below normal pressure, no specific number of starts can be assured and the DG must be assumed to be inoperable.
3.8.1.5	3.8.1.4	New	SR: DG day tank level check; 31 days	Bracketed reference to engine mounted tank omitted, otherwise unchanged. Required fuel inventory applies only to day tank; engine mounted tank gravity fills.
Omitted	3.8.1.5	NA	SR: (DG day tank water check)	This SR is not part of the existing Palisades licensing basis. The DG day tanks have had no history of difficulty with accumulated water. Tank construction is flat bottomed and does not provide a sump for water collection or removal.
3.8.1.6	3.8.1.6	4.7.1.e	SR: DG fuel transfer system test	Reworded SR to address controls as well as pumps since Palisades has asymmetric, shared, DG fuel oil transfer system. Pump testing alone would not necessarily verify operability of automatic and manual controls.
3.8.1.2	3.8.1.7	4.7.1.a	SR: DG timed start	This STS SR combined with STS SR 3.8.7.2 because all DG starts at Palisades are "fast starts". See 3.8.1.2, above.
3.8.1.7	3.8.1.8	New	SR: Automatic transfer of off-site supplies	Reworded for Palisades configuration.
3.8.1.8	3.8.1.9	New	SR: DG largest load rejection test; 18 mo.	Unchanged.
3.8.1.9	3.8.1.10	New	SR: DG full load rejection test; 18 mo.	Unchanged.

RTS Number	STS Number	TS Number	RTS (STS) requirement Description	Explanation of Differences
3.8.1.10	3.8.1.11	4.17.2 4.b	SR: Simulated Loss of offsite Power; 18 mo.	Prelube note omitted; otherwise unchanged.
Omitted	3.8.1.12	NA	SR: (DG start on ESF signal; 18 Mo.)	This is not a feature of the Palisades design. Palisades DGs start only on low voltage or loss of voltage.
Omitted	3.8.1.13	NA	SR: (Verification of DG trip bypass; 18 mo.)	This is not a feature of the Palisades design. Palisades DGs do not have trips which are bypassed on an ESF.
3.8.1.11	3.8.1.14	New	SR: DG 24 hour load test; 18 Mo.	Reduced time above continuous load to avoid exceeding DG rating yet still meet the intent of the test. Palisades DGs have a continuous rating of 2500 kw and a 2 hour rating of 2750 kw. If the SR specifies 2 hours at a load above the continuous rating, a test duration of more than 2 hours would exceed the DG rating and a test duration of less than 2 hours would not satisfy the SR. 100 minutes was chosen to demonstrate that the DG is not degrading, yet to specify testing within the rating of the DG.
Omitted	3.8.1.15	NA	SR: (DG Hot Restart; 18 mo.)	This SR was not proposed. None of the accident analyses or design bases assume a hot restart of the DGs. This SR is not part of the existing licensing basis.
3.8.1.12	3.8.1.16	New	SR: Transfer of DG load to offsite; 18 mo.	Reworded SR to clarify intent. Requirements are unchanged.
Omitted	3.8.1.17	NA	SR: (DG auto reset to standby; 18 mo.)	This is not a feature of the Palisades design.
3.8.1.13	3.8.1.18	New	SR: Sequencer timing test; 18 mo.	SR reworded to verify timing of each load, rather than the intervening interval. The Palisades sequencers are solid state devices which are verified to be within 0.1 seconds of the programmed time. Plant testing is written to verify that the timing meets the accident analyses, and DG load studies allow for maximum allowable sequencer error.
3.8.1.14	3.8.1.19	4.7.1.b	SR: LOSP w/o SIS test	Omitted note inappropriate to Palisades; Palisades DGs have continuous prelube. Used Palisades designations and values.
Omitted	3.8.1.20	NA	SR: (DG simultaneous start)	This SR is not a part of the existing Licensing basis.
3.8.1.15	Added	4.7.1.d	SR: Verify DG load; 18 months	Retained existing SR. Palisades design automatically connected loads closely approach the continuous rating of the DG. Retention of this SR is intended to assure that the loading is verified at least each 18 months.

RTS Number	STS Number	TS Number	RTS (STS) requirement Description	Explanation of Differences
Omitted	3.8.1-1	NA	Tabl: (DG test schedule)	No change is proposed for the DG testing frequency. The existing license does not require increased testing frequencies if the number of failures is high. The table was omitted and the existing monthly test frequency retained.
3.8.2.a	3.8.2.a	3.7.3	LCO: One off-site circuit OPERABLE, MODES 5 & 6	Unchanged.
3.8.2.b	3.8.2.b	3.7.3	LCO: One DG OPERABLE, MODES 5 & 6	Unchanged.
3.8.2 A	3.8.2 A	3.7.3	COND: One required offsite source inoperable.	Unchanged.
3.8.2 A.1	3.8.2 A.1	New	ACTN: Declare affected equip inoperable; immediately	Unchanged.
3.8.2 A.2.1	3.8.2 A.2.1	3.7.3 A	ACTN: Suspend Core Alterations; immediately	Unchanged.
3.8.2 A.2.2	3.8.2 A.2.2	3.7.3 B	ACTN: stop fuel moves; immediately	Unchanged.
3.8.2 A.2.3	3.8.2 A.2.3	New	ACTN: Stop positive Rx addition; immediately	Unchanged.
3.8.2 A.2.4	3.8.2 A.2.4	3.7.3 E	ACTN: Initiate circuit restoration; immediately	Unchanged.
3.8.2 B	3.8.2 B	3.7.3	COND: One required DG inoperable.	Unchanged.
3.8.2 B.1	3.8.2 B.2.1	3.7.3 A	ACTN: Suspend Core Alterations; immediately	Unchanged.
3.8.2 B.2	3.8.2 B.2.2	3.7.3 B	ACTN: stop fuel moves; immediately	Unchanged.
3.8.2 B.3	3.8.2 B.2.3	New	ACTN: Stop positive Rx addition; immediately	Unchanged.
3.8.2 B.4	3.8.2 B.2.4	3.7.3 E	ACTN: initiate circuit restoration; immediately	Unchanged.
3.8.2	3.8.2.1	4.7.1	SR: Required SRs from LCO 3.8.1, for MODES 5 & 6	Specified those SRs which test features required in MODES 5 & 6 and which can be performed w/o making DG inoperable.
3.8.3	3.8.3	3.7.1	LCO: DG fuel oil & Lube oil; when DG required	Moved air system requirements to LCO 3.8.1 because Palisades DG design does not include the 5 start requirement. With below normal pressure, no specific number of starts can be assured. Revised LCO and Applicability wording to reflect Palisades shared fuel oil system.
3.8.3 A	3.8.3 A	New	COND: fuel < 23,700 gal and > 20,110 gal	Reworded to reflect Palisades shared fuel oil system.
3.8.3 A.1	3.8.3 A.1	New	ACTN: Restore fuel oil within 48 hrs	Unchanged.
3.8.3 B	3.8.3 B	New	COND: Lube oil < 7 and > 6 days supply	Reworded to reflect Palisades shared lube oil storage and to be consistent with wording of 3.7.3 A.

RTS Number	STS Number	TS Number	RTS (STS) requirement Description	Explanation of Differences
3.8.3 B.1	3.8.3 B.1	New	ACTN: Restore Lube oil w/in 48 hrs	Unchanged.
3.8.3 C	3.8.3 C	New	COND: Fuel viscosity, water, sediment not in limits	Rewrote condition to reflect Palisades fuel oil storage and usage conditions. Palisades has a single tank which stores fuel oil for both DGs, diesel fire pumps, heating boilers, and rad waste evaporators. Consequently, the residence time for fuel in storage is short. With a short storage time, particulate contamination is not limiting. New fuel is tested for viscosity, SG, and water and sediment prior to acceptance or addition to the tank. Stored fuel is sampled periodically.
3.8.3 C.1	3.8.3 C.1	New	ACTN: Restore fuel quality w/in 7 days	Reworded to agree with reworded condition statement.
3.8.3 D	3.8.3 D	New	COND: Fuel out of spec other than Cond C	Rewrote condition to complement Condition C.
3.8.3 D.1	3.8.3 D.1	New	ACTN: Restore fuel properties; 31 days	Changed Completion time from 30 to 31 days. 30 days is not standard usage within the STS project.
Omitted	3.8.3 E	NA	COND: (DG air receiver low pressure)	The condition, action & surveillance for DG air starting moved to LCO 3.8.1. The replacement SR is 3.8.1.4; The actions are those for an inoperable DG, 3.8.1 B.
3.8.3 E	3.8.3 F	New	COND: Required Action not met or . . .	Reworded to reflect Palisades shared fuel oil system.
3.8.3 E.1	3.8.3 F.1	New	ACTN: Declare both DGs inoperable	Reworded to reflect Palisades shared fuel oil system.
3.8.3.1	3.8.3.1	New	SR: Fuel oil level check; 24 hours	Reworded and retained shorter surveillance interval due to Palisades shared fuel oil system and continuous multi purpose usage.
3.8.3.2	3.8.3.2	New	SR: Lube oil inventory check; 31 days	Unchanged.
3.8.3.3	3.8.3.3	New	SR: Verify fuel oil properties; iaw program	Unchanged.
Omitted	3.8.3.4	NA	SR: (Verify starting air pressure; 31 days)	Moved to LCO 3.8.1
3.8.3.4	3.8.3.5	New	SR: Fuel Oil storage tank water check; 92 days	Added word "excess" due to difficulty in removing all water from Fuel Oil storage tank and the height of the suction pipe above the tank bottom.
Omitted	3.8.3.6	NA	SR: (Clean Fuel Oil storage tank; 10 years)	This SR would have been a new requirement for Palisades. It was deleted from the STS by change TSTF-2.
3.8.4	3.8.4	3.7.1.h	LCO: Two DC sources operable; MODES 1-4	Reworded to fit Palisades terminology and usage, and to specify that the cross-connected chargers are not, by themselves, adequate for continuous operation.

RTS Number	STS Number	TS Number	RTS (STS) requirement Description	Explanation of Differences
3.8.4 A	Added	New	COND: One required charger inoperable	This condition was added due to Palisades arrangement having redundant chargers for each battery, with one cross-connected to the opposite AC train. Addition of this condition allows limited continued operation if one of the required chargers becomes inoperable.
3.8.4 A.1	Added	New	ACTN: Place x-conn charger in service; immediately	This action is added to assure continued charging current is available to the battery during the time when a required charger is out of service. This action is implicit in the existing LCO which requires one of the two chargers to be operable.
3.8.4 A.2	Added	New	ACTN: Restore required charger to OPERABLE status; 7 days	This action was added to assure the restoration of the required charger. The 7 day completion time is that currently allowed for a DG out of service, which is more limiting. The 7 days should allow for trouble shooting, location of parts, and repair.
3.8.4 B	3.8.4 A	3.7.2.h	COND: One battery inoperable	The actions for an inoperable DC source have been separated into two conditions, that for the charger (3.8.4 A) and that for the battery. The condition, associated actions, and completion times are retained from the existing Tech Specs.
3.8.4 B.1	Added	3.7.2.h	ACTN: Place both chargers in service; immediately	This action, taken from the existing Tech Specs, was retained to assure that sufficient DC power was available for the affected train. It also assures that DC power for that train would be restored, following a loss of off-site power, as soon as either AC train was re-energized.
3.8.4 B.2	3.8.4 A.1	3.7.2.h	ACTN: Restore battery; 24 hours	Retained Completion Time from existing Tech Specs.
3.8.4 C	3.8.4 B	3.7.2	COND: Required action and completion time not met	Unchanged.
3.8.4 C.1	3.8.4 B.1	3.7.2	ACTN: Be in MODE 3; 6 hours	Unchanged.
3.8.4 C.2	3.8.4 B.2	3.7.2	ACTN: Be in MODE 5; 36 hours	Unchanged.
3.8.4.1	3.8.4.1	New	SR: Verify battery float voltage; 7 days	Unchanged.
3.8.4.2	3.8.4.2	New	SR: Verify no corrosion; 92 days	Reworded to limit connection resistance to 120% of installation value, in agreement with manufacturers specifications and with reviewer's note in STS bases.

RTS Number	STS Number	TS Number	RTS (STS) requirement Description	Explanation of Differences
3.8.4.3	3.8.4.3	New	SR: Battery inspection; 18 mo.	Specified that inspection be performed rather than to verify no damage. Changed wording avoids declaring the battery to be inoperable for observed damage which does not affect operability.
3.8.4.4	3.8.4.4	New	SR: Remove corrosion; 18 mo.	Unchanged.
3.8.4.5	3.8.4.5	New	SR: Verify connection resistance; 18 mo.	Reworded to limit connection resistance to 120% of installation value, in agreement with manufacturers specifications and with reviewer's note in STS bases.
3.8.4.6	3.8.4.6	New	SR: Verify charger performance; 18 months	Note restricting performance during operation was omitted. The availability of a redundant charger, at Palisades, allows performance of a charger test while the other charger is in service.
3.8.4.7	3.8.4.7	4.7.2.c	SR: Battery service test; 18 months	Unchanged.
3.8.4.8	3.8.4.8	4.7.2.d	SR: Battery performance test; 60 months	Unchanged.
3.8.5	3.8.5	New	LCO: DC sources to support LCO 3.8.10; MODES 5&6	Unchanged.
3.8.5 A	3.8.5 A	New	COND: One DC source inoperable	Unchanged.
3.8.5 A.1	3.8.5 A.1	New	ACTN: Declare affected equip inoperable; immediately	Unchanged.
3.8.5 A.2.1	3.8.5 A.2.1	New	ACTN: Suspend Core Alterations; immediately	Unchanged.
3.8.5 A.2.2	3.8.5 A.2.2	New	ACTN: Suspend fuel movement; immediately	Unchanged.
3.8.5 A.2.3	3.8.5 A.2.3	New	ACTN: Suspend positive Rx addition; immediately	Unchanged.
3.8.5 A.2.4	3.8.5 A.2.4	New	ACTN: Initiate DC source restoration; immediately	Unchanged.
3.8.5	3.8.5.1	New	SR: Perform SRs for operable DC source	Reworded for consistency with balance of proposed TS.
3.8.6	3.8.6	3.7.1.h	LCO: Battery cell parameters w/in limits	Added requirement for average temperature; Condition B and SR 3.8.6.4 each have requirements concerning battery cell temperature, but LCO does not require the battery to be within any temperature limits. Conditions are only entered is LCO is not met, and surveillance need to support a facet of the LCO.
3.8.6 A	3.8.6 A	3.7.2.h	COND: Battery cell parameter not w/in limits	Unchanged.
3.8.6 A.1	3.8.6 A.1	3.7.2.h	ACTN: Verify pilot cell level & voltage; 1 hour	Unchanged.

RTS Number	STS Number	TS Number	RTS (STS) requirement Description	Explanation of Differences
3.8.6 A.2	3.8.6 A.2	3.7.2.h	ACTN: Verify cells w/in Category C limits; 24 hours	Unchanged.
3.8.6 A.3	3.8.6 A.3	3.7.2.h	ACTN: Restore cells to Category A & B limits; 31 days	Unchanged.
3.8.6 B	3.8.6 B	3.7.2.h	ACTN: Required Action not met, etc	Unchanged.
3.8.8 B.1	3.8.6 B.1	3.7.2	ACTN: Declare battery inoperable; immediately	Unchanged.
3.8.6.1	3.8.6.1	4.7.2.a	SR: Verify pilot cell parameters; 31 days	Retained existing SR frequency.
3.8.6.2	3.8.6.3	4.7.2.a	SR: Verify cell temperature; 31 days	Retained existing SR frequency.
3.8.6.3	3.8.6.2	4.7.2.b	SR: Verify all cells w/in limits; 92 days	Omitted specific requirement to perform SR upon severe discharge or overcharge. These requirements are not requirements of the current Palisades license. With Palisades battery parameters, knowledge any severe discharge would comprise knowledge of failure to meet cell float voltage requirements of SRs 3.8.6.1 and 3.8.6.3. Failure to meet SR 3.8.6.1 or 3.8.6.3 would require entering Condition 3.8.6 A; Action 3.8.6 A.2 requires performance of the measurements of SR 3.8.6.3. With the type of batteries used at Palisades, a severe overcharge would result in a reduced electrolyte level rather than an excessive battery terminal voltage. Similarly to a reduced voltage caused by a severe discharge, a reduced level caused by a severe overcharge would invoke the requirement of Action 3.8.6 A.2 to perform the measurements required by SR 3.8.6.3 w/in 24 hours.
3.8.6-1	3.8.6-1	New	Tabl: Battery Cell limits	Unchanged.
3.8.7	3.8.7	New	LCO: Inverters shall be operable; MODES 1-4	Omitted note which is not applicable to Palisades.
3.8.7 A	3.8.7 A	New	COND: one inverter inoperable	Unchanged.
3.8.7 A.1	3.8.7 A Note	New	ACTN: Enter 3.7.9 if Preferred AC bus de-energized	Unchanged.
3.8.7 A.2	3.8.7 A.1	New	ACTN: Restore inverter; 24 hours	Unchanged.
3.8.7 B	3.8.7 B	New	COND: Required action not met, Etc	Unchanged.
3.8.7 B.1	3.8.7 B.1	New	ACTN: Be in MODE 3; 6 hours	Unchanged.
3.8.7 B.2	3.8.7 B.2	New	ACTN: Be in MODE 5; 36 hours	Unchanged.
3.8.7.1	3.8.7.1	New	SR: Verify inverter performance; 7 days	Unchanged.

RTS Number	STS Number	TS Number	RTS (STS) requirement Description	Explanation of Differences
3.8.8	3.8.8	New	LCO: Required inverters operable; MODES 5 & 6	Unchanged.
3.8.8 A	3.8.8 A	New	COND: One or more inverter inoperable	Unchanged.
3.8.8 A.1	3.8.8 A.1	New	ACTN: Declare affected equip inoperable; immediately	Unchanged.
3.8.8 A.2.1	3.8.8 A.2.1	New	ACTN: Suspend Core Alterations; immediately	Unchanged.
3.8.8 A.2.2	3.8.8 A.2.2	New	ACTN: Suspend fuel movement; immediately	Unchanged.
3.8.8 A.2.3	3.8.8 A.2.3	New	ACTN: Suspend positive Rx addition; immediately	Unchanged.
3.8.8 A.2.4	3.8.8 A.2.4	New	ACTN: Initiate DC source restoration; immediately	Unchanged.
3.8.8.1	3.8.8.1	New	SR: Verify inverter performance; 7 days	Unchanged.
3.8.9	3.8.9	3.7.1	LCO: Electrical Distribution buses operable; MODES 1-4	Unchanged.
3.8.9 A	3.8.9 A	3.7.2.c,d,e	COND: AC distribution inoperable	Unchanged.
3.8.9 A.1	3.8.9 A.1	3.7.2.c,d,e	ACTN: Restore AC distribution 8 hours	Retained existing action and completion tine.
3.8.9 B	3.8.9 B	3.7.2.g	COND: Preferred AC bus inoperable	Unchanged.
3.8.9 B.1	3.8.9 B.1	3.7.2.g	ACTN: Restore Preferred AC bus; 8 hours	Retained existing action and completion tine.
3.8.9 C	3.8.9 C	3.7.2.f	COND: DC bus inoperable	Unchanged.
3.8.9 C.1	3.8.9 C.1	3.7.2.f	ACTN: Restore DC bus; 8 hours	Retained existing action and completion tine.
3.8.9 D	3.8.9 D.	3.7.2	COND: Required action not met	Unchanged.
3.8.9 D.1	3.8.9 D.1	3.7.2	ACTN: Be in MODE 3; 6 hours	Unchanged.
3.8.9 D.2	3.8.9 D.2	3.7.2	ACTN: Be in MODE 5; 36 hours	Unchanged.
3.8.9 E	3.8.9 E	3.0.3	COND: Two or more distribution systems inoperable	Unchanged.
3.8.9 E.1	3.8.9 E.1	3.0.3	ACTN: Enter 3.0.3; immediately	Unchanged.
3.8.9.1	3.8.9.1	New	SR: Verify breaker alignments; 7 days	Unchanged.
3.8.10	3.8.10	New	LCO: Electrical distribution buses operable; MODES 5 & 6	Unchanged.
3.8.10 A	3.8.10 A	New	COND: One or more bus inoperable	Unchanged.

RTS Number	STS Number	TS Number	RTS (STS) requirement Description	Explanation of Differences
3.8.10 A.1	3.8.10 A.1	New	ACTN: Declare affected equip inoperable; immediately	Unchanged.
3.8.10 A.2.1	3.8.10 A.2.1	New	ACTN: Suspend Core Alterations; immediately	Unchanged.
3.8.10 A.2.2	3.8.10 A.2.2	New	ACTN: Suspend fuel movement; immediately	Unchanged.
3.8.10 A.2.3	3.8.10 A.2.3	New	ACTN: Suspend positive Rx addition; immediately	Unchanged.
3.8.10 A.2.4	3.8.10 A.2.4	New	ACTN: Initiate DC source restoration; immediately	Unchanged.
3.8.10 A.2.5	3.8.10 A.2.5	New	ACTN: Declare affected SDC inoperable; immediately	Unchanged.
3.8.10.1	3.8.10.1	New	SR: Verify breaker alignments; 7 days	Unchanged.

ENCLOSURE 1

CONSUMERS POWER COMPANY
PALISADES PLANT
DOCKET 50-255

TECHNICAL SPECIFICATION CHANGE REQUEST

PART 12 - SECTION 3.9

March 28, 1996

CONSUMERS POWER COMPANY
Docket 50-255
Request for Change to the Technical Specifications
License DPR-20

3.9 REFUELING OPERATIONS

It is requested that the Refueling Operations requirements of the Technical Specifications contained in the Facility Operating License DPR-20, Docket 50-255, issued to Consumers Power Company on February 21, 1991, for the Palisades Plant be changed as described below:

I. ARRANGEMENT AND CONTENT OF THIS SECTION OF THE CHANGE REQUEST:

This section of the Technical Specification Change Request (TSCR) proposes changes to those Palisades Technical Specification requirements addressing Refueling Operations. These changes are intended to result in requirements which are appropriate for the Palisades plant, but closely emulate those of the Standard Technical Specifications, Combustion Engineering Plants, NUREG 1432, Revision 1.

This discussion and its supporting information frequently refer to three sets of Technical Specifications; the following abbreviations are used for clarity and brevity:

TS - The existing Palisades Technical Specifications,
RTS - The revised Palisades Technical Specifications,
STS - NUREG 1432, Revision 1.

Six attachments are provided to assist the reviewer:

1. Proposed RTS pages
2. Bases for the RTS
3. A line by line comparison of the TS and RTS
4. STS pages marked to show the differences between RTS and STS
5. STS pages marked to show differences between RTS Bases and STS Bases.
6. A line by line comparison of RTS and STS.

Attachment 3, the line by line comparison of TS and RTS, is presented in a tabular format. The first page contains an explanation of the syntax and abbreviations used. The table is arranged numerically by TS item number. Each requirement in Sections 1 through 4 of TS is listed individually. In some cases, where a single numbered TS requirement contains more than one requirement, each requirement is listed individually under the same number. Requirements which appear in RTS or STS, but not in TS, do not appear in the Attachment 3 listing.

Attachment 3 Provides the Following Information for Each TS Requirement:

Identifying number of TS item,
Identifying number of closest equivalent RTS item,
Identification of TS item as LCO, Action, SR, etc.,
A short paraphrase of requirement,
A description of each proposed change from TS to RTS.

Classification of Change as One of the Following Categories:

ADMINISTRATIVE - A change which is editorial in nature, which only involves movement of requirements within the TS without affecting their technical content, or clarifies existing TS requirements.

RELOCATED - A change which only moves requirements, not meeting the 10 CFR 50.36(c)(2)(ii) criteria, from the TS to the FSAR, to the Operating Requirements Manual, or to other documents controlled under 10 CFR 50.59.

MORE RESTRICTIVE - A change which only adds new requirements, or which revised an existing requirement resulting in additional operational restriction.

LESS RESTRICTIVE - A change which deletes any existing requirement, or which revises any existing requirement resulting in less operational restriction.

Attachment 6, the line by line comparison of RTS and STS, is also presented in a tabular format. The first page contains an explanation of the syntax and abbreviations used; the second page contains a list of Palisades terminology used in place of the generic STS terminology. The table is arranged numerically by RTS item number. Each requirement in Sections 1 through 3 of RTS or STS is listed individually. Requirements which appear in TS, but not in RTS or STS, do not appear in the Attachment 6 listing.

Attachment 6 Provides the Following Information for Each RTS Requirement:

Identifying number of RTS requirement,
Identifying number of equivalent STS requirement,
Identification of each requirement as LCO, Action, SR, etc.,
Short paraphrase of each requirement,
A description of each difference between RTS and STS.

II. TECHNICAL SPECIFICATION CHANGES PROPOSED:

The TS LCOs and action statements for Refueling Operations appear in Section 3.8. The TS surveillance requirements for in Refueling Operations TS Sections 3.8 and 4.2.2 RTS requirements for Refueling Operations appear in proposed Section 3.9. Each proposed change from TS to RTS is discussed in the attachments to this section.

Each change from TS to the proposed RTS is described in Attachment 3.

The Major Changes From TS to RTS Proposed in This Section are:

1. The addition of an LCO on Reactor Cavity Level during Core Alterations; This is a new LCO for Palisades. The requirement for reactor cavity level currently exists only in plant procedures.

2. In each section of the proposed RTS, new requirements taken from STS have been proposed. Since there is no equivalent requirement in TS, these changes do not appear in Attachment 3. The new requirements do appear in Attachment 6 where they are identified by an entry of "New" in the third column.

   The changes identified as "New" are considered MORE RESTRICTIVE because they add requirements and operating restrictions which do not exist in the current Palisades TS.

The Major Differences Between RTS and STS Proposed in This Section are:

1. The retention of the existing TS allowance to conduct Core Alterations with the containment equipment hatch open; the existing requirements allow both doors of the personnel hatch and the equipment hatch to be open during Core Alterations provided the spent fuel pool ventilation system and charcoal filter is in operation. The equipment hatch opens directly into the fuel storage building.

2. The retention of several existing TS requirements supporting the dilution accident analyses: A Condition and several Required Actions have been added to LCO 3.9.4, "Shutdown Cooling - High Water Level" and LCO 3.9.5, "Shutdown Cooling - Low Water Level" to assure that appropriate actions are taken if PCS flow drops below the levels assumed in the analysis. These same actions appear in the PCS LCOs which deal with PCS circulation during shutdown conditions.

III. NO SIGNIFICANT HAZARDS ANALYSIS:

Each change proposed is classified in Attachment 3 as either ADMINISTRATIVE, RELOCATED, MORE RESTRICTIVE, or LESS RESTRICTIVE.

Analysis of ADMINISTRATIVE, RELOCATED, and MORE RESTRICTIVE Changes:

ADMINISTRATIVE changes and RELOCATED changes move requirements, either within the TS or to documents controlled under 10 CFR 50.59, or clarify existing TS requirements, without affecting their technical content. Since ADMINISTRATIVE and RELOCATED changes do not alter the technical content of any requirements, they cannot involve a significant increase in the probability or consequences of an accident previously evaluated, create the possibility of a new or different kind of accident from any previously evaluated, or involve a significant reduction in a margin of safety.

MORE RESTRICTIVE changes only add new requirements, or revise existing requirements to result in additional operational restrictions. Since the TS, with all MORE RESTRICTIVE changes incorporated, will still contain all of the requirements which existed prior to the changes, MORE RESTRICTIVE changes cannot involve a significant increase in the probability or consequences of an accident previously evaluated, create the possibility of a new or different kind of accident from any previously evaluated, or involve a significant reduction in a margin of safety.

<u>Analysis of LESS RESTRICTIVE Changes</u>:

<u>The LESS RESTRICTIVE Changes Proposed in This Section are</u>:

1. TS LCO 3.8.1.b requires: "All automatic containment isolation valves shall be operable or at least one valve in each line shall be closed." RTS LCO 3.9.3 addresses only penetrations which provide direct access from the containment atmosphere to the outside atmosphere.

2. TS SR 3.8.1.c requires that the Purge and Vent valves and the Containment Refueling Radiation Monitors which close them be tested for operability immediately prior to refueling operations (typically about each 18 months). RTS SR 3.9.3.2 requires these valves to be tested each 18 months (but not necessarily immediately prior to refueling operations). RTS SRs 3.3.6.1, 3.3.6.2, and 3.3.6.3, for the refueling radiation monitors, require a Channel Check each 12 hours, a Channel Functional Test each 31 days, and a Channel Calibration each 18 months.

3. TS SR 3.8.1.g requires the sampling of the Primary Coolant System for boron concentration each shift (typically each 8 hours). RTS SR 3.9.1.1 requires verification of boron concentration each 72 hours.

<u>Do these LESS RESTRICTIVE changes involve a significant increase in the probability or consequences of an accident previously evaluated?</u>

Change 1:

Change 1 involves changes in containment closure requirements. The proposed change deletes the requirement for automatic containment isolation valves which do not directly connect the containment atmosphere to the outside atmosphere to be operable, or to have their penetrations blocked by a closed valve.

The functioning of the subject valves is intended to provide a leak tight containment closure during accidents which pressurize the containment. Their failure to function could not cause any increase in the probability of an accident previously evaluated.

During MODE 6 operation, the containment is not required to be leak tight at any significant pressure. Since there cannot be a significant pressure within the containment, the closure of containment isolation valves in penetrations which do not provide direct connection between the containment atmosphere and the outside atmosphere would not allow any significant leakage of fission products. Therefore, this proposed change would not involve a significant increase in the consequences of an accident previously evaluated.

Changes 2 and 3:

These changes are LESS RESTRICTIVE only in their allowance of a longer Allowed Outage Time (AOT) for inoperable equipment or a longer surveillance testing interval. The proposed times are those stipulated in the STS. Changing an AOT or a surveillance interval, alone, does not alter any plant design, operating conditions, operating practices, equipment settings, or equipment capabilities. Since these items are unchanged, changing an AOT or a surveillance interval would not increase the probability of any accident previously evaluated.

During the evaluation of potential accidents, the safety analyses assume the occurrence of the most limiting single failure. Typically, this single failure is assumed to disable one of the two trains of the equipment installed to mitigate an accident. In accordance with this assumption, the Technical Specifications allow continued operation with required equipment inoperable for limited periods of time (AOTs) only if the assumed level of equipment remains operable. Extending an AOT does not change level of safety equipment required to be available, and does not allow that level to drop below the level assumed to be available in the safety analyses. Therefore, changing an AOT cannot increase the consequences of an accident previously evaluated.

Excessively extending a surveillance interval could affect the probability that a piece of equipment will function properly upon demand. An overly restrictive surveillance interval could also affect the ability of the equipment to mitigate an accident by imposing unnecessary testing wear, equipment manipulations, and system transients on the plant, and thereby affect the consequences of an accident. The existing surveillance intervals were based on the operating experience available when they were added to the TS. Typically this was done during the initial plant licensing, circa 1970. In each of these changes where it is proposed that a surveillance interval be extended, the time proposed is that stipulated in the STS. The surveillance intervals stipulated in the STS are based on a much larger accumulation of operating experience and have been judged by the NRC and by the industry to be appropriate for typical situations. There are no special features of the Palisades plant which would invalidate those judgements for these changes. Therefore, operation of the facility in accordance with the requirements proposed by these changes does not involve a significant increase in the probability of an accident previously evaluated.

Do these LESS RESTRICTIVE changes create the possibility of a new or different kind of accident from any previously evaluated?

Change 1:

Change 1 involves changes in containment closure requirements. The proposed change deletes the requirement for automatic containment isolation valves which do not directly connect the containment atmosphere to the outside atmosphere to be operable, or to have their penetrations blocked by a closed valve. The functioning of the subject valves is intended to provide a leak tight containment closure during accidents which pressurize the containment. The potential lack of functioning of these valves would not affect the operation or capability of any other plant equipment. Their failure to function could not create the possibility of a new or different kind of accident from any previously evaluated.

Changes 2 and 3:

These changes are LESS RESTRICTIVE only in their allowance of a longer Allowed Outage Time (AOT) for inoperable equipment or a longer surveillance testing interval. The proposed times are those stipulated in the STS. Changing an AOT or surveillance interval, alone, cannot alter any plant operating conditions, operating practices, equipment settings, or equipment capabilities. Therefore, changing an AOT or a surveillance interval cannot create the possibility of a new or different kind of accident from any previously evaluated.

Do these LESS RESTRICTIVE changes involve a significant reduction in a margin of safety?

Change 1:

Change 1 involves changes in containment closure requirements. The proposed change deletes the requirement for automatic containment isolation valves which do not directly connect the containment atmosphere to the outside atmosphere to be operable, or to have their penetrations blocked by a closed valve.

During MODE 6 operation, the containment is not capable of being, nor required to be, leak tight at any significant pressure. Since there cannot be a significant pressure within the containment, the closure of containment isolation valves in penetrations which do not provide direct connection between the containment atmosphere and the outside atmosphere would not allow any significant leakage of fission products. Therefore, this proposed change would not involve a significant reduction in a margin of safety.

Changes 2 and 3:

These changes are LESS RESTRICTIVE only in their allowance of an extension to an Allowed Outage Time (AOT) for inoperable equipment or to a surveillance testing interval. Extending an AOT or a surveillance interval, alone, cannot alter any plant operating conditions, operating practices, equipment settings, or equipment capabilities.

An excessive AOT extension could reduce the margin of safety by allowing operation for an excessive period with less capability to mitigate an accident, or with parameters outside those assumed in the safety analysis. An overly restrictive AOT could also reduce the margin of safety by imposing unnecessary transients on the plant for minor deviations from the requirements of the LCOs. Similarly, an excessive surveillance interval extension could reduce the margin of safety by reducing assurance that required equipment will function as designed or that parameters are within the required limits. An overly restrictive surveillance interval could also reduce the margin of safety by imposing unnecessary testing wear, equipment manipulations, and system transients on the plant.

The existing AOTs and surveillance intervals were based on the operating experience available when they were added to the TS. Typically this was done during the initial plant licensing, circa 1970. In each of these changes where it is proposed that an AOT or surveillance interval be extended, the time proposed is that stipulated in the STS. The AOTs and surveillance intervals stipulated in the STS are based on a much larger accumulation of operating experience and have been judged by the NRC and by the industry to be appropriate for typical situations. There are no special features of the Palisades plant which would invalidate those judgements for these changes. Therefore, operation of the facility in accordance with the requirements proposed by these changes does not involve a significant reduction in a margin of safety.

IV. CONCLUSION

The Palisades Plant Review Committee has reviewed this part of the STS conversion Technical Specifications Change Request and has determined that proposing this change does not involve an unreviewed safety question. Further, the change involves no significant hazards consideration. This change has been reviewed by the Nuclear Performance Assessment Department.

ATTACHMENT 1

CONSUMERS POWER COMPANY
PALISADES PLANT
DOCKET 50-255

STS CONVERSION TECHNICAL SPECIFICATION CHANGE REQUEST

3.9 REFUELING OPERATIONS PART

Proposed Technical Specifications pages

3.9 REFUELING OPERATIONS

3.9.1 Boron Concentration

LCO 3.9.1 Boron concentrations of the Primary Coolant System and the reactor cavity shall be maintained within the limit specified in the COLR.

APPLICABILITY: MODE 6.

ACTIONS

CONDITION	REQUIRED ACTION	COMPLETION TIME
A. Boron concentration not within limit.	A.1 Suspend CORE ALTERATIONS. AND A.2 Suspend positive reactivity additions. AND A.3 Initiate action to restore boron concentration to within limit.	Immediately Immediately Immediately

SURVEILLANCE REQUIREMENTS

SURVEILLANCE		FREQUENCY
SR 3.9.1.1	Verify boron concentration is within the limit specified in the COLR.	72 hours

3.9 **REFUELING OPERATIONS**

3.9.2 Nuclear Instrumentation

LCO 3.9.2 Two source range channels shall be OPERABLE.

APPLICABILITY: MODE 6.

ACTIONS

CONDITION	REQUIRED ACTION	COMPLETION TIME
A. One source range channel inoperable.	A.1 Suspend CORE ALTERATIONS. AND A.2 Suspend positive reactivity additions.	Immediately Immediately
B. Two source range channels inoperable.	B.1 Initiate action to restore one source range channel to OPERABLE status. AND B.2 Perform SR 3.9.1.1 (Boron verification).	Immediately 4 hours AND Once per 12 hours thereafter.

SURVEILLANCE REQUIREMENTS

SURVEILLANCE		FREQUENCY
SR 3.9.2.1	Perform CHANNEL CHECK on each source range channel.	12 hours
SR 3.9.2.2	Perform CHANNEL CALIBRATION on each source range channel.	18 months

3.9 **REFUELING OPERATIONS**

3.9.3 Containment Penetrations

LCO 3.9.3 The containment penetrations shall be in the following status:

a. Whenever both doors of the personnel air lock are open during core alterations, the equipment door shall be open and the ventilating system and charcoal filter in the fuel storage building shall be operating; and

b. One door in the emergency air lock closed; and

c. Each penetration, other than a. or b. above, providing direct access from the containment atmosphere to the outside atmosphere either:

1. Closed by a manual valve, de-activated automatic isolation valve, blind flange, or equivalent, or

2. Capable of being closed by an OPERABLE Containment Refueling Radiation Monitor.

APPLICABILITY: During CORE ALTERATIONS,
During movement of irradiated fuel assemblies within containment.

ACTIONS

CONDITION	REQUIRED ACTION		COMPLETION TIME
A. One or more containment penetrations not in required status.	A.1	Suspend CORE ALTERATIONS.	Immediately
	<u>AND</u>		
	A.2	Suspend movement of irradiated fuel assemblies within containment.	Immediately
	<u>AND</u>		
	A.3	Suspend positive reactivity additions.	Immediately

SURVEILLANCE REQUIREMENTS

SURVEILLANCE		FREQUENCY
SR 3.9.3.1	Verify each required containment penetration, and the spent fuel pool ventilation and charcoal filter system is in the required status.	7 days
SR 3.9.3.2	Verify each required containment isolation valve actuates to the isolation position on an actual or simulated Containment High Radiation signal.	18 months

3.9 **REFUELING OPERATIONS**

3.9.4 Shutdown Cooling (SDC) - High Water Level

LCO 3.9.4 One SDC train shall be OPERABLE, providing ≥ 2810 gpm through the core.

------------------------------------NOTE------------------------------------
The required SDC train may be removed from operation for ≤ 1 hour per 8 hour period, provided no operations are permitted that would cause reduction of the Primary Coolant System boron concentration.

APPLICABILITY: MODE 6 with the reactor cavity water level ≥ 647′ elevation.

ACTIONS

CONDITION	REQUIRED ACTION	COMPLETION TIME
A. Required SDC train flow rate < 2810 gpm.	A.1 Suspend all operation involving reduction of primary coolant boron concentration.	Immediately
	<u>AND</u>	
	A.2 Initiate action to assure SDC flow ≥ 1000 gpm.	Immediately
	<u>AND</u>	
		(continued)

ACTIONS (continued)

CONDITION	REQUIRED ACTION		COMPLETION TIME
A. (continued)	A.3.1	Verify two of three charging pumps are electrically disabled.	15 minutes
	<u>OR</u>		
	A.3.2	Initiate action to perform SR 3.1.2.1 (verify SDM).	Within 15 minutes following dilution flow to the PCS. <u>AND</u> Every 30 minutes thereafter until stable PCS boron concentration exists.

(continued)

ACTIONS (continued)

CONDITION	REQUIRED ACTION		COMPLETION TIME
B. SDC train requirements not met, for reasons other than Condition A.	B.1	Suspend operations involving a reduction in primary coolant boron concentration.	Immediately
	AND		
	B.2	Suspend loading irradiated fuel assemblies in the core.	Immediately
	AND		
	B.3	Initiate action to satisfy SDC train requirements.	Immediately
	AND		
	B.4	Close all containment penetrations providing direct access from containment atmosphere to outside atmosphere.	4 hours

SURVEILLANCE REQUIREMENTS

SURVEILLANCE		FREQUENCY
SR 3.9.4.1	Verify one SDC train is OPERABLE.	12 hours
SR 3.9.4.2	Verify one SDC train is in operation and circulating primary coolant at a flow rate of $\geq$ 2810 gpm.	12 hours

3.9 **REFUELING OPERATIONS**

3.9.5 Shutdown Cooling (SDC) - Low Water Level

LCO 3.9.5 Two SDC trains shall be OPERABLE, with one SDC train providing ≥ 2810 gpm through the core shall be in operation.

APPLICABILITY: MODE 6 with the reactor cavity water level < 647′ elevation.

ACTIONS

CONDITION	REQUIRED ACTION	COMPLETION TIME
A. Required SDC train flow rate < 2810 gpm.	A.1 Suspend all operation involving reduction of primary coolant boron concentration.	Immediately
	AND	
	A.2 Initiate action to assure SDC flow ≥ 1000 gpm.	Immediately
	AND	
	A.3.1 Verify two of three charging pumps are electrically disabled.	15 minutes
	OR	
	A.3.2 Perform SR 3.1.2.1 (verify SDM).	Within 15 minutes following dilution flow to the PCS. AND Every 30 minutes thereafter until stable PCS boron concentration exists.

(continued)

ACTIONS (continued)

CONDITION	REQUIRED ACTION		COMPLETION TIME
B. One SDC train inoperable.	B.1	Initiate action to restore SDC train to OPERABLE status.	Immediately
	<u>OR</u>		
	B.2	Initiate action to establish reactor cavity water level $\geq$ 647′ elevation.	Immediately
C. No SDC train OPERABLE or in operation.	C.1	Suspend operations involving a reduction in primary coolant boron concentration.	Immediately
	<u>AND</u>		
	C.2	Initiate action to restore one SDC train to OPERABLE status and to operation.	Immediately
	<u>AND</u>		
	C.3	Close all containment penetrations providing direct access from containment atmosphere to outside atmosphere.	4 hours

SURVEILLANCE REQUIREMENTS

SURVEILLANCE		FREQUENCY
SR 3.9.5.1	Verify required SDC trains are OPERABLE.	12 hours
SR 3.9.5.2	Verify one SDC train is in operation and circulating primary coolant at a flow rate of $\geq$ 2810 gpm.	12 hours
SR 3.9.5.3	Verify correct breaker alignment and indicated power available to the required SDC pump that is not in operation.	7 days

3.9 **REFUELING OPERATIONS**

3.9.6 Reactor Cavity Water Level

LCO 3.9.6 The reactor cavity water level shall be maintained $\geq$ 647′ elevation.

APPLICABILITY: During CORE ALTERATIONS,
During movement of irradiated fuel assemblies within containment.

ACTIONS

CONDITION	REQUIRED ACTION		COMPLETION TIME
A. Reactor cavity water level not within limit.	A.1	Suspend CORE ALTERATIONS.	Immediately
	AND		
	A.2	Suspend movement of irradiated fuel assemblies within containment.	Immediately

SURVEILLANCE REQUIREMENTS

SURVEILLANCE		FREQUENCY
SR 3.9.6.1	Verify reactor cavity water level is $\geq$ 647′ elevation.	24 hours

ATTACHMENT 2

CONSUMERS POWER COMPANY
PALISADES PLANT
DOCKET 50-255

STS CONVERSION TECHNICAL SPECIFICATION CHANGE REQUEST

3.9 REFUELING OPERATIONS PART

Bases for the Revised Technical Specifications

B 3.9 **REFUELING OPERATIONS**

B 3.9.1 Boron Concentration

BASES

BACKGROUND

The limit on the boron concentrations of the Primary Coolant System (PCS) and reactor cavity during refueling ensures that the reactor remains subcritical during MODE 6. Refueling boron concentration is the soluble boron concentration in the coolant in each of these volumes having direct access to the reactor core during refueling.

The soluble boron concentration offsets the core reactivity and is measured by chemical analysis of a representative sample of the coolant in each of the volumes. The refueling boron concentration limit is specified in the COLR. Plant procedures ensure the specified boron concentration in order to maintain an overall core reactivity of $k_{eff} \leq 0.95$ during fuel handling, with control rods and fuel assemblies assumed to be in the most adverse configuration (least negative reactivity) allowed by plant procedures.

GDC 26 of 10 CFR 50, Appendix A, requires that two independent reactivity control systems of different design principles be provided (Ref. 1). One of these systems must be capable of holding the reactor core subcritical under cold conditions. The Chemical and Volume Control System (CVCS) is the system capable of maintaining the reactor subcritical in cold conditions by maintaining the boron concentration.

After the PCS is cooled and depressurized the vessel head is removed. The reactor cavity is then flooded with borated water from the safety injection refueling water tank.

The Shutdown Cooling (SDC) System is in operation during refueling (see LCOs 3.9.4 and 3.9.5) to provide forced circulation in the PCS and assist in maintaining the boron concentrations in the PCS and the reactor cavity above the COLR limit.

APPLICABLE SAFETY ANALYSES

During refueling operations, the reactivity condition of the core is consistent with the initial conditions assumed for the boron dilution accident analysis and is conservative for MODE 6. The boron concentration limit specified in the COLR is based on the core reactivity at the beginning of each fuel cycle (the end of refueling) and includes an uncertainty allowance.

BASES

APPLICABLE SAFETY ANALYSES

The required boron concentration and the plant refueling procedures that demonstrate the correct fuel loading plan (including full core mapping) ensure the k_{eff} of the core will remain $\leq$ 0.95 during the refueling operation. The limiting boron dilution accident analyzed occurs in MODE 5. A discussion of this event is provided in the Bases for LCO 3.1.2, "SHUTDOWN MARGIN—$T_{ave} \leq 525°F$."

LCO

The LCO requires that a minimum boron concentration be maintained in the PCS and reactor cavity while in MODE 6. The boron concentration limit specified in the COLR ensures a core k_{eff} of $\leq$ 0.95 is maintained during fuel handling operations. Violation of the LCO could lead to an inadvertent criticality.

APPLICABILITY

This LCO is applicable in MODE 6 to ensure that the fuel in the reactor vessel will remain subcritical. The required boron concentration ensures a $k_{eff} \leq 0.95$. Above MODE 6, LCO 3.1.1, "SHUTDOWN MARGIN (SDM) - $T_{ave} > 525°F$," and LCO 3.1.2, "SHUTDOWN MARGIN - $T_{ave} \leq 525°F$," ensure that an adequate amount of negative reactivity is available to shut down the reactor and to maintain it subcritical.

ACTIONS

A.1 and A.2

Continuation of CORE ALTERATIONS or positive reactivity additions (including actions to reduce boron concentration) is contingent upon maintaining the plant in compliance with the LCO. If the boron concentration of any coolant volume in the PCS or the reactor cavity is less than its limit, all operations involving CORE ALTERATIONS or positive reactivity additions must be suspended immediately.

Suspension of CORE ALTERATIONS, movement of irradiated fuel assemblies, and positive reactivity additions shall not preclude moving a component to a safe position.

BASES

ACTIONS (continued)

A.3

In addition to immediately suspending CORE ALTERATIONS or positive reactivity additions, boration to restore the concentration must be initiated immediately.

In determining the required combination of boration flow rate and concentration, there is no unique design basis event that must be satisfied. The only requirement is to restore the boron concentration to its required value as soon as possible. In order to raise the boron concentration as soon as possible, the operator should begin boration with the best source available for plant conditions.

Once boration is initiated, it must be continued until the boron concentration is restored. The restoration time depends on the amount of boron that must be injected to reach the required concentration.

SURVEILLANCE REQUIREMENTS

SR 3.9.1.1

This SR ensures the coolant boron concentration in the PCS and the reactor cavity is within the COLR limits. The boron concentration of the coolant in each volume is determined periodically by chemical analysis.

A minimum Frequency of once every 72 hours is therefore a reasonable amount of time to verify the boron concentration of representative samples. The Frequency is based on operating experience, which has shown 72 hours to be adequate.

REFERENCES

1. 10 CFR 50, Appendix A, GDC 26

B 3.9 **REFUELING OPERATIONS**

B 3.9.2 Nuclear Instrumentation

BASES

BACKGROUND	The source range channels of Nuclear Instruments NI-01/03 and NI-02/04 are used during refueling operations to monitor the core reactivity. These detectors are located external to the reactor vessel and detect neutrons leaking from the core. The use of portable detectors is permitted, provided the LCO requirements are met. The installed detectors monitor the neutron flux in counts per second. The detectors provide continuous visual and audible indication in the control room to alert operators to a possible dilution accident. If used, portable detectors should be functionally equivalent to the installed source range channels.
APPLICABLE SAFETY ANALYSES	Two OPERABLE source range channels are required to provide a signal to alert the operator to unexpected changes in core reactivity such as by a boron dilution accident or an improperly loaded fuel assembly. The safety analysis of the uncontrolled boron dilution accident is described in Reference 2. The analysis of the uncontrolled boron dilution accident shows that normally available SHUTDOWN MARGIN would be reduced, but there is sufficient time for the operator to take corrective actions.
LCO	This LCO requires two OPERABLE source range channels to ensure that redundant monitoring capability is available to detect changes in core reactivity.
APPLICABILITY	In MODE 6, the source range channels must be OPERABLE to determine changes in core reactivity. There is no other direct means available to check core reactivity levels. In MODES 2, 3, 4, and 5, the installed source range detectors and circuitry are required to be OPERABLE by LCO 3.3.9, "Neutron Flux Monitoring".

ACTIONS

A.1 and A.2

With only one source range channel OPERABLE, redundancy has been lost. Since these instruments are the only direct means of monitoring core reactivity conditions, CORE ALTERATIONS and positive reactivity additions must be suspended immediately. Performance of Required Action A.1 shall not preclude completion of movement of a component to a safe position.

B.1

With no OPERABLE source range channels, action to restore one source range channel to OPERABLE status shall be initiated immediately. Once initiated, action shall be continued until it is restored to OPERABLE status.

B.2

With no OPERABLE source range channels, there is no direct means of detecting changes in core reactivity. However, since CORE ALTERATIONS and positive reactivity additions are not to be made, the core reactivity condition is stabilized until the source range channels are OPERABLE. This stabilized condition is determined by performing SR 3.9.1.1 to verify that the required boron concentration exists.

The Completion Time of 4 hours is sufficient to obtain and analyze a primary coolant sample for boron concentration. The Frequency of once per 12 hours ensures that unplanned changes in boron concentration would be identified. The 12 hour Frequency is reasonable, considering the low probability of a change in core reactivity during this period.

SURVEILLANCE REQUIREMENTS

SR 3.9.2.1

SR 3.9.2.1 is the performance of a CHANNEL CHECK, which is a comparison of the parameter indicated on one channel to a similar parameter on other channels. It is based on the assumption that the two indication channels should be consistent with core conditions, but does not require the two source range channels to have the same reading. Changes in fuel loading and core geometry can result in significant differences between source range channels, but each channel should be consistent with its local conditions.

The Frequency of 12 hours is consistent with the CHANNEL CHECK Frequency specified similarly for the same instruments in LCO 3.3.1, "Reactor Protection System Instrumentation - Operating."

BASES

SURVEILLANCE REQUIREMENTS (continued)

SR 3.9.2.2

SR 3.9.2.2 is the performance of a CHANNEL CALIBRATION every 18 months. The 18 month Frequency is based on the need to perform this Surveillance under the conditions that apply during a plant outage. Operating experience has shown these components usually pass the Surveillance when performed on the 18 month Frequency.

REFERENCES

1. 10 CFR 50, Appendix A, GDC 13, GDC 26, GDC 28, and GDC 29

2. FSAR, Section 14

B 3.9 REFUELING OPERATIONS

B 3.9.3 Containment Penetrations

BASES

BACKGROUND

During CORE ALTERATIONS or movement of fuel assemblies within containment with irradiated fuel in containment, a release of fission product radioactivity within the containment will be restricted from escaping to the environment when the LCO requirements are met. In MODES 1, 2, 3, and 4, this is accomplished by maintaining containment OPERABLE as described in LCO 3.6.1, "Containment."

In MODE 6, the potential for containment pressurization as a result of an accident is not likely; therefore, requirements to isolate the containment from the outside atmosphere can be less stringent. The requirements of this LCO are referred to as "containment closure" rather than "containment OPERABILITY." Containment closure means that all potential escape paths are either closed or capable of being closed, or provide a controlled ventilation flow path through the Spent Fuel Pool ventilation charcoal filters. Since there is no potential for containment pressurization, the Appendix J leakage criteria and tests are not required.

The containment serves to contain fission product radioactivity that may be released from the reactor core following an accident, such that offsite radiation exposures are maintained well within the requirements of 10 CFR 100. Additionally, the containment structure provides radiation shielding from the fission products that may be present in the containment atmosphere following accident conditions.

The containment equipment hatch, which is part of the containment pressure boundary, provides a means for moving large equipment and components into and out of containment. During CORE ALTERATIONS or movement of irradiated fuel assemblies within containment, the equipment hatch may be open because it opens into the fuel handling building.

BASES

BACKGROUND (continued)

The charcoal filter installed in the fuel handling building exhaust will handle the full (approximately 10,000) cfm capacity of the normal ventilation flow with both exhaust fans operating. The normal mode of operation will require that the ventilation supply fan and one exhaust fan be manually tripped following a radioactivity release with a resulting flow of 7300 cfm through the filter. Any radioactivity which should inadvertently, during a refueling operation, pass through the normally opened equipment door would be handled by the charcoal filter in the fuel handling building. The several radiation monitors installed in the containment building and the fuel handling building will give adequate warning to the refueling crew if radioactivity is released. The efficiency of the installed charcoal filters is at least 90% for inorganic species and 70% for organic species with rated flows. The offsite thyroid dose for the bounding accident in the fuel handling building (the cask drop accident) is less than 39 rem at the site boundary using the filter efficiencies specified above.

The emergency air lock provides access to the containment directly from the auxiliary building roof. During CORE ALTERATIONS and movement of irradiated fuel assemblies within the containment, at least one door in the emergency air lock must be closed to prevent possible escape of fission products following a fuel handling accident.

The personnel air lock provides access to the containment from within the auxiliary building. During CORE ALTERATIONS and movement of irradiated fuel assemblies within the containment, at least one door in the personnel air lock must be closed, unless the equipment hatch is open and the spent fuel pool ventilation and charcoal filter system is operating.

The requirements on containment penetration closure ensure that a release of fission product radioactivity within containment will be restricted from escaping to the environment. The closure restrictions are sufficient to restrict fission product radioactivity release from containment due to a fuel handling accident during refueling.

The containment penetrations that provide direct access from containment atmosphere to outside atmosphere must be capable of being closed by a Containment High Radiation Signal, or be isolated by a de-activated automatic isolation valve, or by a manual isolation valve, blind flange, or equivalent. Equivalent isolation methods must be approved as temporary plant modifications and may include use of a material that can provide a temporary, atmospheric pressure ventilation barrier for the other containment penetrations during fuel movements.

BASES

BACKGROUND (continued)

The fuel transfer tube may be open because, during CORE ALTERATIONS and movement if irradiated fuel assemblies within the containment, it is sealed by the water level in the reactor cavity. LCO 3.9.6, "Reactor Cavity Water Level" specifies the required water level, and is also applicable during CORE ALTERATIONS and movement of irradiated fuel assemblies within the containment.

APPLICABLE SAFETY ANALYSES

During CORE ALTERATIONS or movement of irradiated fuel assemblies within containment, the most severe radiological consequences result from a fuel handling accident. The fuel handling accident is a postulated event that involves damage to irradiated fuel (Ref. 1). The requirements of LCO 3.9.6, "Reactor Cavity Water Level," ensure that the release of fission product radioactivity, subsequent to a fuel handling accident, results in doses that are within the values specified in 10 CFR 100.

LCO

This LCO limits the consequences of a fuel handling accident in containment by limiting the potential escape paths for fission product radioactivity released within containment. The LCO requires any penetration providing direct access from the containment atmosphere to the outside atmosphere to be closed except for the equipment hatch, personnel air lock, and penetrations capable of being closed by an Containment High Radiation signal.

There is no specific closure time requirement for these containment isolation valves, since the accident analyses make no specific assumptions about containment closure time after a fuel handling accident.

APPLICABILITY

The containment penetration requirements are applicable during CORE ALTERATIONS or movement of irradiated fuel assemblies within containment because this is when there is a potential for a fuel handling accident. In MODES 1, 2, 3, and 4, containment penetration requirements are addressed by LCO 3.6.1, "Containment." In MODE 5, and MODE 6 when CORE ALTERATIONS or movement of irradiated fuel assemblies within containment are not being conducted, the potential for a fuel handling accident does not exist. Therefore, under these conditions no requirements are placed on containment penetration status.

BASES

ACTIONS

A.1 and A.2

With the containment equipment hatch, air locks, or any containment penetration that provides direct access from the containment atmosphere to the outside atmosphere not in the required status, the plant must be placed in a condition in which the isolation function is not needed. This is accomplished by immediately suspending CORE ALTERATIONS and movement of irradiated fuel assemblies within containment. Performance of these actions shall not preclude completion of movement of a component to a safe position.

A.3

Continuation of positive reactivity additions (including actions to reduce boron concentration) is contingent upon maintaining the plant in compliance with the LCO. If the containment closure requirements are not met, all operations involving positive reactivity additions must be suspended immediately.

SURVEILLANCE REQUIREMENTS

SR 3.9.3.1

This Surveillance demonstrates that each of the containment penetrations required to be in a specific position or condition is in its required status. The Surveillance will demonstrate that each valve operator has motive power, which will ensure each valve is capable of being closed by a Containment High Radiation signal.

The Surveillance is performed every 7 days during CORE ALTERATIONS or movement of irradiated fuel assemblies within the containment. This Surveillance helps assure that for a postulated fuel handling accident that releases fission product radioactivity within the containment will not result in an excessive release of fission product radioactivity to the environment.

SR 3.9.3.2

This Surveillance demonstrates that each required containment isolation valve actuates to its isolation position on an actual or simulated Containment High Radiation signal. The 18 month Frequency maintains consistency with other similar instrumentation and valve testing requirements. LCO 3.3.7, "Refueling Containment Radiation Monitors" requires a CHANNEL CHECK every 12 hours, a CHANNEL FUNCTIONAL TEST every 31 days, and a CHANNEL CALIBRATION every 18 months for the Refueling Containment Radiation Monitors.

BASES

REFERENCES 1. FSAR, Section 14

B 3.9 REFUELING OPERATIONS

B 3.9.4 Shutdown Cooling (SDC) - High Water Level

BASES

BACKGROUND

The purposes of the SDC System in MODE 6 are to remove decay heat and sensible heat from the Primary Coolant System (PCS), as required by GDC 34, to provide mixing of borated coolant, to provide sufficient coolant circulation to minimize the effects of a boron dilution accident, and to prevent boron stratification (Ref. 1). Heat is removed from the PCS by circulating primary coolant through the shutdown heat exchangers, where the heat is transferred to the Component Cooling Water System via the shutdown heat exchangers. The coolant is then returned to the PCS cold legs. Operation of the SDC System for normal cooldown or decay heat removal is manually accomplished from the control room. The heat removal rate is adjusted by controlling the flow of primary coolant through the shutdown heat exchangers and bypassing the heat exchangers. Mixing of the primary coolant is maintained by this continuous circulation of primary coolant through the SDC System.

APPLICABLE SAFETY ANALYSES

If the primary coolant temperature is not maintained below 200°F, boiling of the primary coolant could result. This could lead to inadequate cooling of the reactor fuel due to a resulting loss of coolant in the reactor vessel. The loss of primary coolant and the reduction of boron concentration in the primary coolant would eventually challenge the integrity of the fuel cladding, which is a fission product barrier. One train of the SDC System is required to be operational in MODE 6, with the water level at or above the 647′ elevation, to prevent this challenge.

LCO

Only one SDC train is required for decay heat removal in MODE 6, with water level ≥ 647′ elevation. Only one SDC train is required because the volume of water above the reactor vessel flange provides backup decay heat removal capability. At least one SDC train must be in operation to provide:

a. Removal of decay heat;

b. Mixing of borated coolant to minimize the possibility of a criticality; and

c. Indication of primary coolant temperature.

BASES

LCO (continued)

An SDC train includes an SDC pump, a heat exchanger, valves, piping, instruments, and controls to ensure an OPERABLE flow path and to determine the PCS temperature.

The LCO is modified by a Note that allows the required operating SDC train to be removed from service for up to 1 hour in each 8 hour period, provided no operations are permitted that would cause a reduction of the PCS boron concentration. Boron concentration reduction is prohibited because uniform concentration distribution cannot be ensured without forced circulation. This permits operations such as core mapping or alterations in the vicinity of the reactor vessel hot leg nozzles, and PCS to SDC isolation valve testing. During this 1 hour period, decay heat is removed by natural convection to the large mass of water in the reactor cavity.

APPLICABILITY

One SDC train must be in operation in MODE 6 with the water level at or above the 647′ elevation, to provide decay heat removal. The 647′ elevation was selected because it corresponds to the requirement established for fuel movement in LCO 3.9.6, "Reactor Cavity Water Level."

Requirements for the SDC System in other MODES are covered by LCOs in Section 3.4, Primary Coolant System. SDC train requirements in MODE 6, with the water level < 647′ elevation, are located in LCO 3.9.5, "Shutdown Cooling (SDC) - Low Water Level."

ACTIONS

SDC train requirements are met by having one SDC train in operation, except as permitted in the Note to the LCO.

<u>A.1 and A.2</u>

When the SDC flow rate is throttled to less than 2810 gpm, all of the assumptions of the dilution accident analysis are no longer met. Actions must be initiated immediately to suspend all activities which could lead to a reduction of PCS boron concentration and to assure that SDC flow remains above 1000 gpm.

BASES

ACTIONS (continued)

A.3.1

With SDC flow less than 2810 GPM, but at least 1000 gpm, the dilution accident analysis shows satisfactory results if the assumed dilution flow is less than the capacity of a single charging pump. Action is therefore required to assure that SDC flow through the core is at least 1000 gpm, and that two charging pumps are electrically disabled. By disabling two charging pumps, the potential source of unborated PCS make up from charging pumps or primary makeup pumps is limited to 53 gpm.

A.3.2

Plant conditions exist when it is desired to have charging pumps available for immediate make up, but when it is also desired to reduce SDC flow for testing or maintenance activities. Action A.3.2 provides an allowance for these conditions to exist if periodic verifications assure that no charging pump is operating. If during conditions when SDC flow is less than 2810 gpm, a dilution does occur, SHUTDOWN MARGIN must be verified by performance of SR 3.1.2.1. Action required to take PCS boron samples shall be initiated within 15 minutes after the dilution and every 15 minutes thereafter until a stable PCS boron concentration exists or a flow of 2810 gpm has been re-established.

B.1

If SDC train requirements are not met, there will be no forced circulation to provide mixing to establish uniform boron concentrations. Reduced boron concentrations can occur through the addition of water with a lower boron concentration than that contained in the PCS. Therefore, actions that reduce boron concentration shall be suspended immediately.

B.2

If SDC train requirements are not met, actions shall be taken immediately to suspend loading irradiated fuel assemblies in the core. With no forced circulation cooling, decay heat removal from the core occurs by natural convection to the heat sink provided by the water above the core. A minimum reactor cavity water level of 647′ provides an adequate heat sink. Suspending any operation that would increase the decay heat load, such as loading a fuel assembly, is a prudent action under this condition.

B.3

If SDC train requirements are not met, actions shall be initiated and continued in order to satisfy SDC train requirements.

BASES

ACTIONS (continued)

B.4

If SDC train requirements are not met, all containment penetrations to the outside atmosphere must be closed to prevent fission products, if released by a loss of decay heat event, from escaping the containment building. The 4 hour Completion Time allows fixing most SDC problems without incurring the additional action of establishing containment closure.

SURVEILLANCE REQUIREMENTS

SR 3.9.4.1

This Surveillance verifies that the required Shutdown Cooling (SDC) train is OPERABLE by an administrative verification that no SDC components required for the train to perform its decay heat removal function are known to be inoperable or unavailable. No physical testing is required.

SR 3.9.4.2

This Surveillance demonstrates that the SDC train is in operation and circulating primary coolant. The required flow rate is determined by dilution accident analysis and is sufficient to provide the necessary decay heat removal capability and to prevent thermal and boron stratification in the core. The Frequency of 12 hours is sufficient, considering the flow, temperature, pump control, and alarm indications available to the operator in the control room for monitoring the SDC System.

REFERENCE

1. FSAR, Section 14

B 3.9 **REFUELING OPERATIONS**

B 3.9.5 Shutdown Cooling (SDC) - Low Water Level

BASES

BACKGROUND

The purposes of the SDC System in MODE 6 are to remove decay heat and sensible heat from the Primary Coolant System (PCS), as required by GDC 34, to provide mixing of borated coolant, to provide sufficient coolant circulation to minimize the effects of a boron dilution accident, and to prevent boron stratification (Ref. 1). Heat is removed from the PCS by circulating primary coolant through the shutdown heat exchangers, where the heat is transferred to the Component Cooling Water System via the shutdown heat exchangers. The coolant is then returned to the PCS cold legs. Operation of the SDC System for normal cooldown or decay heat removal is manually accomplished from the control room. The heat removal rate is adjusted by controlling the flow of primary coolant through the shutdown heat exchangers and bypassing the heat exchangers. Mixing of the primary coolant is maintained by this continuous circulation of primary coolant through the SDC System.

APPLICABLE SAFETY ANALYSES

If the primary coolant temperature is not maintained below 200°F, boiling of the primary coolant could result. This could lead to inadequate cooling of the reactor fuel due to the resulting loss of coolant in the reactor vessel. The loss of primary coolant and the reduction of boron concentration in the primary coolant would eventually challenge the integrity of the fuel cladding, which is a fission product barrier. Two trains of the SDC System are required to be OPERABLE, and one train is required to be in operation in MODE 6, with the water level below the 647′ elevation, to prevent this challenge.

BASES

LCO

In MODE 6, with the water level below the 647′ elevation, both SDC trains must be OPERABLE. Additionally, one train of the SDC System must be in operation in order to provide:

a. Removal of decay heat;

b. Mixing of borated coolant to minimize the possibility of a criticality; and

c. Indication of primary coolant temperature.

An OPERABLE SDC train consists of an SDC pump, a heat exchanger, valves, piping, instruments, and controls to ensure an OPERABLE flow path and to determine the PCS temperature.

APPLICABILITY

Two SDC trains are required to be OPERABLE, and one SDC train must be in operation in MODE 6, with the water level below the 647′ elevation, to provide decay heat removal. Requirements for the SDC System in other MODES are covered by LCOs in Section 3.4, Primary Coolant System. MODE 6 requirements, with a water level at or above the 647′ elevation, are covered in LCO 3.9.4, "Shutdown Cooling - High Water Level."

ACTIONS

A.1 and A.2

When the SDC flow rate is throttled to less than 2810 gpm, all of the assumptions of the dilution accident analysis are no longer met. Actions must be initiated immediately to suspend all activities which could lead to a reduction of PCS boron concentration and to assure that SDC flow remains above 1000 gpm.

A.3.1

With SDC flow less than 2810 GPM, but at least 1000 gpm, the dilution accident analysis shows satisfactory results if the assumed dilution flow is less than the capacity of a single charging pump. Action is therefore required to assure that SDC flow through the core is at least 1000 gpm, and that two charging pumps are electrically disabled. By disabling two charging pumps, the potential source of unborated PCS make up from charging pumps or primary makeup pumps is limited to 53 gpm.

BASES

ACTIONS (continued)

A.3.2

Plant conditions exist when it is desired to have charging pumps available for immediate make up, but when it is also desired to reduce SDC flow for testing or maintenance activities. Action A.3.2 provides an allowance for these conditions to exist if periodic verifications assure that no charging pump is operating. If during conditions when SDC flow is less than 2810 gpm, a dilution does occur, SHUTDOWN MARGIN must be verified by performance of SR 3.1.2.1 within 15 minutes after the dilution and every 15 minutes thereafter until a stable PCS boron concentration exists or a flow of 2810 gpm has been re-established.

B.1 and B.2

If one SDC train is inoperable, action shall be immediately initiated and continued until the SDC train is restored to OPERABLE status and to operation, or until a water level of ≥ 647′ is established in the reactor cavity. When the water level is established at 647′ or greater, the Applicability will change to that of LCO 3.9.4, "Shutdown Cooling - High Water Level," and only one SDC train is required to be in operation. An immediate Completion Time is necessary for an operator to initiate corrective actions.

C.1

If no SDC train is in operation or no SDC trains are OPERABLE, there will be no forced circulation to provide mixing to establish uniform boron concentrations. Reduced boron concentrations can occur by the addition of water with lower boron concentration than that contained in the PCS. Therefore, actions that reduce boron concentration shall be suspended immediately.

C.2

If no SDC train is in operation or no SDC trains are OPERABLE, action shall be initiated immediately and continued without interruption to restore one SDC train to OPERABLE status and operation. Since the plant is in Conditions A and B concurrently, the restoration of two OPERABLE SDC trains and one operating SDC train should be accomplished expeditiously.

BASES

ACTIONS (continued)

C.3

If no SDC train is in operation, all containment penetrations providing direct access from the containment atmosphere to the outside atmosphere must be closed within 4 hours. With the SDC train requirements not met, the potential exists for the coolant to boil away, uncover the core, and release radioactive gas to the containment atmosphere. Closing containment penetrations that are open to the outside atmosphere ensures that dose limits are not exceeded.

The Completion Time of 4 hours is reasonable, based on the low probability of the core becoming uncovered in that time.

SURVEILLANCE REQUIREMENTS

SR 3.9.5.1

This Surveillance verifies that the required Shutdown Cooling (SDC) trains are OPERABLE by an administrative verification that no SDC components required for the trains to perform their decay heat removal function are known to be inoperable or unavailable. No physical testing is required.

SR 3.9.5.2

This Surveillance demonstrates that one SDC train is in operation and circulating primary coolant. The required flow rate is determined by dilution accident analysis and is sufficient to provide the necessary decay heat removal capability and to prevent thermal and boron stratification in the core. The Frequency of 12 hours is sufficient, considering the flow, temperature, pump control, and alarm indications available to the operator in the control room for monitoring the SDC System.

SR 3.9.5.3

Verification that the required standby SDC pump has proper breaker alignment and power available ensures that an additional SDC train can be placed in operation, if needed, to maintain decay heat removal and primary coolant circulation. 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.

REFERENCE

1. FSAR, Section 14

B 3.9 **REFUELING OPERATIONS**

B 3.9.6 Reactor Cavity Water Level

BASES

BACKGROUND	The performance of CORE ALTERATIONS or movement of irradiated fuel assemblies within containment requires a minimum water level of the 647′ elevation. During refueling this maintains sufficient water level in the reactor cavity and the spent fuel pool. Sufficient water is necessary to retain iodine fission product activity in the water in the event of a fuel handling accident (Refs. 1 and 2). Sufficient iodine activity would be retained to limit offsite doses from the accident to < 25% of 10 CFR 100 limits, as provided by the guidance of Reference 4.
APPLICABLE SAFETY ANALYSES	During CORE ALTERATIONS and during movement of irradiated fuel assemblies, the water level in the reactor cavity is an initial the analysis of the fuel handling accident in containment postulated by Regulatory Guide 1.25 (Ref. 1). A minimum water level of 23 ft (Regulatory Position C.1.c of Ref. 1) allows a decontamination factor of 100 (Regulatory Position C.1.g of Ref. 1) to be used in the accident analysis for iodine. This relates to the assumption that 99% of the total iodine released from the pellet to cladding gap of all the dropped fuel assembly rods is retained by the reactor cavity water. The fuel pellet to cladding gap is assumed to contain 12% of the total fuel rod I-131 inventory (to account for increased burn-up) and 10% of the remaining fuel rod iodine inventory (Ref. 1 and Ref 2). The fuel handling accident analysis inside containment is described in Reference 2. With a minimum water level of 23 ft , the analyses demonstrate that the iodine release due to a postulated fuel handling accident is adequately captured by the water and offsite doses are maintained within allowable limits (Ref. 4).
LCO	A minimum refueling water level of ≥ 647′ elevation is required to ensure that the radiological consequences of a postulated fuel handling accident inside containment are within acceptable limits.

BASES

APPLICABILITY

LCO 3.9.6 is applicable during CORE ALTERATIONS and when moving fuel assemblies in the presence of irradiated fuel assemblies. The LCO minimizes the possibility of a fuel handling accident in containment that is beyond the assumptions of the safety analysis. If irradiated fuel is not present in containment, there can be no significant radioactivity release as a result of a postulated fuel handling accident. Requirements for fuel handling accidents in the spent fuel pool are covered by LCO 3.7.10, "Spent Fuel Pool Water Level."

ACTIONS

A.1 and A.2

With a water level below the 647′ elevation, all operations involving CORE ALTERATIONS or movement of irradiated fuel assemblies shall be suspended immediately to ensure that a fuel handling accident cannot occur.

The suspension of CORE ALTERATIONS and fuel movement shall not preclude completion of movement of a component to a safe position.

SURVEILLANCE REQUIREMENTS

SR 3.9.6.1

Verification of a minimum water level of 647′ ensures that the design basis for the postulated fuel handling accident analysis during refueling operations is met. Water at the required level above the top of the reactor vessel flange limits the consequences of damaged fuel rods that are postulated to result from a fuel handling accident inside containment (Ref. 2).

The Frequency of 24 hours is based on engineering judgment and is considered adequate in view of the large volume of water and the normal procedural controls of valve positions, which make significant unplanned level changes unlikely.

REFERENCES

1. Regulatory Guide 1.25, March 23, 1972

2. FSAR, Section 14

3. NUREG-0800, Section 15.7.4

4. 10 CFR 100.10

ATTACHMENT 3

CONSUMERS POWER COMPANY
PALISADES PLANT
DOCKET 50-255

STS CONVERSION TECHNICAL SPECIFICATION CHANGE REQUEST

3.9 REFUELING OPERATIONS PART

Comparison of Existing and Revised Technical Specifications

Palisades Tech Spec Requirement List. Corrected through Amendment 170

A list of the existing Palisades Tech Specs (TS) correlated to Palisades Revised Technical Specifications (RTS).

First Column; Existing Palisades Tech Spec (TS) number

Each numbered TS item is listed in the left-most column. Items which contain more than one requirement are listed once for each requirement.

Second Column; Palisades Revised Tech Spec (RTS) number

The nearest corresponding numbered RTS item is listed in the second column. If the item does not appear in RTS, it is noted as 'Deleted' or 'Relocated.'

Deleted is used where an item has been eliminated as a tech spec, ie deleting, iaw GL 84-15, the requirement to test a D.G. when an ECCS pump in the opposite train becomes inoperable.

Relocated is used where an item has been moved to a controlled program or document because it does not meet the "Criteria" of 10 CFR 50.36(2)(c)(ii).

Where an item is relocated or deleted, the number of the associated RTS section has been added to allow sorting the list by section number. Relocated items, such as heavy load restrictions, which are not associated with any particular RTS section are arbitrarily assigned the number 5.0.

Third Column; TS Item Description

An abbreviation of the TS requirement appears in the third column. Each item is identified as: LCO, ACTION, SR, Admin, Exception, etc. Some items are implied, rather than explicit, ie a LCO is implied when an ACTION exists without a stated LCO.

Description Key; TS requirement type:	Column 3 syntax:
Safety Limit	SL: Safety limit; Applicable conditions
Surveillance Requirement	SR: Equipment to be tested; Test description; Frequency
Limiting Safety Setting	LSS: RPS Trip Channel & required setting
Limiting Condition for Operation	LCO: Equipment to be operable; Applicable conditions
Action	ACTN: Condition requiring action; Required action; Completion time
Administrative Requirement	ADMN: Administrative requirement
Permitted Instrument Bypass	Byps: Bypassable component; conditions when bypass permitted
Defined Term	DEF: Name of defined item
Exception to other Requirement	XCPT: Excepted spec or condition; Applicable conditions
Descriptive material	DESC: Subject matter
Table	TBL: Table

Forth Column; Classification of Changes:

Each change is identified as ADMINISTRATIVE, RELOCATED, MORE RESTRICTIVE, or LESS RESTRICTIVE.

Fifth Column; Discussion of Changes:

Each change is discussed briefly.

TS Number	RTS Number	TS requirement description	Classification and Description of Changes
3.6.1.b	3.9.1	LCO: Integrity Req; W/head off & <refueling Boron	ADMINISTRATIVE: RTS (and STS) require >5% SDM when MODE 6, but do not tie this requirement to Containment Integrity.
3.8	3.9	Refueling Operations	
3.8.1.a	3.9.3.b	LCO: One Emerg air lock door closed	ADMINISTRATIVE: Requirement unchanged.
3.8.1.a	3.9.3.a	LCO: 2 pers lock doors open; Equip hatch open	ADMINISTRATIVE: Requirement unchanged.
3.8.1.a	3.9.3.a	LCO: 2 pers lock doors open; Run vent sys & fltr	ADMINISTRATIVE: Requirement unchanged.
3.8.1.b	3.9.3	LCO: All auto Iso vlvs operable or isolated	LESS RESTRICTIVE: Only those valves which provide direct path are required to be operable in RTS, as in STS.
3.8.1.c	3.9.3.2	SR: Cont Vent & purge valves; Verify operable; B4 refuel	LESS RESTRICTIVE: SR frequency changed from "immediately before refueling" to "18 months." Proposed SR, like its STS counterpart has an 18 month frequency. Therefore, it does not require valves to be tested "immediately" before refueling.
3.8.1.c	3.3.6.1, 2, 3	SR: 2 radiation monit; verify oper; B4 refuel	MORE RESTRICTIVE: Proposed SRs, like STS counterpart require verifications on a periodic basis, not "immediately" before refueling. Like most instrumentation channels, a channel check is required each 12 hrs, a channel functional test each 31 days, and a channel calibration each 18 months.
3.8.1.d	3.3.6	LCO: Monitor CB Rad lvl; Refueling	ADMINISTRATIVE: Requirement unchanged. Proposed LCO requires two radiation monitor channels to be operable during Core Alterations. These monitors actuate containment isolation during refueling.
3.8.1.d	3.3.10	LCO: Monitor SFP Rad lvl; Refueling	ADMINISTRATIVE: LCO added to instrumentation section of RTS.
3.8.1.e	3.9.2	LCO: 2 source range chnls operable; Core alt	ADMINISTRATIVE: Requirement unchanged.
3.8.1.e	3.9.2 A	LCO: 1 source range chnl operable; Refueling condition	ADMINISTRATIVE: Requirement unchanged.
3.8.1.f	3.9.4 & .5	LCO: 1 SDC pmp & HX in operation; Refueling	MORE RESTRICTIVE: RTS requires 2 SDC trains in MODE 6 if water level is <647'; 1 SDC train when level is ≥647'.
3.8.1.g	3.9.1	LCO: Maintain refueling boron; During head removal	ADMINISTRATIVE: Requirement unchanged. TS definition of "Refueling Boron Conc" is ≥5% subcritical.
3.8.1.g	3.9.1	LCO: Maintain refueling boron; During refueling ops	ADMINISTRATIVE: Requirement unchanged. TS definition of "Refueling Boron Conc" is ≥5% subcritical.
3.8.1.g	3.9.1.1	SR: PCS boron; sample; Each shift during head removal	LESS RESTRICTIVE: SR Frequency extended to 72 hrs iaw STS.

TS Number	RTS Number	TS requirement description	Classification and Description of Changes
3.8.1.g	3.9.1.1	SR: PCS boron; sample; Each shift during refuel ops	LESS RESTRICTIVE: SR Frequency extended to 72 hrs iaw STS.
3.8.1.h	3.9 Relocated	LCO: Maintain comm CR to fuel mach; During core alts	RELOCATED: This requirement does not meet criterion of 10 CFR 50.36.
3.8.2	3.9.1,.2,.3,&.4	ACTN: 3.8.1 not met; Stop refuel ops	ADMINISTRATIVE: Requirement unchanged.
3.8.2	3.9.1,.2,.3,.4,&.5	ACTN: 3.8.1 not met; Stop reactivity changes	ADMINISTRATIVE: Requirement unchanged.
3.8.2	3.9.1,.2,.4,&.5	ACTN: 3.8.1 not met; Initiate repairs to meet 3.8.1	ADMINISTRATIVE: Requirement Unchanged.
3.8.3	3.9 Relocated	LCO: Decay time for refueling >48 hrs	RELOCATED: The corresponding LCO was omitted from STS. It is not possible to make required preparations for refueling operation in such a short time. TS definition of Refueling Operation is equivalent to STS definition of Core Alterations.
3.8.4.a	3.9.3.a	LCO: Pool vent & fltr on; Moving hot fuel, hatch open	ADMINISTRATIVE: Requirement unchanged.
3.8.4.b	3.7.12	LCO: Pool vent & fltr on; Moving hot fuel in SFP	ADMINISTRATIVE: Requirement unchanged.
3.8.4	3.7.12 C/3.9.3 C	ACTN: Both fans out; Stop fuel handling	ADMINISTRATIVE: Requirement unchanged.
3.8.5	3.9 Relocated	LCO: Tilt pit temp <150°F; <1 year fuel	RELOCATED: This requirement does not meet the criterion of 10 CFR 50.36.
3.8.5	3.9 Relocated	SR: Tilt pit temp; Monitor continuously; <1 yr fuel	RELOCATED: This requirement does not meet the criterion of 10 CFR 50.36.
3.8.5	3.9 Relocated	SR: Tilt pit temp; Monitor after fuel addn 24 hrs	RELOCATED: This requirement does not meet the criterion of 10 CFR 50.36.
3.8.5	3.9 Relocated	SR: Tilt pit temp monitoring, when pool clg failed	RELOCATED: This requirement does not meet the criterion of 10 CFR 50.36.
3.10.1.c.1.b	3.9.4 A/3.9.5 A	ACTN: <525°F, 2810 >flow ≥610; 2 Chg pumps off, or c.2	ADMINISTRATIVE: Requirements unchanged except for higher required minimum flow rate of 100 gpm.
3.10.1.c.2	3.9.4 A/3.9.5 A	ACTN: <525°F, 2810 >flow ≥610, Chg on; Stop Chg, chk SDM	ADMINISTRATIVE: Requirements unchanged except for higher required minimum flow rate of 100 gpm.
3.10.1.c.2(a)	3.9.4 A/3.9.5 A	ACTN: <525°F, 2810 >flow ≥610, Chg on; Stop Chg, chk SDM	ADMINISTRATIVE: Requirements unchanged except for higher required minimum flow rate of 100 gpm.

ATTACHMENT 4

CONSUMERS POWER COMPANY
PALISADES PLANT
DOCKET 50-255

STS CONVERSION TECHNICAL SPECIFICATION CHANGE REQUEST

3.9 REFUELING OPERATIONS PART

STS Pages Marked to Show the Differences Between RTS and STS

3.9 **REFUELING OPERATIONS**

3.9.1 Boron Concentration

LCO 3.9.1 Boron concentrations of the ~~Reactor~~ Primary Coolant System, ~~[the refueling canal~~, and the refueling cavity~~]~~ shall be maintained within the limit specified in the COLR.

APPLICABILITY: MODE 6.

ACTIONS

CONDITION	REQUIRED ACTION	COMPLETION TIME
A. Boron concentration not within limit.	A.1 Suspend CORE ALTERATIONS.	Immediately
	AND	
	A.2 Suspend positive reactivity additions.	Immediately
	AND	
	A.3 Initiate action to restore boron concentration to within limit.	Immediately

SURVEILLANCE REQUIREMENTS

SURVEILLANCE		FREQUENCY
SR 3.9.1.1	Verify boron concentration is within the limit specified in the COLR.	72 hours

3.9 **REFUELING OPERATIONS**

3.9.2 Nuclear Instrumentation

LCO 3.9.2 Two source range ~~monitors (SRMs)~~ channels shall be OPERABLE.

APPLICABILITY: MODE 6.

ACTIONS

CONDITION	REQUIRED ACTION	COMPLETION TIME
A. One ~~[required] SRM~~ source range channel inoperable.	A.1 Suspend CORE ALTERATIONS. AND A.2 Suspend positive reactivity additions.	Immediately Immediately
B. Two ~~[required~~ SRMs source range channels inoperable.	B.1 Initiate action to restore one ~~SRM~~ source range channel to OPERABLE status. AND B.2 Perform SR 3.9.1.1. (Boron Verification)	Immediately 4 hours AND Once per 12 hours thereafter

SURVEILLANCE REQUIREMENTS

SURVEILLANCE		FREQUENCY
SR 3.9.2.1	Perform CHANNEL CHECK on each source range channel.	12 hours
SR 3.9.2.2	~~NOTE~~ ~~Neutron detectors are excluded from CHANNEL CALIBRATION.~~ Perform CHANNEL CALIBRATION on each source range channel.	~~[~~18~~]~~ months

3.9 REFUELING OPERATIONS

3.9.3 Containment Penetrations

LCO 3.9.3 The containment penetrations shall be in the following status:

a. ~~The equipment hatch closed and held in place by [four] bolts;~~ Whenever both doors of the personnel air lock are open during core alterations, the equipment door shall be open and the ventilating system and charcoal filter in the fuel storage building shall be operating; and

b. One door in ~~each~~ the emergency air lock closed; and

c. Each penetration, other than a. or b. above, providing direct access from the containment atmosphere to the outside atmosphere either:

1. closed by a manual ~~or~~ valve, de-activated automatic isolation valve, blind flange, or equivalent, or

2. capable of being closed by an OPERABLE Containment ~~Purge and Exhaust Isolation System~~ Refueling Radiation Monitor.

APPLICABILITY: During CORE ALTERATIONS,
During movement of irradiated fuel assemblies within containment.

(continued)

ACTIONS

CONDITION	REQUIRED ACTION		COMPLETION TIME
A. One or more containment penetrations not in required status.	A.1	Suspend CORE ALTERATIONS.	Immediately
	AND		
	A.2	Suspend movement of irradiated fuel assemblies within containment.	Immediately
	AND		
	A.3	Suspend positive reactivity additions.	Immediately

SURVEILLANCE REQUIREMENTS

	SURVEILLANCE	FREQUENCY
SR 3.9.3.1	Verify each required containment penetration, and the spent fuel pool ventilation and charcoal filter system is in the required status.	7 days
SR 3.9.3.2	Verify each required containment ~~purge and exhaust~~ isolation valve actuates to the isolation position on an actual or simulated ~~actuation~~ Containment High Radiation signal.	~~[~~18~~]~~ months

3.9 REFUELING OPERATIONS

3.9.4 Shutdown Cooling (SDC) ~~and Coolant Circulation~~ - High Water Level

LCO 3.9.4 One SDC ~~loop~~ train shall be OPERABLE, providing ≥ 2810 gpm through the core ~~shall be in operation~~.

----------------------------NOTE----------------------------
The required SDC ~~loop~~ train may be removed from operation for ≤ 1 hour per ~~[8]~~ hour period, provided no operations are permitted that would cause reduction of the ~~Reactor~~ Primary Coolant System boron concentration.

APPLICABILITY: MODE 6 with the reactor cavity water level ≥ ~~23 ft above the top of reactor vessel flange~~ 647' elevation.

ACTIONS

CONDITION	REQUIRED ACTION	COMPLETION TIME
A. Required SDC train flow rate < 2810 gpm.	A.1 Suspend all operation involving reduction of primary coolant boron concentration.	Immediately
	AND	
	A.2 Initiate action to assure SDC flow ≥ 1000 gpm.	Immediately
	AND	
	A.3.1 Verify two of three charging pumps are electrically disabled.	15 minutes
	OR	
	A.3.2 Initiate action to perform SR 3.1.2.1 (verify SDM).	Within 15 minutes following dilution flow to the PCS AND Every 15 minutes thereafter until stable PCS boron concentration exists

CONDITION	REQUIRED ACTION	COMPLETION TIME
~~A~~B. SDC ~~loop~~ train requirements not met for reasons other than Condition A.	~~A~~B.1 Suspend operations involving a reduction in ~~reactor~~ primary coolant boron concentration.	Immediately
	<u>AND</u>	
	~~A~~B.2 Suspend loading irradiated fuel assemblies in the core.	Immediately
	<u>AND</u>	
	~~A~~B.3 Initiate action to satisfy SDC ~~loop~~ train requirements.	Immediately
	<u>AND</u>	
	~~A~~B.4 Close all containment penetrations providing direct access from containment atmosphere to outside atmosphere.	4 hours

SURVEILLANCE REQUIREMENTS

SURVEILLANCE		FREQUENCY
SR 3.9.4.1	Verify one SDC train is OPERABLE.	12 hours
SR 3.9.4.~~1~~2	Verify one SDC ~~loop~~ train is in operation and circulating ~~reactor~~ primary coolant at a flow rate of ≥ ~~[2200]~~2810 gpm.	12 hours

3.9 REFUELING OPERATIONS

3.9.5 Shutdown Cooling (SDC) ~~and Coolant Circulation~~ - Low Water Level

LCO 3.9.5 Two SDC ~~loops~~ trains shall be OPERABLE, ~~and~~with one SDC ~~loop~~ train providing ≥ 2810 gpm through the core ~~shall be in operation~~.

APPLICABILITY: MODE 6 with the reactor cavity water level ~~< 23 ft above the top of reactor vessel flange~~ < 647' elevation.

ACTIONS

CONDITION	REQUIRED ACTION	COMPLETION TIME
A. Required SDC train flow rate < 2810 gpm.	A.1 Suspend all operation involving reduction of primary coolant boron concentration.	Immediately
	AND	
	A.2 Initiate action to assure SDC flow ≥ 1000 gpm.	Immediately
	AND	
	A.3.1 Verify two of three charging pumps are electrically disabled.	15 minutes
	OR	
	A.3.2 Perform SR 3.1.2.1 (verify SDM).	Within 15 minutes following dilution flow to the PCS AND Every 30 minutes thereafter until stable PCS boron exists

ACTIONS (continued)

CONDITION	REQUIRED ACTION	COMPLETION TIME
~~A~~B. One SDC ~~loop~~ train inoperable.	~~A~~B.1 Initiate action to restore SDC ~~loop~~ train to OPERABLE status.	Immediately
	OR	
	~~A~~B.2 Initiate action to establish ~~≥ 23 ft of~~ reactor cavity water ~~above the top of reactor vessel flange~~ level ≥ 647′ elevation.	Immediately
~~B~~C. No SDC ~~loop~~ train OPERABLE or in operation.	~~B~~C.1 Suspend operations involving a reduction in ~~reactor~~ primary coolant boron concentration.	Immediately
	AND	
	~~B~~C.2 Initiate action to restore one SDC ~~loop~~ train to OPERABLE status and to operation.	Immediately
	AND	
	~~B~~C.3 Close all containment penetrations providing direct access from containment atmosphere to outside atmosphere.	4 hours

SURVEILLANCE REQUIREMENTS

SURVEILLANCE		FREQUENCY
SR 3.9.5.1	Verify required SDC trains are OPERABLE.	12 hours
SR 3.9.5.~~1~~2	Verify ~~required SDC loops are OPERABLE and~~ one SDC ~~loop~~ train is in operation and circulating primary coolant at a flow rate of ≥ 2810 gpm.	12 hours
SR 3.9.5.~~2~~3	Verify correct breaker alignment and indicated power available to the required SDC pump that is not in operation.	7 days

3.9 REFUELING OPERATIONS

3.9.6 ~~Refueling~~ Reactor Cavity Water Level

LCO 3.9.6 The reactor cavity ~~Refueling~~ water level shall be maintained ~~≥ 23 ft above the top of reactor vessel flange~~ ≥ 647′ elevation.

APPLICABILITY: During CORE ALTERATIONS~~, except during latching and unlatching of control rod drive shafts,~~
During movement of irradiated fuel assemblies within containment.

ACTIONS

CONDITION	REQUIRED ACTION	COMPLETION TIME
A. ~~Refueling~~ Reactor cavity water level not within limit.	A.1 Suspend CORE ALTERATIONS.	Immediately
	AND	
	A.2 Suspend movement of irradiated fuel assemblies within containment.	Immediately
	~~AND~~	
	~~A.3 Initiate action to restore refueling cavity water level to within limit.~~	~~Immediately~~

SURVEILLANCE REQUIREMENTS

SURVEILLANCE		FREQUENCY
SR 3.9.6.1	Verify ~~refueling~~ reactor cavity water level is ~~≥ 23 ft above the top of reactor vessel flange.~~ ≥ 647′ elevation.	24 hours

ATTACHMENT 5

CONSUMERS POWER COMPANY
PALISADES PLANT
DOCKET 50-255

STS CONVERSION TECHNICAL SPECIFICATION CHANGE REQUEST

3.9 REFUELING OPERATIONS PART

STS Bases Pages Marked to Show the Differences Between RTS and STS

B 3.9 REFUELING OPERATIONS

B 3.9.1 Boron Concentration

BASES

BACKGROUND

The limit on the boron concentrations of the ~~Reactor~~ Primary Coolant System (~~RCS~~PCS)~~, the refueling canal,~~ and ~~refueling~~reactor cavity during refueling ensures that the reactor remains subcritical during MODE 6. Refueling boron concentration is the soluble boron concentration in the coolant in each of these volumes having direct access to the reactor core during refueling.

The soluble boron concentration offsets the core reactivity and is measured by chemical analysis of a representative sample of the coolant in each of the volumes. The refueling boron concentration limit is specified in the COLR. ~~unit~~plant procedures ensure the specified boron concentration in order to maintain an overall core reactivity of $k_{eff} \leq 0.95$ during fuel handling, with control ~~element assemblies (CEAs)~~ rods and fuel assemblies assumed to be in the most adverse configuration (least negative reactivity) allowed by ~~unit~~plant procedures.

GDC 26 of 10 CFR 50, Appendix A, requires that two independent reactivity control systems of different design principles be provided (Ref. 1). One of these systems must be capable of holding the reactor core subcritical under cold conditions. The Chemical and Volume Control System (CVCS) is the system capable of maintaining the reactor subcritical in cold conditions by maintaining the boron concentration.

~~The reactor is brought to shutdown conditions before beginning operations to open the reactor vessel for refueling.~~ After the ~~RCS~~PCS is cooled and depressurized ~~and~~ the vessel head is ~~unbolted, the head is slowly~~ removed ~~to form the refueling~~reactor cavity. The ~~refueling canal and the refueling~~reactor cavity are then flooded with borated water from the safety injection refueling water tank~~ into the open reactor vessel by gravity feeding or by the use of the Shutdown Cooling (SDC) System pumps~~.

BASES

~~The pumping action of the SDC System in the RCSPCS and the natural circulation due to thermal driving heads in the reactor vessel and the refueling~~reactor cavity mix the added ~~concentrated boric acid with the water in the refueling canal.~~ The Shutdown Cooling (SDC) System is in operation during refueling (see LCOs 3.9.4~~, "Shutdown Cooling (SDC) and Coolant Circulation - High Water Level,"~~ and ~~LCO~~ 3.9.5~~, "Shutdown Cooling (SDC) and Coolant Circulation - Low Water Level")~~ to provide forced circulation in the ~~RCS~~PCS and assist in maintaining the boron concentrations in the ~~RCS~~PCS~~, the refueling canal,~~ and the ~~refueling~~reactor cavity above the COLR limit.

APPLICABLE SAFETY ANALYSES

During refueling operations, the reactivity condition of the core is consistent with the initial conditions assumed for the boron dilution accident ~~in the accident~~ analysis and is conservative for MODE 6. The boron concentration limit specified in the COLR is based on the core reactivity at the beginning of each fuel cycle (the end of refueling) and includes an uncertainty allowance.

The required boron concentration and the ~~unit~~plant refueling procedures that demonstrate the correct fuel loading plan (including full core mapping) ensure the k_{eff} of the core will remain $\leq$ 0.95 during the refueling operation.~~ Hence, at least a 5% Δk/k margin of safety is established during refueling.~~

~~During refueling, the water volume in the spent fuel pool, the transfer canal, the refueling canal, the refueling cavity, and the reactor vessel form a single mass. As a result, the soluble boron concentration is relatively the same in each of these volumes.~~

The limiting boron dilution accident analyzed occurs in MODE 5 ~~(Ref. 2)~~. A ~~detailed~~ discussion of this event is provided in the Bases for LCO ~~B~~ 3.1.2, "SHUTDOWN MARGIN - $T_{ave} \leq$ ~~200~~525°F."

~~The RCS boron concentration satisfies Criterion 2 of the NRC Policy Statement.~~

LCO

The LCO requires that a minimum boron concentration be maintained in the ~~RCS~~PCS~~, the refueling canal,~~ and ~~refueling~~reactor cavity while in MODE 6. The boron concentration limit specified in the COLR ensures a core k_{eff} of $\leq$ 0.95 is maintained during fuel handling operations. Violation of the LCO could lead to an inadvertent criticality~~ during MODE 6~~.

BASES

APPLICABILITY

This LCO is applicable in MODE 6 to ensure that the fuel in the reactor vessel will remain subcritical. The required boron concentration ensures a $k_{eff} \leq 0.95$. Above MODE 6, LCO 3.1.1, "SHUTDOWN MARGIN (SDM) - T_{ave} > ~~200~~525°F," and LCO 3.1.2, "SHUTDOWN MARGIN - $T_{ave} \leq$ ~~200~~525°F," ensure that an adequate amount of negative reactivity is available to shut down the reactor and to maintain it subcritical.

ACTIONS

A.1 and A.2

Continuation of CORE ALTERATIONS or positive reactivity additions (including actions to reduce boron concentration) is contingent upon maintaining the ~~unit~~plant in compliance with the LCO. If the boron concentration of any coolant volume in the ~~RCS~~PCS~~, the refueling canal,~~ or the ~~refueling~~reactor cavity is less than its limit, all operations involving CORE ALTERATIONS or positive reactivity additions must be suspended immediately.

Suspension of CORE ALTERATIONS, movement of irradiated fuel assemblies, and positive reactivity additions shall not preclude moving a component to a safe position.

A.3

In addition to immediately suspending CORE ALTERATIONS or positive reactivity additions, boration to restore the concentration must be initiated immediately.

In determining the required combination of boration flow rate and concentration, there is no unique design basis event that must be satisfied. The only requirement is to restore the boron concentration to its required value as soon as possible. In order to raise the boron concentration as soon as possible, the operator should begin boration with the best source available for ~~unit~~plant conditions.

Once boration is initiated, it must be continued until the boron concentration is restored. The restoration time depends on the amount of boron that must be injected to reach the required concentration.

BASES

SURVEILLANCE REQUIREMENTS

SR 3.9.1.1

This SR ensures the coolant boron concentration in the ~~RCS~~PCS~~, the refueling canal,~~ and the ~~refueling~~reactor cavity is within the COLR limits. The boron concentration of the coolant in each volume is determined periodically by chemical analysis.

A minimum Frequency of once every 72 hours is therefore a reasonable amount of time to verify the boron concentration of representative samples. The Frequency is based on operating experience, which has shown 72 hours to be adequate.

REFERENCES

1. 10 CFR 50, Appendix A, GDC 26

~~2. FSAR, Section [ ]~~

B 3.9 **REFUELING OPERATIONS**

B 3.9.2 Nuclear Instrumentation

BASES

BACKGROUND

The source range ~~monitors (SRMs)~~ channels of Nuclear Instruments NI-01/03 and NI-02/04 are used during refueling operations to monitor the core reactivity ~~condition~~. ~~The installed SRMs are part of the Nuclear Instrumentation System (NIS).~~ These detectors are located external to the reactor vessel and detect neutrons leaking from the core. The use of portable detectors is permitted, provided the LCO requirements are met.

The installed ~~SRMs are BF3 detectors operating in the proportional region of the gas filled detector characteristic curve. The~~ detectors monitor the neutron flux in counts per second. ~~The instrument range covers five decades of neutron flux (1E+5 cps) with a [5%] instrument accuracy.~~ The detectors ~~also~~ provide continuous visual and audible indication in the control room ~~and an audible alarm~~ to alert operators to a possible dilution accident. ~~The NIS is designed in accordance with the criteria presented in Reference 1.~~

If used, portable detectors should be functionally equivalent to the ~~NIS SRMs~~ installed source range channels.

APPLICABLE SAFETY ANALYSES

Two OPERABLE ~~SRMs~~ source range channels are required to provide a signal to alert the operator to unexpected changes in core reactivity such as by a boron dilution accident or an improperly loaded fuel assembly. The safety analysis of the uncontrolled boron dilution accident is described in Reference 2. The analysis of the uncontrolled boron dilution accident shows that normally available SHUTDOWN MARGIN would be reduced, but there is sufficient time for the operator to take corrective actions.

~~The SRMs satisfy Criterion 3 of the NRC Policy Statement.~~

LCO

This LCO requires two ~~SRMs~~ OPERABLE source range channels to ensure that redundant monitoring capability is available to detect changes in core reactivity.

BASES

APPLICABILITY

In MODE 6, the ~~SRMs~~source range channels must be OPERABLE to determine changes in core reactivity. There is no other direct means available to check core reactivity levels.

In MODES 2, 3, 4, and 5, the installed source range detectors and circuitry are required to be OPERABLE by LCO ~~3.3.2, "RPS Instrumentation Shutdown."~~3.3.9, "Neutron Flux Monitoring".

ACTIONS

A.1 and A.2

With only one ~~SRM~~source range channel OPERABLE, redundancy has been lost. Since these instruments are the only direct means of monitoring core reactivity conditions, CORE ALTERATIONS and positive reactivity additions must be suspended immediately. Performance of Required Action A.1 shall not preclude completion of movement of a component to a safe position.

B.1

With no ~~SRM~~ OPERABLE source range channels, action to restore ~~a monitor~~one source range channel to OPERABLE status shall be initiated immediately. Once initiated, action shall be continued until ~~an SRM~~ it is restored to OPERABLE status.

B.2

With no ~~SRM~~ OPERABLE source range channels, there is no direct means of detecting changes in core reactivity. However, since CORE ALTERATIONS and positive reactivity additions are not to be made, the core reactivity condition is stabilized until the ~~SRMs~~ source range channels are OPERABLE. This stabilized condition is determined by performing SR 3.9.1.1 to verify that the required boron concentration exists.

The Completion Time of 4 hours is sufficient to obtain and analyze a ~~reactor~~primary coolant sample for boron concentration. The Frequency of once per 12 hours ensures that unplanned changes in boron concentration would be identified. The 12 hour Frequency is reasonable, considering the low probability of a change in core reactivity during this period.

BASES

SURVEILLANCE REQUIREMENTS

SR 3.9.2.1

SR 3.9.2.1 is the performance of a CHANNEL CHECK, which is a comparison of the parameter indicated on one channel to a similar parameter on other channels. It is based on the assumption that the two indication channels should be consistent with core conditions, but does not require the two source range channels to have the same reading. Changes in fuel loading and core geometry can result in significant differences between source range channels, but each channel should be consistent with its local conditions.

The Frequency of 12 hours is consistent with the CHANNEL CHECK Frequency specified similarly for the same instruments in LCO 3.3.1, "Reactor Protection System Instrumentation - Operating."

SR 3.9.2.2

SR 3.9.2.2 is the performance of a CHANNEL CALIBRATION every 18 months. ~~This SR is modified by a Note stating that neutron detectors are excluded from the CHANNEL CALIBRATION. The CHANNEL CALIBRATION for the source range neutron flux monitors consists of obtaining the detector plateau or preamp discriminator curves, evaluating those curves, and comparing the curves to the manufacturer's data.~~ The 18 month Frequency is based on the need to perform this Surveillance under the conditions that apply during a plant outage. Operating experience has shown these components usually pass the Surveillance when performed on the 18 month Frequency.

REFERENCES

1. 10 CFR 50, Appendix A, GDC 13, GDC 26, GDC 28, and GDC 29
2. FSAR, Section 14

Containment Penetrations
B 3.9.3

B 3.9 **REFUELING OPERATIONS**

B 3.9.3 Containment Penetrations

BASES

BACKGROUND

During CORE ALTERATIONS or movement of fuel assemblies within containment with irradiated fuel in containment, a release of fission product radioactivity within the containment will be restricted from escaping to the environment when the LCO requirements are met. In MODES 1, 2, 3, and 4, this is accomplished by maintaining containment OPERABLE as described in LCO 3.6.1, "Containment." In MODE 6, the potential for containment pressurization as a result of an accident is not likely; therefore, requirements to isolate the containment from the outside atmosphere can be less stringent. The ~~LCO~~ requirements of this LCO are referred to as "containment closure" rather than "containment OPERABILITY." Containment closure means that all potential escape paths are either closed or capable of being closed, or provide a controlled ventilation flow path through the Spent Fuel Pool ventilation charcoal filters. Since there is no potential for containment pressurization, the Appendix J leakage criteria and tests are not required.

The containment serves to contain fission product radioactivity that may be released from the reactor core following an accident, such that offsite radiation exposures are maintained well within the requirements of 10 CFR 100. Additionally, the containment structure provides radiation shielding from the fission products that may be present in the containment atmosphere following accident conditions.

The containment equipment hatch, which is part of the containment pressure boundary, provides a means for moving large equipment and components into and out of containment. During CORE ALTERATIONS or movement of irradiated fuel assemblies within containment, the equipment hatch ~~must be held in place by at least four bolts (Good engineering practice dictates that the bolts required by this LCO be approximately equally spaced)~~may be open because it opens into the fuel handling building.

BASES

The charcoal filter installed in the fuel handling building exhaust will handle the full (approximately 10,000) cfm capacity of the normal ventilation flow with both exhaust fans operating. The normal mode of operation will require that the ventilation supply fan and one exhaust fan be manually tripped following a radioactivity release with a resulting flow of 7300 cfm through the filter. Any radioactivity which should inadvertently, during a refueling operation, pass through the normally opened equipment door would be handled by the charcoal filter in the fuel handling building. The several radiation monitors installed in the containment building and the fuel handling building will give adequate warning to the refueling crew if radioactivity is released. The efficiency of the installed charcoal filters is at least 90% for inorganic species and 70% for organic species with rated flows. The offsite thyroid dose for the bounding accident in the fuel handling building (the cask drop accident) is less than 39 rem at the site boundary using the filter efficiencies specified above.

~~The containment air locks, which are also part of the containment pressure boundary, provide a means for personnel access during MODES 1, 2, 3, and 4 operation in accordance with LCO 3.6.2, "Containment Air Locks." Each air lock has a door at both ends. The doors are normally interlocked to prevent simultaneous opening when containment OPERABILITY is required. During periods of shutdown when containment closure is not required, the door interlock mechanism may be disabled, allowing both doors of an air lock to remain open for extended periods when frequent containment entry is necessary. During CORE ALTERATIONS or movement of irradiated fuel assemblies within containment, containment closure is required; therefore, the door interlock mechanism may remain disabled, but one air lock door must always remain closed.~~

The emergency air lock privides access to the containment directly from the auxilliary building roof. During CORE ALTERATIONS and movement of irradiated fuel assemblies within the containment, at least one door in the emergency air lock must be closed to prevent possible escape of fission products following a fuel handeling accident.

The personnel air lock provides access to the containment from within the auxilliary building. During CORE ALTERATIONS and movement of irradiated fuel assemblies within the containment, at least one door in the personnel air lock must be closed, unless the equipment hatch is open and the spent fuel pool ventilation and charcoal filter system is operating.

BASES

The requirements on containment penetration closure ensure that a release of fission product radioactivity within containment will be restricted from escaping to the environment. The closure restrictions are sufficient to restrict fission product radioactivity release from containment due to a fuel handling accident during refueling.

~~The Containment Purge and Exhaust System includes two subsystems. The normal subsystem includes a 42 inch purge penetration and a 42 inch exhaust penetration. The second subsystem, a minipurge system, includes an 8 inch purge penetration and an 8 inch exhaust penetration. During MODES 1, 2, 3, and 4, the two valves in each of the normal purge and exhaust penetrations are secured in the closed position. The two valves in each of the two minipurge penetrations can be opened intermittently, but are closed automatically by the Engineered Safety Features Actuation System (ESFAS). Neither of the subsystems is subject to a Specification in MODE 5.~~

~~In MODE 6, large air exchanges are necessary to conduct refueling operations. The normal 42 inch purge system is used for this purpose and all valves are closed by the ESFAS in accordance with LCO 3.3.2, "Reactor Protective System (RPS) — Shutdown."~~

~~The minipurge system remains operational in MODE 6 and all four valves are also closed by the ESFAS.~~

~~or~~

~~The minipurge system is not used in MODE 6. All four [8] inch valves are secured in the closed position.~~

The ~~other~~ containment penetrations that provide direct access from containment atmosphere to outside atmosphere must be capable of being closed by a Containment High Radiation Signal, or be isolated ~~on at least one side. Isolation may be achieved~~ by ~~an OPERABLE~~ a de-activated automatic isolation valve, or by a manual isolation valve, blind flange, or equivalent. Equivalent isolation methods must be approved as temporary plant modidfications and may include use of a material that can provide a temporary, atmospheric pressure ventilation barrier for the other containment penetrations during fuel movements ~~(Ref. 1)~~.

BASES

The fuel transfer tube may be open because, during CORE ALTERATIONS and movement if irradiated fuel assemblies within the containment, it is sealed by the water level in the reactor cavity. LCO 3.9.6, "Reactor Cavity Water Level" specifies the required water level, and is also applicable during CORE ALTERATIONS and movement of irradiated fuel assemblies within the containment.

APPLICABLE SAFETY ANALYSES

During CORE ALTERATIONS or movement of irradiated fuel assemblies within containment, the most severe radiological consequences result from a fuel handling accident. The fuel handling accident is a postulated event that involves damage to irradiated fuel (Ref. ~~2~~1). ~~Fuel handling accidents, analyzed in Reference 3, include dropping a single irradiated fuel assembly and handling tool or a heavy object onto other irradiated fuel assemblies.~~ The requirements of LCO 3.9.6, "~~Refueling~~Reactor Cavity Water Level," ~~and the minimum decay time of [72] hours prior to CORE ALTERATIONS~~ ensure that the release of fission product radioactivity, subsequent to a fuel handling accident, results in doses that are ~~well~~ within the ~~guideline~~ values specified in 10 CFR 100. ~~The acceptance limits for offsite radiation exposure are contained in Standard Review Plan Section 15.7.4, Rev. 1 (Ref. 2), which defines "well within" 10 CFR 100 to be 25% or less of the 10 CFR 100 values.~~

~~Containment penetrations satisfy Criterion 3 of the NRC Policy Statement.~~

LCO

This LCO limits the consequences of a fuel handling accident in containment by limiting the potential escape paths for fission product radioactivity released within containment. The LCO requires any penetration providing direct access from the containment atmosphere to the outside atmosphere to be closed except for the ~~OPERABLE containment purge and exhaust penetrations~~ equipment hatch, personnel air lock and penetrations capable of being closed by an Containment High Radiation signal. ~~For the OPERABLE containment purge and exhaust penetrations, this LCO ensures that these penetrations are isolable by the Containment Purge and Exhaust Isolation System. The OPERABILITY requirements for this LCO ensure that the automatic purge and exhaust valve closure times specified in the FSAR can be achieved and therefore meet the assumptions used in the safety analysis to ensure releases through the valves are terminated, such that the radiological doses are within the acceptance limit.~~

BASES

There is no specific closure time requirement for these containment isolation valves, since the accident analyses make no specific assumptions about containment closure time after a feul handeling accident.

APPLICABILITY

The containment penetration requirements are applicable during CORE ALTERATIONS or movement of irradiated fuel assemblies within containment because this is when there is a potential for a fuel handling accident. In MODES 1, 2, 3, and 4, containment penetration requirements are addressed by LCO 3.6.1, "Containment." In MODE~~S~~ 5, and MODE 6~~,~~ when CORE ALTERATIONS or movement of irradiated fuel assemblies within containment are not being conducted, the potential for a fuel handling accident does not exist. Therefore, under these conditions no requirements are placed on containment penetration status.

ACTIONS

A.1 and A.2

With the containment equipment hatch, air locks, or any containment penetration that provides direct access from the containment atmosphere to the outside atmosphere not in the required status, ~~including the Containment Purge and Exhaust Isolation System not capable of automatic actuation when the purge and exhaust valves are open,~~ the ~~unit~~plant must be placed in a condition in which the isolation function is not needed. This is accomplished by immediately suspending CORE ALTERATIONS and movement of irradiated fuel assemblies within containment. Performance of these actions shall not preclude completion of movement of a component to a safe position.

A.3

Continuation of positive reactivity additions (including actions to reduce boron concentration) is contingent upon maintaining the plant in compliance with the LCO. If the containment closure requirements are not met, all operations involving positive reactivity additions must be suspended immediately.

BASES

SURVEILLANCE REQUIREMENTS

SR 3.9.3.1

This Surveillance demonstrates that each of the containment penetrations required to be in ~~its closed~~ in a specific position or condition is in ~~that position~~ its required status. The ~~Surveillance on the open purge and exhaust valves will demonstrate that the valves are not blocked from closing. Also, the~~ Surveillance will demonstrate that each valve operator has motive power, which will ensure each valve is capable of being closed by ~~an OPERABLE automatic containment purge and exhaust isolation~~ a Containment High Radiation signal.

The Surveillance is performed every 7 days during CORE ALTERATIONS or movement of irradiated fuel assemblies within the containment. ~~The Surveillance interval is selected to be commensurate with the normal duration of time to complete fuel handling operations. A surveillance before the start of refueling operations will provide two or three surveillance verifications during the applicable period for this LCO. As such,~~ this Surveillance ~~ensures~~ helps assure that for a postulated fuel handling accident that releases fission product radioactivity within the containment will not result in ~~a~~an excessive release of fission product radioactivity to the environment.

SR 3.9.3.2

This Surveillance demonstrates that each required containment ~~purge and exhaust~~ isolation valve actuates to its isolation position ~~on manual initiation or~~ on an actual or simulated Containment High Radiation signal. The 18 month Frequency maintains consistency with other similar ESFAS instrumentation and valve testing requirements. ~~In~~ LCO ~~3.3.4 [(Digital) or 3.3.3 (Analog)], "Miscellaneous Actuations," the Containment Purge Isolation Signal System~~ 3.3.7, "Refueling Containment Radiation Monitors" requires a CHANNEL CHECK every ~~7 days~~ 12 hours, ~~and~~ a CHANNEL FUNCTIONAL TEST every 31 days, and a CHANNEL CALIBRATION every 18 months for the Refueling Containment Radiation Monitors. ~~to ensure the channel OPERABILITY during refueling operations. Every 18 months a CHANNEL CALIBRATION is performed. The system actuation response time is demonstrated every 18 months, during refueling, on a STAGGERED TEST BASIS. SR 3.6.3.5 demonstrates that the isolation time of each valve is in accordance with the Inservice Testing Program requirements. These surveillances performed during MODE 6 will ensure that the valves are capable of closing after a postulated fuel handling accident to limit a release of fission product radioactivity from the containment.~~

BASES

REFERENCES

~~1. GPU Nuclear Safety Evaluation SE 0002000 001, Rev. 0, May 20, 1988~~

~~2~~1. FSAR, Section 14

~~3. NUREG 0800, Section 15.7.4, Rev. 1, July 1981~~

B 3.9 REFUELING OPERATIONS

B 3.9.4 Shutdown Cooling (SDC) ~~and Coolant Circulation~~ - High Water Level

BASES

BACKGROUND

The purposes of the SDC System in MODE 6 are to remove decay heat and sensible heat from the ~~Reactor~~ Primary Coolant System (~~RCS~~PCS), as required by GDC 34, to provide mixing of borated coolant, to provide sufficient coolant circulation to minimize the effects of a boron dilution accident, and to prevent boron stratification (Ref. 1). Heat is removed from the ~~RCS~~PCS by circulating ~~reactor~~ primary coolant through the ~~SDC~~ shutdown heat exchanger~~(s)~~, where the heat is transferred to the Component Cooling Water System via the ~~SDC~~ shutdown heat exchanger~~(s)~~. The coolant is then returned to the ~~RCS~~PCS ~~via the RCS~~ cold leg~~(s)~~. Operation of the SDC System for normal cooldown or decay heat removal is manually accomplished from the control room. The heat removal rate is adjusted by controlling the flow of ~~reactor~~ primary coolant through the ~~SDC~~ shutdown heat exchanger~~(s)~~ and bypassing the heat exchanger~~(s)~~. Mixing of the ~~reactor~~ primary coolant is maintained by this continuous circulation of ~~reactor~~ primary coolant through the SDC System.

APPLICABLE SAFETY ANALYSES

If the ~~reactor~~ primary coolant temperature is not maintained below 200°F, boiling of the ~~reactor~~ primary coolant could result. This could lead to inadequate cooling of the reactor fuel due to a resulting loss of coolant in the reactor vessel. ~~Additionally, boiling of the reactor coolant could lead to a reduction in boron concentration in the coolant due to the boron plating out on components near the areas of the boiling activity, and because of the possible addition of water to the reactor vessel with a lower boron concentration than is required to keep the reactor subcritical.~~ The loss of ~~reactor~~ primary coolant and the reduction of boron concentration in the ~~reactor~~primary coolant would eventually challenge the integrity of the fuel cladding, which is a fission product barrier. One train of the SDC System is required to be operational in MODE 6, with the water level ~~≥ 23 ft above the top of the reactor vessel flange~~ at or above the 647 foot elevation, to prevent this challenge. ~~The LCO does permit de-energizing of the SDC pump for short durations under the condition that the boron concentration is not diluted. This conditional de-energizing of the SDC pump does not result in a challenge to the fission product barrier. SDC and Coolant Circulation—High Water Level satisfies Criterion 2 of the NRC Policy Statement.~~

BASES

LCO

Only one SDC ~~loop~~train is required for decay heat removal in MODE 6, with water level ~~≥ 23 ft above the top of the reactor vessel flange~~ ≥ 647' elevation. Only one SDC ~~loop~~train is required because the volume of water above the reactor vessel flange provides backup decay heat removal capability. At least one SDC ~~loop~~train must be in operation to provide:

a. Removal of decay heat;

b. Mixing of borated coolant to minimize the possibility of a criticality; and

c. Indication of ~~reactor~~primary coolant temperature.

An ~~OPERABLE~~ SDC ~~loop~~train includes an SDC pump, a heat exchanger, valves, piping, instruments, and controls to ensure an OPERABLE flow path and to determine the ~~low end~~PCS temperature. ~~The flow path starts in one of the RCS hot legs and is returned to the RCS cold legs.~~

The LCO is modified by a Note that allows the required operating SDC ~~loop~~train to be removed from service for up to 1 hour in each 8 hour period, provided no operations are permitted that would cause a reduction of the ~~RCS~~PCS boron concentration. Boron concentration reduction is prohibited because uniform concentration distribution cannot be ensured without forced circulation. This permits operations such as core mapping or alterations in the vicinity of the reactor vessel hot leg nozzles, and ~~RCS~~PCS to SDC isolation valve testing. During this 1 hour period, decay heat is removed by natural convection to the large mass of water in the ~~refueling~~reactor cavity.

APPLICABILITY

One SDC ~~loop~~train must be in operation in MODE 6 with the water level ~~≥ 23 ft above the top of the reactor vessel flange~~ at or above the 647 foot elevation, to provide decay heat removal. The ~~23 ft level~~ 647 foot elevation was selected because it corresponds to the ~~23 ft~~ requirement established for fuel movement in LCO 3.9.6, "~~Refueling~~Reactor Cavity Water Level." Requirements for the SDC System in other MODES are covered by LCOs in Section 3.4, ~~Reactor~~ Primary Coolant System ~~(RCS), and Section 3.5, Emergency Core Cooling Systems (ECCS)~~. SDC ~~loop~~train requirements in MODE 6, with the water level < ~~23 ft~~ 647' elevation ~~above the top of the reactor vessel flange~~, are located in LCO 3.9.5, "Shutdown Cooling (SDC) ~~and Coolant Circulation~~ - Low Water Level."

BASES

ACTIONS

SDC ~~loop~~train requirements are met by having one SDC ~~loop~~train ~~OPERABLE and~~ in operation, except as permitted in the Note to the LCO.

A.1 and A.2

When the SDC flow rate is throttled to less than 2810 gpm, all of the assumptions of the dilution accident analysis are no longer met. Actions must be initiated immediately to suspend all activities which could lead to a reduction of PCS boron concentration and to assure that SDC flow remains above 1000 gpm.

A.3.1

With SDC flow less than 2810 GPM, but at least 1000 gpm, the dilution accident analysis shows satisfactory results if the assumed dilution flow is less than the capacity of a single charging pump. Action is therefore required to assure that SDC flow through the core is at least 1000 gpm, and that two charging pumps are electrically disabled. By disabling two charging pumps, the potential source of unborated PCS make up from charging pumps or primary makeup pumps is limited to 53 gpm.

A.3.2

Plant conditions exist when it is desired to have charging pumps available for immediate make up, but when it is also desired to reduce SDC flow for testing or maintenance activities. Action A.3.2 provides an allowance for these conditions to exist if periodic verifications assure that no charging pump is operating. If during conditions when SDC flow is less than 2810 gpm, a dilution does occur, SHUTDOWN MARGIN must be verified by performance of SR 3.1.2.1. Action required to take PCS boron samples shall be initiated within 15 minutes after the dilution and every 15 minutes thereafter until a stable PCS boron concentration exists or a flow of 2810 gpm has been re-established.

~~A~~B.1

If SDC ~~loop~~train requirements are not met, there will be no forced circulation to provide mixing to establish uniform boron concentrations. Reduced boron concentrations can occur through the addition of water with a lower boron concentration than that contained in the ~~RCS~~PCS. Therefore, actions that reduce boron concentration shall be suspended immediately.

BASES

~~A~~B.2

If SDC ~~loop~~train requirements are not met, actions shall be taken immediately to suspend loading irradiated fuel assemblies in the core. With no forced circulation cooling, decay heat removal from the core occurs by natural convection to the heat sink provided by the water above the core. A minimum ~~refueling~~reactor cavity water level of ~~23 ft above the reactor vessel flange~~ 647' provides an adequate ~~available~~ heat sink. Suspending any operation that would increase the decay heat load, such as loading a fuel assembly, is a prudent action under this condition.

~~A~~B.3

If SDC ~~loop~~train requirements are not met, actions shall be initiated and continued in order to satisfy SDC ~~loop~~train requirements.

~~A~~B.4

If SDC ~~loop~~train requirements are not met, all containment penetrations to the outside atmosphere must be closed to prevent fission products, if released by a loss of decay heat event, from escaping the containment building. The 4 hour Completion Time allows fixing most SDC problems without incurring the additional action of ~~violating the containment atmosphere~~ establishing containment closure.

SURVEILLANCE REQUIREMENTS

SR 3.9.4.1

This Surveillance verifies that the required Shutdown Cooling (SDC) train is OPERABLE by an administrative verification that no SDC components required for the train to perform its decay heat removal function are known to be inoperable or unavailable. No physical testing is required.

BASES

SR 3.9.4.2

This Surveillance demonstrates that the SDC ~~loop~~train is in operation and circulating ~~reactor~~ primary coolant. ~~The flow rate is determined by the flow rate necessary to provide sufficient decay heat removal capability and to prevent thermal and boron stratification in the core.~~ The required flow rate is determined by dilution accident analysis and is sufficient to provide the necessary decay heat removal capability and to prevent thermal and boron stratification in the core. The Frequency of 12 hours is sufficient, considering the flow, temperature, pump control, and alarm indications available to the operator in the control room for monitoring the SDC System.

REFERENCE 1. FSAR, Section 14

B 3.9 REFUELING OPERATIONS

B 3.9.5 Shutdown Cooling (SDC) ~~and Coolant Circulation~~ - Low Water Level

BASES

BACKGROUND

The purposes of the SDC System in MODE 6 are to remove decay heat and sensible heat from the ~~Reactor~~ Primary Coolant System (~~RCS~~PCS), as required by GDC 34, to provide mixing of borated coolant, to provide sufficient coolant circulation to minimize the effects of a boron dilution accident, and to prevent boron stratification (Ref. 1). Heat is removed from the ~~RCS~~PCS by circulating ~~reactor~~ primary coolant through the ~~SDC~~ shutdown heat exchanger~~(s)~~, where the heat is transferred to the Component Cooling Water System via the ~~SDC~~ shutdown heat exchanger~~(s)~~. The coolant is then returned to the ~~RCS~~PCS ~~via the RCS~~ cold leg~~(s)~~. Operation of the SDC System for normal cooldown or decay heat removal is manually accomplished from the control room. The heat removal rate is adjusted by controlling the flow of ~~reactor~~ primary coolant through the ~~SDC~~ shutdown heat exchanger~~(s)~~ and bypassing the heat exchanger~~(s)~~. Mixing of the ~~reactor~~primary coolant is maintained by this continuous circulation of ~~reactor~~ primary coolant through the SDC System.

APPLICABLE SAFETY ANALYSES

If the ~~reactor~~ primary coolant temperature is not maintained below 200°F, boiling of the ~~reactor~~ primary coolant could result. This could lead to inadequate cooling of the reactor fuel due to the resulting loss of coolant in the reactor vessel. ~~Additionally, boiling of the reactor coolant could lead to a reduction in boron concentration in the coolant due to the boron plating out on components near the areas of the boiling activity, and because of the possible addition of water to the reactor vessel with a lower boron concentration than is required to keep the reactor subcritical.~~ The loss of ~~reactor~~ primary coolant and the reduction of boron concentration in the ~~reactor~~ primary coolant would eventually challenge the integrity of the fuel cladding, which is a fission product barrier. Two trains of the SDC System are required to be OPERABLE, and one train is required to be in operation in MODE 6, with the water level ~~< 23 ft above the top of the reactor vessel flange~~ below the 647 foot elevation, to prevent this challenge.

~~SDC and Coolant Circulation - Low Water Level satisfies Criterion 2 of the NRC Policy Statement.~~

BASES

LCO

In MODE 6, with the water level ~~< 23 ft above the top of the reactor vessel flange~~ below the 647' elevation, both SDC ~~loop~~trains must be OPERABLE. Additionally, one ~~loop~~train of the SDC System must be in operation in order to provide:

a. Removal of decay heat;

b. Mixing of borated coolant to minimize the possibility of a criticality; and

c. Indication of ~~reactor~~ primary coolant temperature.

An OPERABLE SDC ~~loop~~train consists of an SDC pump, a heat exchanger, valves, piping, instruments, and controls to ensure an OPERABLE flow path and to determine the ~~low end~~ PCS temperature. ~~The flow path starts in one of the RCS hot legs and is returned to the RCS cold legs.~~

APPLICABILITY

Two SDC ~~loop~~trains are required to be OPERABLE, and one SDC ~~loop~~train must be in operation in MODE 6, with the water level ~~< 23 ft above the top of the reactor vessel flange~~ below the 647 foot elevation, to provide decay heat removal. Requirements for the SDC System in other MODES are covered by LCOs in Section 3.4, ~~Reactor~~ Primary Coolant System. MODE 6 requirements, with a water level ~~≥ 23 ft above the reactor vessel flange~~ at or above the 647 foot elevation, are covered in LCO 3.9.4, "Shutdown Cooling ~~and Coolant Circulation~~ - High Water Level."

ACTIONS

A.1 and A.2

When the SDC flow rate is throttled to less than 2810 gpm, all of the assumptions of the dilution accident analysis are no longer met. Actions must be initiated immediately to suspend all activities which could lead to a reduction of PCS boron concentration and to assure that SDC flow remains above 1000 gpm.

A.3.1

With SDC flow less than 2810 GPM, but at least 1000 gpm, the dilution accident analysis shows satisfactory results if the assumed dilution flow is less than the capacity of a single charging pump. Action is therefore required to assure that SDC flow through the core is at least 1000 gpm, and that two charging pumps are electrically disabled. By disabling two charging pumps, the potential source of unborated PCS make up from charging pumps or primary makeup pumps is limited to 53 gpm.

A.3.2

Plant conditions exist when it is desired to have charging pumps available for immediate make up, but when it is also desired to reduce SDC flow for testing or maintenance activities. Action A.3.2 provides an allowance for these conditions to exist if periodic verifications assure that no charging pump is operating. If during conditions when SDC flow is less than 2810 gpm, a dilution does occur, SHUTDOWN MARGIN must be verified by performance of SR 3.1.2.1 within 15 minutes after the dilution and every 15 minutes thereafter until a stable PCS boron concentration exists or a flow of 2810 gpm has been re-established.

~~A~~B.1 and ~~A~~B.2

If one SDC ~~loop~~train is inoperable, action shall be immediately initiated and continued until the SDC ~~loop~~train is restored to OPERABLE status and to operation, or until ~~≥ 23 ft of~~ a water level of ≥ 647′ is established ~~above the reactor vessel flange~~ in the reactor cavity. When the water level is established at ~~≥ 23 ft above the reactor vessel flange~~ 647′ or greater, the Applicability will change to that of LCO 3.9.4, "Shutdown Cooling ~~and Coolant Circulation~~ - High Water Level," and only one SDC ~~loop~~train is required to be ~~OPERABLE and~~ in operation. An immediate Completion Time is necessary for an operator to initiate corrective actions.

~~B~~C.1

If no SDC ~~loop~~train is in operation or no SDC ~~loop~~trains are OPERABLE, there will be no forced circulation to provide mixing to establish uniform boron concentrations. Reduced boron concentrations can occur by the addition of water with lower boron concentration than that contained in the ~~RCS~~PCS. Therefore, actions that reduce boron concentration shall be suspended immediately.

~~B~~C.2

If no SDC ~~loop~~train is in operation or no SDC ~~loop~~trains are OPERABLE, action shall be initiated immediately and continued without interruption to restore one SDC ~~loop~~train to OPERABLE status and operation. Since the ~~unit~~plant is in Conditions A and B concurrently, the restoration of two OPERABLE SDC ~~loop~~trains and one operating SDC ~~loop~~train should be accomplished expeditiously.

BASES

~~B~~C.3

If no ~~RHR~~SDC ~~loop~~train is in operation, all containment penetrations providing direct access from the containment atmosphere to the outside atmosphere must be closed within 4 hours. With the ~~RHR~~SDC ~~loop~~train requirements not met, the potential exists for the coolant to boil away, uncover the core, and release radioactive gas to the containment atmosphere. Closing containment penetrations that are open to the outside atmosphere ensures that dose limits are not exceeded.

The Completion Time of 4 hours is reasonable, based on the low probability of the ~~coolant boiling~~core becoming uncovered in that time.

SURVEILLANCE REQUIREMENTS

SR 3.9.5.1

This Surveillance verifies that the required Shutdown Cooling (SDC) trains are OPERABLE by an administrative verification that no SDC components required for the trains to perform their decay heat removal function are known to be inoperable or unavailable. No physical testing is required.

SR 3.9.5.2

This Surveillance demonstrates that one SDC ~~loop~~train is operating and circulating ~~reactor~~ primary coolant. ~~The flow rate is determined by the flow rate necessary to provide sufficient decay heat removal capability and to prevent thermal and boron stratification in the core.~~ The required flow rate is determined by dilution accident analysis and is sufficient to provide the necessary decay heat removal capability and to prevent thermal and boron stratification in the core. ~~In addition, this Surveillance demonstrates that the other SDC loop is OPERABLE.~~

~~In addition, during operation of the SDC loop with the water level in the vicinity of the reactor vessel nozzles, the SDC loop~~train ~~flow rate determination must also consider the SDC pump suction requirements.~~ The Frequency of 12 hours is sufficient, considering the flow, temperature, pump control, and alarm indications available to the operator to monitor the SDC System in the control room.

BASES

~~Verification that the required loops are OPERABLE and in operation ensures that loops can be placed in operation as needed, to maintain decay heat and retain forced circulation. The Frequency of 12 hours is considered reasonable, since other administrative controls are available and have proven to be acceptable by operating experience.~~

SR 3.9.5.~~2~~3

Verification that the required standby SDC pump has proper breaker alignment and power available ~~pump is OPERABLE~~ ensures that an additional SDC pump can be placed in operation, if needed, to maintain decay heat removal and ~~reactor~~ primary coolant circulation. ~~Verification is performed by verifying proper breaker alignment and power available to the required pump.~~ 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.

REFERENCE 1. FSAR, Section ~~[ ]~~.14

B 3.9 REFUELING OPERATIONS

B 3.9.6 ~~Refueling~~ Reactor Cavity Water Level

BASES

BACKGROUND

The performance of CORE ALTERATIONS or movement of irradiated fuel assemblies ~~or performance of CORE ALTERATIONS, except during latching and unlatching of control rod drive shafts,~~ within containment requires a minimum water level of ~~23 ft above the top of the reactor vessel flange~~ the 647 foot elevation. During refueling this maintains sufficient water level in the containment~~,~~ ~~the refueling canal, the fuel transfer canal,~~ the ~~refueling~~reactor cavity, and the spent fuel pool. Sufficient water is necessary to retain iodine fission product activity in the water in the event of a fuel handling accident (Refs. 1 and 2). Sufficient iodine activity would be retained to limit offsite doses from the accident to < 25% of 10 CFR 100 limits, as provided by the guidance of Reference 3.

APPLICABLE SAFETY ANALYSES

During ~~core alterations~~ CORE ALTERATIONS and during movement of irradiated fuel assemblies, the water level in the ~~refueling canal and refueling~~reactor cavity is an initial condition design parameter in the analysis of the fuel handling accident in containment postulated by Regulatory Guide 1.25 (Ref. 1). A minimum water level of 23 ft (Regulatory Position C.1.c of Ref. 1) allows a decontamination factor of 100 (Regulatory Position C.1.g of Ref. 1) to be used in the accident analysis for iodine. This relates to the assumption that 99% of the total iodine released from the pellet to cladding gap of all the dropped fuel assembly rods is retained by the ~~refueling~~reactor cavity water. ~~The fuel pellet to cladding gap is assumed to contain 10% of the total fuel rod iodine inventory (Ref. 1).~~ The fuel pellet to cladding gap is assumed to contain 12% of the total fuel rod I-131 inventory (to account for increased burn-up) and 10% of the remaining fuel rod iodine inventory (Ref. 1 and Ref. 2).

The fuel handling accident analysis inside containment is described in Reference 2. With a minimum water level of 23 ft ~~and a minimum decay time of 72 hours prior to fuel handling~~, the analyses ~~and test programs~~ demonstrate that the iodine release due to a postulated fuel handling accident is adequately captured by the water and offsite doses are maintained within allowable limits (Ref. 4).

~~Refueling water level satisfies Criterion 2 of the NRC Policy Statement.~~

BASES

LCO

A minimum ~~refueling~~reactor cavity water level of ~~23 ft above the reactor vessel flange~~≥ 647′ elevation is required to ensure that the radiological consequences of a postulated fuel handling accident inside containment are within acceptable limits~~ as provided by the guidance of Reference 3~~.

APPLICABILITY

LCO 3.9.6 is applicable during CORE ALTERATIONS~~, except during latching and unlatching of control rod drive shafts,~~ and when moving fuel assemblies in the presence of irradiated fuel assemblies. The LCO minimizes the possibility of a fuel handling accident in containment that is beyond the assumptions of the safety analysis. If irradiated fuel is not present in containment, there can be no significant radioactivity release as a result of a postulated fuel handling accident. Requirements for fuel handling accidents in the spent fuel pool are covered by LCO 3.7.10, "~~Fuel Storage~~Spent Fuel Pool Water Level."

ACTIONS

A.1 and A.2

With a water level ~~of < 23 ft above the top of the reactor vessel flange~~below the 647′ elevation, all operations involving CORE ALTERATIONS or movement of irradiated fuel assemblies shall be suspended immediately to ensure that a fuel handling accident cannot occur.

The suspension of CORE ALTERATIONS and fuel movement shall not preclude completion of movement of a component to a safe position.

~~A.3~~

~~In addition to immediately suspending CORE ALTERATIONS or movement of irradiated fuel, action to restore refueling~~reactor cavity water level must be initiated immediately.

SURVEILLANCE REQUIREMENTS

SR 3.9.6.1

Verification of a minimum water level of ~~23 ft above the top of the reactor vessel flange~~ 647′ ensures that the design basis for the postulated fuel handling accident analysis during refueling operations is met. Water at the required level above the top of the reactor vessel flange limits the consequences of damaged fuel rods that are postulated to result from a fuel handling accident inside containment (Ref. 2).

BASES

The Frequency of 24 hours is based on engineering judgment and is considered adequate in view of the large volume of water and the normal procedural controls of valve positions, which make significant unplanned level changes unlikely.

REFERENCES

1. Regulatory Guide 1.25, March 23, 1972
2. FSAR, Section 14
3. NUREG-0800, Section 15.7.4
4. 10 CFR 100.10

ATTACHMENT 6

CONSUMERS POWER COMPANY
PALISADES PLANT
DOCKET 50-255

STS CONVERSION TECHNICAL SPECIFICATION CHANGE REQUEST

3.9 REFUELING OPERATIONS PART

Comparison of Revised and Standard Technical Specifications

Palisades Revised Tech Spec Requirement List. (03/28/96)

A listing of the proposed Palisades Revised Tech Specs (RTS) correlated to the CE Standard Tech Specs (STS).

First Column; Proposed Palisades Revised Tech Spec (RTS) number
Each RTS item is listed in the left-most column.
If a STS item has been omitted from RTS, the word 'Omitted' is used.

Second Column; CE Standard Tech Spec (STS) number
The corresponding STS item is listed in the second column.
If a RTS item does not appear in STS, it is noted as 'Added'.

Third Column; Existing Palisades Tech Spec (TS) number
The closest TS item is listed in the third column.
If a RTS item does not appear in TS, it is noted as 'New'.

Fourth Column; RTS Item Description
An abbreviation of the RTS item appears in the third column.
Each item is identified as: LCO, ACTION, SR, ADMIN, Exception, etc.
In cases where a STS item was omitted from RTS, the description is of the STS item.

Description Key:	RTS requirement type:	Column 4 syntax:
	Safety Limit	SL: Safety limit; Applicable conditions
	Limiting Condition for Operation	LCO: LCO Description; Applicable conditions
	Condition	COND: Description of non-conforming condition
	Action	ACTN: Required action; Completion time
	Surveillance Requirement	SR: Test description; Frequency
	Table	TABL: Title
	Administrative Requirement	ADMN: Administrative requirement
	Defined Term	DEF: Name of defined term

Fifth Column; Comments and Explanations of Differences between RTS and STS.
A brief explanation of differences between RTS and STS is provided in the fifth column.

Other abbreviations used in the listing are:

NA:	Not Applicable
CFT:	Channel Functional Test
CHNL:	Channel

RTS Number	STS Number	TS Number	RTS (STS) requirement Description	Explanation of Differences

Global differences between the proposed Palisades Technical Specifications and the Standard Technical Specifications for CE plants, Nureg 1432:

The following changes are not discussed in the explanation of differences for each TS requirement.

1) Bracketed values have been replaced with appropriate values for Palisades. Typically, the basis for these values is provided in the bases document.

2) Each required action of the form "Perform SR X.X.X.X . . ." has been altered by a parenthetical summary of the SR requirements. This change allows a reader to understand the required actions without constantly turning pages to locate the referenced SR.

3) Terminology has been changed to reflect Palisades usage:

"RWT"	becomes	"SIRWT"	Safety Injection Refueling Water Tank
"CEA"	becomes	"Control Rod" or "Rod"	Palisades uses cruciform control rods rather than the multifingered "Control Element Assemblies" of later CE plants.
"RCS"	becomes	"PCS"	Palisades terminology is "Primary Coolant System" rather than "Reactor Coolant System"
"SIAS"	becomes	"SIS"	Palisades terminology is "Safety Injection Signal" rather than "Safety Injection Actuation Signal"
"AC Vital bus"	becomes	"Preferred AC bus"	Palisades terminology.
"PAMI"	becomes	"AMI"	Accident Monitoring Instrumentation, Palisades terminology
"ESFAS"	becomes	"ESF Instrumentation"	There is no stand-alone ESFAS system or cabinet at Palisades; ESF instruments actuate the ESF functions
"DG LOVS"	becomes	"DG UV Start"	Palisades Terminology
"Remote Shutdown System"	becomes	"Alternate Shutdown System"	Palisades Terminology
"Power Rate of Change-High"	becomes	"High Startup Rate"	Palisades Terminology

RTS Number	STS Number	TS Number	RTS (STS) requirement Description	Explanation of Differences
3.9	3.9		REFUELING	
3.9.1	3.9.1	3.8.1.g	LCO: PCS boron ≥ 1720; MODE 6	Unchanged.
3.9.1 A	3.9.1 A	3.8.2	COND: Boron < limit	Unchanged.
3.9.1 A.1	3.9.1 A.1	3.8.2	ACTN: Suspend CORE ALT; immediately	Unchanged.
3.9.1 A.2	3.9.1 A.2	3.8.2	ACTN: Suspend +Δk/k addition; immediately	Unchanged.
3.9.1 A.3	3.9.1 A.3	3.8.2	ACTN: Borate; immediately	Unchanged.
3.9.1.1	3.9.1.1	3.8.1.g	SR: Verify Boron; 72 hrs	Unchanged.
3.9.2	3.9.2	3.8.1.e	LCO: 2 SR monitors OPERABLE; MODE 6	Unchanged. Used Palisades terminology of source range channels throughout LCO.
3.9.2 A	3.9.2 A	3.8.2	COND: 1 SR monitor inoperable	Unchanged.
3.9.2 A.1	3.9.2 A.1	3.8.2	ACTN: Suspend core alterations; immediately	Unchanged.
3.9.2 A.2	3.9.2 A.2	3.8.2	ACTN: Suspend + Δk/k addition; Immediately	Unchanged.
3.9.2 B	3.9.2 B	3.8.2	COND: 2 SR monitors inoperable	Unchanged.
3.9.2 B.1	3.9.2 B.1	3.8.2	ACTN: Initiate action to fix SR monitor; immediately	Unchanged.
3.9.2 B.2	3.9.2 B.2	3.8.1.g	ACTN: Perform SR 3.9.1.1; 4 hrs & every 12 hrs	Unchanged.
3.9.2.1	3.9.2.1	4.17.6#1	SR: channel check; 12 hours	Added "on each source range channel" for consistency with section 3.3 SRs
3.9.2.2	3.9.2.2	4.17.6#1	SR: channel calibration; 18 months	Added "on each source range channel" for consistency with section 3.3 SRs; deleted note since that allowance is contained in Palisades Chnl Cal definition.
3.9.3	3.9.3	3.8.1.a	LCO: Containment penetration status; core alts & fuel moves.	Unchanged.
3.9.3 a	3.9.3 a	3.8.1.a	LCO: (sub para) Air lock door closed or SFP vent system on	Retained allowance to refuel with equipment hatch open if SFP vent system is operating. This is retained from existing Tech Specs. Palisades equip hatch opens to the fuel pool area and is used for communication and containment access during refueling.
3.9.3 b	3.9.3 b	3.8.1.a	LCO: (sub para) 1 door in emergency airlock closed.	Limited requirement to emergency lock. personnel lock addressed in 3.9.3.a, above.

RTS Number	STS Number	TS Number	RTS (STS) requirement Description	Explanation of Differences
3.9.3 c	3.9.3 c	3.8.1.b,.c	LCO: (sub para) Penetration status	Added the word "other" since 3.9.3.a allows the equipment hatch and personnel airlock to be open.
3.9.3 c.1	3.9.3 c.2	3.8.1.b,.c	LCO: (sub para) Penetrations closed by isolation valve etc	Used Palisades signal name, otherwise unchanged.
3.9.3 c.2	3.9.3 c.2	3.8.1.b,.c	LCO: (sub para) Capable of being closed by valve, etc	Changed item c.2 to reflect Palisades configuration. Palisades has no separate CPIS signal, but uses a low range area monitor to initiate a "Containment High Radiation" closure of all containment isolation valves.
3.9.3 A	3.9.3 A	3.8.2	COND: Penetration not in required status	Unchanged.
3.9.3 A.1	3.9.3 A.1	3.8.2	ACTN: Suspend core alterations; Immediately	Unchanged.
3.9.3 A.2	3.9.3 A.2	3.8.2.	ACTN: Suspend fuel movement; Immediately	Unchanged.
3.9.3 A.3	Added	3.8.2	ACTN: Suspend reactivity addition; immediately	Added requirement from existing license.
3.9.3.1	3.9.3.1	New	SR: Verify penetration status; 7 days	Added requirement to verify operation of SFP ventilation & filter system.
3.9.3.2	3.9.3.2	New	SR: Verify automatic penetration closure; 31 days	Reworded to reflect Palisades equipment.
3.9.4	3.9.4	3.1.9.3	LCO: SDC loop operating; MODE 6 $\geq$ 647' level	Retained existing TS level specification of 647' elevation, OPERABLE requirement for SDC train, and flow requirement. The flow is an assumption of the dilution analyses. Used Palisades terminology of "trains" and "reactor Cavity" throughout LCO.
3.9.4 A	Added	3.10.1.c.1	COND: Flow < 2810 gpm	Added condition equivalent to that of existing TS.
3.9.4 A.1	Added	3.10.1.c.1	ACTN: Suspend dilution operations; immediately	New action in support of dilution analysis assumptions.
3.9.4 A.2	Added	3.1.9.3	ACTN: Assure flow $\geq$ 1000 gpm; Immediately	Added action to assure adequate mixing flow as assumed in dilution analyses.
3.9.4 A.3	Added	3.10.1.c.1	ACTN: electrically disable 2 charging pumps; 1 hour	Retained existing action in support of dilution analysis.
3.9.4 A.4	Added	3.10.1.c.2	ACTN: verify SDM; 15 min	Retained existing action in support of dilution accident analysis.
3.9.4 B	3.9.4 A	3.1.9.3 1&2	COND: SDC requirements not met	Unchanged.
3.9.4 B.1	3.9.4 A.1	3.1.9.3 2.a	ACTN: Suspend dilution; Immediately	Unchanged.
3.9.4 B.2	3.9.4 A.2	New	ACTN: Suspend adding fuel to core; Immediately	Unchanged.

RTS Number	STS Number	TS Number	RTS (STS) requirement Description	Explanation of Differences
3.9.4 B.3	3.9.3 A.3	3.1.9.3 1.a 3.1.9.3 2.b	ACTN: Initiate SDC repair; immediately	Unchanged.
3.9.4 B.4	3.9.4 A.4	New	ACTN: Close penetrations; 4 hours	Unchanged.
3.9.4.1	Added	New	SR: Verify SDC Loop OPERABLE; 12 hrs	Added SR to support OPERABLE requirement of LCO.
3.9.4.2	3.9.4.1	4.2.2#14.c	SR: Verify SDC loop operating; 12 hrs	Unchanged.
3.9.5	3.9.5	3.1.9.3	LCO: 2 OPERABLE SDC; 1 operating; MODE 6 < 647' level	Retained existing TS level specification of 647; elevation. Used Palisades terminology of "trains" and "reactor Cavity" throughout LCO. Otherwise unchanged.
3.9.5 A	Added	3.10.1.c.1	COND: Flow < 2810 gpm	Added condition equivalent to that of existing TS.
3.9.5 A.1	Added	3.10.1.c.1	ACTN: Suspend dilution operations; immediately	New action in support of dilution analysis assumptions.
3.9.5 A.2	Added	3.1.9.3	ACTN: Assure flow ≥ 1000 gpm; Immediately	Added action to assure adequate mixing flow as assumed in dilution analyses.
3.9.5 A.3	Added	3.10.1.c.1	ACTN: electrically disable 2 charging pumps; 1 hour	Retained existing action in support of dilution analysis.
3.9.5 A.4	Added	3.10.1.c.2	ACTN: verify SDM; 15 min	Retained existing action in support of dilution accident analysis.
3.9.5 B	3.9.5 A	3.1.9.3 1&2	COND: 1 SDC loop inoperable	Unchanged.
3.9.5 B.1	3.9.5 A.1	3.1.9.3 1.a 3.1.9.3 2.b	ACTN: Initiate fix; immediately	Unchanged.
3.9.5 B.2	3.9.5 A.2	New	ACTN: Initiate pool fill; immediately	Unchanged.
3.9.5 C	3.9.5 B	3.1.9.3 1&2	COND: No SDC loop operating or OPERABLE	Unchanged.
3.9.5 C.1	3.9.5 B.1	3.1.9.3 2.a	ACTN: Suspend dilution; Immediately	Unchanged.
3.9.5 C.2	3.9.5 B.2.1	3.1.9.3 1.a 3.1.9.3 2.b	ACTN: Initiate fix; immediately	Unchanged.
3.9.5 C.3	3.9.5 B.3	New	ACTN: Close penetrations; 4 hours	Unchanged.
3.9.5.1	Added	New	SR: Verify SDC Loop OPERABLE; 12 hrs	Added SR to support OPERABLE requirement of LCO.
3.9.5.2	3.9.4.1	4.2.2#14.c	SR: Verify SDC loop operating; 12 hrs	Replaced with wording like that of SR 3.9.4.2 to require verification of required flow.

RTS Number	STS Number	TS Number	RTS (STS) requirement Description	Explanation of Differences
3.9.5.3	3.9.5.2	New	SR: Verify 2nd SDC loop OPERABLE; 7 days	Unchanged.
3.9.6	3.9.6	New	LCO: Water level ≥ 647; fuel movement in CB	Retained existing TS level specification of 647; elevation. Used Palisades terminology of "trains" and "reactor Cavity" throughout LCO. Otherwise unchanged.
3.9.6 A	3.9.6 A	New	COND: Level < limit	Unchanged.
3.9.6 A.1	3.9.6 A.1	New	ACTN: Suspend Core Alterations; Immediately	Unchanged.
3.9.6 A.2	3.9.6 A.2	New	ACTN: Fuel moves; Immediately	Unchanged.
Omitted	3.9.6 A.3	NA	ACTN: (Initiate Action to restore level; Immediately)	This Action was omitted because Actions A.1 and A.2 require plant to be out of applicable conditions. Action A.3, therefore would never be applicable. This change has been submitted as a change to the STS under the number TSTF-20.
3.9.6.1	3.9.6.1	New	SR: verify level; 24 hrs	Unchanged.

ENCLOSURE 1

CONSUMERS POWER COMPANY
PALISADES PLANT
DOCKET 50-255

TECHNICAL SPECIFICATION CHANGE REQUEST

PART 13 - SECTION 4.0

March 28, 1996

CONSUMERS POWER COMPANY
Docket 50-255
Request for Change to the Technical Specifications
License DPR-20

4.0 DESIGN FEATURES CHANGE REQUEST

It is requested that the Design Features section of the Technical Specifications contained in the Facility Operating License DPR-20, Docket 50-255, issued to Consumers Power Company on February 21, 1991, for the Palisades Plant be changed as described below:

I. ARRANGEMENT AND CONTENT OF THIS SECTION OF THE CHANGE REQUEST:

This section of the Technical Specification Change Request (TSCR) proposes changes to those Palisades Technical Specification requirements addressing Design Features. These changes are intended to result in requirements which are appropriate for the Palisades plant, but closely emulate those of the Standard Technical Specifications, Combustion Engineering Plants, NUREG 1432, Revision 1.

This discussion and its supporting information frequently refer to three sets of Technical Specifications; the following abbreviations are used for clarity and brevity:

TS - The existing Palisades Technical Specifications,
RTS - The revised Palisades Technical Specifications,
STS - NUREG 1432, Revision 1.

Four attachments are provided to assist the reviewer. The Design Features of the TS does not have a corresponding Bases section. Attachments 2 and 5, supplied for other parts of the TSCR, address the Bases for the associated parts of TS. The numbering and content of the remaining attachments is consistent with other parts of the TSCR.

1. Proposed RTS pages
2. Not Applicable to Design Features.
3. A line by line comparison of the TS and RTS
4. STS pages marked to show the differences between RTS and STS
5. Not applicable to Design Features.
6. A line by line comparison of RTS and STS.

Attachment 3, the line by line comparison of TS and RTS, is presented in a tabular format. The first page contains an explanation of the syntax and abbreviations used. The table is arranged numerically by TS item number. Each requirement in Sections 1 through 4 of TS is listed individually. In some cases, where a single numbered TS requirement contains more than one requirement, each requirement is listed individually under the same number. Requirements which appear in RTS or STS, but not in TS, do not appear in the Attachment 3 listing.

Attachment 3 Provides the Following Information for Each TS Requirement:

Identifying number of TS item,
Identifying number of closest equivalent RTS item,
Identification of TS item as LCO, Action, SR, etc.,
A short paraphrase of requirement,
A description of each proposed change from TS to RTS.

Classification of Change as One of the Following Categories:

ADMINISTRATIVE - A change which is editorial in nature, which only involves movement of requirements within the TS without affecting their technical content, or clarifies existing TS requirements.

RELOCATED - A change which only moves requirements, not meeting the 10 CFR 50.36(c)(2)(ii) criteria, from the TS to the FSAR, to the Operating Requirements Manual, or to other documents controlled under 10 CFR 50.59.

MORE RESTRICTIVE - A change which only adds new requirements, or which revised an existing requirement resulting in additional operational restriction.

LESS RESTRICTIVE - A change which deletes any existing requirement, or which revises any existing requirement resulting in less operational restriction.

Attachment 6, the line by line comparison of RTS and STS, is also presented in a tabular format. The first page contains an explanation of the syntax and abbreviations used; the second page contains a list of Palisades terminology used in place of the generic STS terminology. The table is arranged numerically by RTS item number. Each requirement in Sections 1 through 3 of RTS or STS is listed individually. Requirements which appear in TS, but not in RTS or STS, do not appear in the Attachment 6 listing.

Attachment 6 Provides the Following Information for Each RTS Requirement:

Identifying number of RTS requirement,
Identifying number of equivalent STS requirement,
Identification of each requirement as LCO, Action, SR, etc.,
Short paraphrase of each requirement,
A description of each difference between RTS and STS.

II. TECHNICAL SPECIFICATION CHANGES PROPOSED:

The TS Design Features appear in Section 5.0. The RTS Design Features appear in proposed Section 4.0. Each proposed change from TS to RTS is discussed in the attachments to this section.

Each change from TS to the proposed RTS is described in Attachment 3.

The Major Changes From TS to RTS Proposed in This Section are:

1. The discussion of Containment Design Features, currently in Section 5.2, was replaced by the discussion in the bases of RTS Section 3.6, Containment.

2. The discussion of the Primary Coolant System Design Pressure and Temperature, currently in Section 5.3.1, was replaced by the discussion in the bases of RTS Section 3.4, Primary Coolant System.

3. The discussion of the Emergency Core Cooling System, currently in Section 5.3.3, was replaced by the discussion in the bases of RTS Section 3.5, Emergency Core Cooling System.

4. The existing Design Features section describing the spent fuel storage facilities contained both operating limitations and surveillance requirements. Therefore, the requirements for fuel storage in the Region II fuel racks, currently in Section 5.4.2, was replaced by LCO 3.7.15, "Spent Fuel Storage." Figure 5.4-1 and Table 5.4-1 were also moved to that LCO. The requirements for Spent Fuel Pool boron concentration were moved to LCO 3.7.14, "Spent Fuel Pool Boron Concentration".

5. In each section of the proposed RTS, new requirements taken from STS have been proposed. Since there is no equivalent requirement in TS, these changes do not appear in Attachment 3. The new requirements do appear in Attachment 6 where they are identified by an entry of "New" in the third column.

   The changes identified as "New" are considered More Restrictive because they add requirements and operating restrictions which do not exist in the current Palisades TS.

   There is one major difference between RTS and STS proposed in this section; the discussion of Spent Fuel Storage was replaced by LCO 3.7.15, "Spent Fuel Storage."

III. NO SIGNIFICANT HAZARDS ANALYSIS:

Each change proposed for the Design Features section is classified as ADMINISTRATIVE. ADMINISTRATIVE changes move requirements, either within the TS or to documents controlled under 10 CFR 50.59, or clarify existing TS requirements, without affecting their technical content. Since ADMINISTRATIVE changes do not alter the technical content of any requirements, they cannot involve a significant increase in the probability or consequences of an accident previously evaluated, create the possibility of a new or different kind of accident from any previously evaluated, or involve a significant reduction in a margin of safety.

IV. CONCLUSION

The Palisades Plant Review Committee has reviewed this part of the STS conversion Technical Specifications Change Request and has determined that proposing this change does not involve an unreviewed safety question. Further, the change involves no significant hazards consideration. This change has been reviewed by the Nuclear Performance Assessment Department.

ATTACHMENT 1

CONSUMERS POWER COMPANY
PALISADES PLANT
DOCKET 50-255

STS CONVERSION TECHNICAL SPECIFICATION CHANGE REQUEST

4.0 DESIGN FEATURES PART

Proposed Revised Technical Specifications pages

4.0 DESIGN FEATURES

4.1 Site Location

The Palisades reactor shall be located on property owned by Consumers Power Company on the eastern shore of Lake Michigan approximately four and one-half miles south of the southern city limits of South Haven, Michigan. The minimum distance to the boundary of the exclusion area as defined in 10 CFR 100.3 shall be 677 meters.

4.2 Reactor Core

4.2.1 Reactor Core

The reactor shall contain 204 fuel assemblies. Each assembly shall consist of a matrix of Zircalloy fuel rods with an initial composition of depleted, natural, or slightly enriched uranium dioxide (UO_2) as fuel material. Limited substitutions of zirconium alloy or stainless steel filler rods for fuel rods, in accordance with approved applications of fuel rod configurations, may be used. Fuel assemblies shall be limited to those fuel designs that have been analyzed with applicable NRC staff approved codes and methods and shown by tests or analyses to comply with all fuel safety design bases. A limited number of lead test assemblies that have not completed representative testing may be placed in non-limiting core regions. A core plug or plugs may be used to replace one or more fuel assemblies subject to the analysis of the resulting power distribution. Poison may be placed in the fuel bundles for long-term reactivity control.

4.2.2 Control Rods and Reactivity Control

The core excess reactivity shall be controlled by a combination of boric acid chemical shim, cruciform control rods, and mechanically fixed absorber rods where required. Forty-five control rods shall be distributed throughout the core as shown in Figure 3-2 of the FSAR. Four of these control rods may consist of part-length absorbers.

4.3 Fuel Storage

4.3.1 New Fuel Storage:

a. The pitch of the new fuel storage rack lattice is ≥ 9.375 inches, and every other position in the lattice is permanently occupied by an 8" x 8" structural steel box beam having a minimum wall thickness of 0.25 inches or core plugs such that the minimum center-to-center spacing of new fuel assemblies in the alternating storage array is 13.26". This distance in the alternating storage lattice is sufficient so that K_{eff} will not exceed 0.95 where fuel assemblies with 216 UO_2 or Gd_2O_3-UO_2 fuel rods or metal rods and a maximum average planar enrichment in the UO_2 or Gd_2O_3-UO_2 fuel rods of 4.20 w/o U_{235} are in place and optimum moderation is assumed.

b. New fuel may also be stored in the Spent Fuel Pool, in accordance with the limitations of LCO 3.7.15, "Spent Fuel Assembly Storage," or in approved shipping containers.

c. The new fuel storage racks are designed as a Class I structure.

4.3.2 Spent Fuel Storage:

a. The spent fuel storage pool and spare (north) tilt pit are divided into two regions identified as Region I and Region II as illustrated in Figure B 3.7.15-1. Region I racks are designed and shall be maintained with a nominal 10.25" center-to-center distance between fuel assemblies with the exception of the single Type E rack which has a nominal 11.25" center-to-center distance between fuel assemblies. The Region I spent fuel storage racks are designed such that fuel having a maximum assembly planar average U_{235} enrichment of 4.40 w/o placed in the racks would result in a K_{eff} equivalent to ≤ 0.95 when flooded with unborated water. The K_{eff} of ≤ 0.95 includes a conservative allowance for uncertainties. For enrichments above 3.27 w/o U_{235}, the fuel assemblies must contain 216 rods which are either UO_2, Gd_2O_3-UO_2 or solid metal.

b. Region II racks have a 9.17 inch center-to-center spacing. Because of this smaller spacing, strict controls are employed to evaluate burnup of the fuel assembly prior to its placement in Region II cell locations.

c. The requirements for storage of spent fuel in Region II are described in LCO 3.7.15, "Spent Fuel Assembly Storage."

d. Additional requirements for spent fuel storage are described in LCO 3.7.13, "Spent Fuel Pool Water Level" and LCO 3.7.14, "Spent Fuel Pool Boron Concentration."

e. The spent fuel storage racks are designed as a Class I structure.

ATTACHMENT 2

CONSUMERS POWER COMPANY
PALISADES PLANT
DOCKET 50-255

STS CONVERSION TECHNICAL SPECIFICATION CHANGE REQUEST

4.0 DESIGN FEATURES PART

Not Applicable

to

This Section

ATTACHMENT 3

CONSUMERS POWER COMPANY
PALISADES PLANT
DOCKET 50-255

STS CONVERSION TECHNICAL SPECIFICATION CHANGE REQUEST

4.0 DESIGN FEATURES PART

Comparison of Existing and Revised Technical Specifications

Palisades Tech Spec Requirement List. Corrected through Amendment 170

A list of the existing Palisades Tech Specs (TS) correlated to Palisades Revised Technical Specifications (RTS).

First Column; Existing Palisades Tech Spec (TS) number

Each numbered TS item is listed in the left-most column. Items which contain more than one requirement are listed once for each requirement.

Second Column; Palisades Revised Tech Spec (RTS) number

The nearest corresponding numbered RTS item is listed in the second column. If the item does not appear in RTS, it is noted as 'Deleted' or 'Relocated.'

Deleted is used where an item has been eliminated as a tech spec, ie deleting, iaw GL 84-15, the requirement to test a D.G. when an ECCS pump in the opposite train becomes inoperable.

Relocated is used where an item has been moved to a controlled program or document because it does not meet the "Criteria" of 10 CFR 50.36(2)(c)(ii).

Where an item is relocated or deleted, the number of the associated RTS section has been added to allow sorting the list by section number. Relocated items, such as heavy load restrictions, which are not associated with any particular RTS section are arbitrarily assigned the number 5.0.

Third Column; TS Item Description

An abbreviation of the TS requirement appears in the third column. Each item is identified as: LCO, ACTION, SR, Admin, Exception, etc. Some items are implied, rather than explicit, ie a LCO is implied when an ACTION exists without a stated LCO.

Description Key; TS requirement type:	Column 3 syntax:
Safety Limit	SL: Safety limit; Applicable conditions
Surveillance Requirement	SR: Equipment to be tested; Test description; Frequency
Limiting Safety Setting	LSS: RPS Trip Channel & required setting
Limiting Condition for Operation	LCO: Equipment to be operable; Applicable conditions
Action	ACTN: Condition requiring action; Required action; Completion time
Administrative Requirement	ADMN: Administrative requirement
Permitted Instrument Bypass	Byps: Bypassable component; conditions when bypass permitted
Defined Term	DEF: Name of defined item
Exception to other Requirement	XCPT: Excepted spec or condition; Applicable conditions
Descriptive material	DESC: Subject matter
Table	TBL: Table

Forth Column; Classification of Changes:

Each change is identified as ADMINISTRATIVE, RELOCATED, MORE RESTRICTIVE, or LESS RESTRICTIVE.

Fifth Column; Discussion of Changes:

Each change is discussed briefly.

TS Number	RTS Number	TS requirement description	Classification and Description of Changes	
5.0	4.0	Design features		
5.1	4.1	DESC: Description of Site-Location/Size	ADMINISTRATIVE:	Description unchanged.
5.2	3.6 Bases	DESC: Description of Containment Design Features	ADMINISTRATIVE:	Description moved to Bases of Section 3.6, Containment.
5.3.1	3.4 Bases	DESC: Description of Primary Coolant System	ADMINISTRATIVE:	Description of PCS features moved to Bases of Section 3.4, Primary Coolant System.
5.3.2	4.2	DESC: Description of Reactor Core and Control	ADMINISTRATIVE:	Description of reactor core and reactivity control moved to RTS Section 4.2. Reference to FSAR Figure 3-5 was corrected to Figure 3-2. This reference to the subject figure was overlooked during an FSAR revision.
5.3.3	3.5 Bases	DESC: ECCS-SIT/HPSI/LPSI/SIRW	ADMINISTRATIVE:	Description of ECCS components moved to bases of Section 3.5, ECCS.
5.4.1	4.3.1	DESC: New Fuel Storage	ADMINISTRATIVE:	Description of new fuel storage facilities moved to RTS Section 4.3.1.
5.4.2	3.7.15	DESC: Spent Fuel Storage	ADMINISTRATIVE:	Description of spent fuel storage facilities moved to RTS bases Section 3.7.15.
5.4.2a	3.7.15, Bases	DESC: Spent Fuel Storage before shipment	ADMINISTRATIVE:	Description moved to RTS bases Section 3.7.15.
5.4.2b		Deleted		
5.4.2c	3.7.15, Bases	DESC: SFP (Region I Design)	ADMINISTRATIVE:	The description of the spent fuel Region I racks has been moved to RTS bases Section 3.7.15.
5.4.2d	3.7.15, Bases	DESC: SFP (Region II Design)	ADMINISTRATIVE:	The description of the spent fuel Region II racks has been moved to RTS bases Section 3.7.15.
5.4.2d	3.7.15	LCO: Limitation on burnup of fuel placed in Region II	ADMINISTRATIVE:	Requirement unchanged. Fuel storage limitations moved to LCO 3.7.15.
5.4.2e		Deleted		
5.4.2f	3.7.14	LCO: Boron >1720 ppm; monthly	MORE RESTRICTIVE:	Changed surveillance to 7 days.
5.4.2f	3.7.14.1	SR: Verify SFP boron; monthly	MORE RESTRICTIVE:	Changed surveillance to 7 days.
5.4.2g	4.3.2.e	DESC: Spent fuel racks Class I structure	ADMINISTRATIVE:	Requirement unchanged.
5.4.2h		Deleted		

Comparison of existing Palisades Tech Specs and Proposed Palisades Tech Specs. (03/28/96)

TS Number	RTS Number	TS requirement description	Classification and Description of Changes	
5.4.2i	3.7.15	LCO: Region II and North Pit Restrictions	ADMINISTRATIVE:	Requirement unchanged.
5.4.2 Note	3.7.15, Bases	NOTE: Allowance to remove empty rack	ADMINISTRATIVE:	Discussion moved to RTS bases Section 3.7.15.
Fig. 5.4-1	3.7.15-1, Bases	FIG: Spent Fuel Pool Layout	ADMINISTRATIVE:	Requirement unchanged.
Table 5.4-1	3.7.15-1	TABL: Spent Fuel Pit (Region II)	ADMINISTRATIVE:	Requirement unchanged.
Fig. 5-1	4.0 Relocated	DESC: Site layout	RELOCATED:	Similar figure provided in FSAR.

ATTACHMENT 4

CONSUMERS POWER COMPANY
PALISADES PLANT
DOCKET 50-255

STS CONVERSION TECHNICAL SPECIFICATION CHANGE REQUEST

4.0 DESIGN FEATURES PART

STS Pages Marked to Show the Differences Between RTS and STS

4.0 DESIGN FEATURES

4.1 Site Location ~~[Text description of the site location.]~~

The Palisades reactor shall be located on property owned by Consumers Power Company on the eastern shore of Lake Michigan approximately four and one-half miles south of the southern city limits of South Haven, Michigan. The minimum distance to the boundary of the exclusion area as defined in 10 CFR 100.3 shall be 677 meters.

4.2 Reactor Core

4.2.1 ~~Fuel Assemblies~~ Reactor Core

The reactor shall contain ~~[217]~~204 fuel assemblies. Each assembly shall consist of a matrix of ~~[~~Zircalloy ~~or ZIRLO]~~ fuel rods with an initial composition of depleted, natural or slightly enriched uranium dioxide (UO_2) as fuel material. Limited substitutions of zirconium alloy or stainless steel filler rods for fuel rods, in accordance with approved applications of fuel rod configurations, may be used. Fuel assemblies shall be limited to those fuel designs that have been analyzed with applicable NRC staff approved codes and methods and shown by tests or analyses to comply with all fuel safety design bases. A limited number of lead test assemblies that have not completed representative testing may be placed in nonlimiting core regions. A core plug or plugs may be used to replace one or more fuel assemblies subject to the analysis of the resulting power distribution. Poison may be placed in the fuel bundles for long-term reactivity control.

4.2.2 ~~[~~Control Rods~~] Assemblies~~ and Reactivity Control

~~The reactor core shall contain [91] control element assemblies (CEAs). The control material shall be [silver indium cadmium, boron carbide, or hafnium metal] as approved by the NRC.~~

The core excess reactivity shall be controlled by a combination of boric acid chemical shim, cruciform control rods, and mechanically fixed absorber rods where required. Forty-five control rods shall be distributed throughout the core as shown in Figure 3-2 of the FSAR. Four of these control rods may consist of part-length absorbers.

4.3 Fuel Storage

~~4.3.1 Criticality~~

~~4.3.1.1 The spent fuel storage racks are designed and shall be maintained with:~~

~~a. Fuel assemblies having a maximum U 235 enrichment of [4.5] weight percent;~~

~~b. $k_{eff} \leq 0.95$ if fully flooded with unborated water, which includes an allowance for uncertainties as described in [Section 9.1 of the FSAR];~~

~~[c. A nominal [9] inch center to center distance between fuel assemblies placed in [the high density fuel storage racks];]~~

~~[d. A nominal [10.4] inch center to center distance between fuel assemblies placed in [the low density fuel storage racks];]~~

~~[e. New or partially spent fuel assemblies with a discharge burnup in the "acceptable range" of Figure [3.7.17-1] may be allowed unrestricted storage in [either] fuel storage rack(s); and]~~

~~[f. New or partially spent fuel assemblies with a discharge burnup in the "unacceptable range" of Figure [3.7.17-1] will be stored in compliance with the NRC approved [specified document containing the analytical methods, title, date, or specific configuration or figure].]~~

~~4.3.1.2 The new fuel storage racks are designed and shall be maintained with:~~

~~a. Fuel assemblies having a maximum U 235 enrichment of [4.5] weight percent;~~

~~b. $k_{eff} \leq 0.95$ if fully flooded with unborated water, which includes an allowance for uncertainties as described in [Section 9.1 of the FSAR];~~

~~c. $k_{eff} \leq 0.98$ if moderated by aqueous foam, which includes an allowance for uncertainties as described in [Section 9.1 of the FSAR]; and~~

~~d. A nominal [10] inch center to center distance between fuel assemblies placed in the storage racks.~~

4.3.1 New Fuel Storage:

a. The pitch of the new fuel storage rack lattice is ≥ 9.375 inches, and every other position in the lattice is permanently occupied by an 8" x 8" structural steel box beam having a minimum wall thickness of 0.25 inches or core plugs such that the minimum center-to-center spacing of new fuel assemblies in the alternating storage array is 13.26". This distance in the alternating storage lattice is sufficient so that K_{eff} will not exceed 0.95 where fuel assemblies with 216 UO_2 or Gd_2O_3-UO_2 fuel rods or metal rods and a maximum average planar enrichment in the UO_2 or Gd_2O_3-UO_2 fuel rods of 4.20 w/o U_{235} are in place and optimum moderation is assumed.

b. New fuel may also be stored in shipping containers.

c. The new fuel storage racks are designed as a Class I structure.

4.3.2 Spent Fuel Storage:

a. The spent fuel storage pool and spare (north) tilt pit are divided into two regions identified as Region I and Region II as illustrated in Figure B 3.7.15-1. Region I racks are designed and shall be maintained with a nominal 10.25" center-to-center distance between fuel assemblies with the exception of the single Type E rack which has a nominal 11.25" center-to-center distance between fuel assemblies. The Region I spent fuel storage racks are designed such that fuel having a maximum assembly planar average U_{235} enrichment of 4.40 w/o placed in the racks would result in a K_{eff} equivalent to ≤ 0.95 when flooded with unborated water. The K_{eff} of ≤ 0.95 includes a conservative allowance for uncertainties. For enrichments above 3.27 w/o U_{235}, the fuel assemblies must contain 216 rods which are either UO_2, Gd_2O_3-UO_2 or solid metal.

b. Region II racks have a 9.17 inch center-to-center spacing. Because of this smaller spacing, strict controls are employed to evaluate burnup of the fuel assembly prior to its placement in Region II cell locations.

c. The requirements for storage of spent fuel in Region II are described in LCO 3.7.15, "Spent Fuel Assembly Storage."

d. Additional requirements for spent fuel storage are described in LCO 3.7.13, "Spent Fuel Pool Water Level" and LCO 3.7.14, "Spent Fuel Pool Boron Concentration."

~~4.3.2 Drainage~~

~~The spent fuel storage pool is designed and shall be maintained to prevent inadvertent draining of the pool below elevation [23 ft].~~

~~4.3.3 Capacity~~

~~The spent fuel storage pool is designed and shall be maintained with a storage capacity limited to no more than [1542] fuel assemblies.~~

ATTACHMENT 5

CONSUMERS POWER COMPANY
PALISADES PLANT
DOCKET 50-255

STS CONVERSION TECHNICAL SPECIFICATION CHANGE REQUEST

4.0 DESIGN FEATURES PART

Not Applicable

to

This Section

ATTACHMENT 6

CONSUMERS POWER COMPANY
PALISADES PLANT
DOCKET 50-255

STS CONVERSION TECHNICAL SPECIFICATION CHANGE REQUEST

4.0 DESIGN FEATURES PART

Comparison of Revised and Standard Technical Specifications

Palisades Revised Tech Spec Requirement List. (03/28/96)

A listing of the proposed Palisades Revised Tech Specs (RTS) correlated to the CE Standard Tech Specs (STS).

First Column; Proposed Palisades Revised Tech Spec (RTS) number
Each RTS item is listed in the left-most column.
If a STS item has been omitted from RTS, the word 'Omitted' is used.

Second Column; CE Standard Tech Spec (STS) number
The corresponding STS item is listed in the second column.
If a RTS item does not appear in STS, it is noted as 'Added'.

Third Column; Existing Palisades Tech Spec (TS) number
The closest TS item is listed in the third column.
If a RTS item does not appear in TS, it is noted as 'New'.

Fourth Column; RTS Item Description
An abbreviation of the RTS item appears in the third column.
Each item is identified as: LCO, ACTION, SR, ADMIN, Exception, etc.
In cases where a STS item was omitted from RTS, the description is of the STS item.

Description Key:	RTS requirement type:	Column 4 syntax:
	Safety Limit	SL: Safety limit; Applicable conditions
	Limiting Condition for Operation	LCO: LCO Description; Applicable conditions
	Condition	COND: Description of non-conforming condition
	Action	ACTN: Required action; Completion time
	Surveillance Requirement	SR: Test description; Frequency
	Table	TABL: Title
	Administrative Requirement	ADMN: Administrative requirement
	Defined Term	DEF: Name of defined term

Fifth Column; Comments and Explanations of Differences between RTS and STS.
A brief explanation of differences between RTS and STS is provided in the fifth column.

Other abbreviations used in the listing are:

NA:	Not Applicable
CFT:	Channel Functional Test
CHNL:	Channel

RTS Number	STS Number	TS Number	RTS (STS) requirement Description	Explanation of Differences

Global differences between the proposed Palisades Technical Specifications and the Standard Technical Specifications for CE plants, Nureg 1432:

The following changes are not discussed in the explanation of differences for each TS requirement.

1) Bracketed values have been replaced with appropriate values for Palisades. Typically, the basis for these values is provided in the bases document.

2) Each required action of the form "Perform SR X.X.X.X . . ." has been altered by a parenthetical summary of the SR requirements. This change allows a reader to understand the required actions without constantly turning pages to locate the referenced SR.

3) Terminology has been changed to reflect Palisades usage:

"RWT"	becomes	"SIRWT"	Safety Injection Refueling Water Tank
"CEA"	becomes	"Control Rod" or "Rod"	Palisades uses cruciform control rods rather than the multifingered "Control Element Assemblies" of later CE plants.
"RCS"	becomes	"PCS"	Palisades terminology is "Primary Coolant System" rather than "Reactor Coolant System"
"SIAS"	becomes	"SIS"	Palisades terminology is "Safety Injection Signal" rather than "Safety Injection Actuation Signal"
"AC Vital bus"	becomes	"Preferred AC bus"	Palisades terminology.
"PAMI"	becomes	"AMI"	Accident Monitoring Instrumentation, Palisades terminology
"ESFAS"	becomes	"ESF Instrumentation"	There is no stand-alone ESFAS system or cabinet at Palisades; ESF instruments actuate the ESF functions
"DG LOVS"	becomes	"DG UV Start"	Palisades Terminology
"Remote Shutdown System"	becomes	"Alternate Shutdown System"	Palisades Terminology
"Power Rate of Change-High"	becomes	"High Startup Rate"	Palisades Terminology

RTS Number	STS Number	TS Number	RTS (STS) requirement Description	Explanation of Differences
4.0	4.0	5.0	DESIGN FEATURES	
4.1	4.1	5.1	Desc: Description of plant site	Unchanged.
4.2.1	4.2	5.3.2a,b,c	Desc: Description of Reactor Core	Used existing description.
4.2.2	4.2.2	5.3.2.d	Desc: Description of Control Rods	Used existing description.
4.3.1.1	3.7.15, bases	5.4.2	Desc: Description of spent fuel storage	Moved description of spent fuel storage requirements and facilities to LCO 3.7.15 and its bases.
4.3.1.2	4.3.1	5.4.1	Desc: Description of new fuel storage facilities	Used existing description.
4.3.2	3.7.15, bases	New	Desc: Description of fuel storage drainage limitation	The drainage discussion is not applicable to the Palisades new fuel storage racks. This subject is discussed in the bases for LCO 3.7.15.
4.3.3	3.7.15, bases	New	Desc: Description of fuel storage capacity	This subject is discussed in the bases for LCO 3.7.15.

ENCLOSURE 1

CONSUMERS POWER COMPANY
PALISADES PLANT
DOCKET 50-255

TECHNICAL SPECIFICATION CHANGE REQUEST

PART 14 - SECTION 5.0

March 28, 1996

CONSUMERS POWER COMPANY
Docket 50-255
Request for Change to the Technical Specifications
License DPR-20

5.0 ADMINISTRATIVE CONTROLS

It is requested that Section 6.0, Administrative Controls, of the Technical Specifications contained in the Facility Operating License DPR-20, Docket 50-255, issued to Consumers Power Company on February 21, 1991, for the Palisades Plant be changed as described below:

I. ARRANGEMENT AND CONTENT OF THIS PART OF THE CHANGE REQUEST:

This part of the Technical Specification Change Request (TSCR) proposes changes to those Palisades Technical Specifications addressing Section 6.0, Administrative Controls. These requirements appear in Section 5.0 of RTS and STS. These changes are intended to result in requirements which are appropriate for the Palisades plant, but closely emulate those of the Standard Technical Specifications, Combustion Engineering Plants, NUREG 1432, Revision 1.

This discussion and its supporting information frequently refer to three sets of Technical Specifications; the following abbreviations are used for clarity and brevity:

TS - The existing Palisades Technical Specifications,
RTS - The revised Palisades Technical Specifications,
STS - NUREG 1432, Revision 1.

Two attachments are provided to assist the reviewer. Section 6.0 of the TS (Section 5.0 of the RTS) does not have a corresponding Bases section. Attachments 2 and 5, supplied for other parts of the TSCR, address the Bases for the associated parts of TS. Attachments 3 and 6, line by line comparisons, are not supplied for the Administrative Controls section due to the minimal number of changes. The numbering and content of the remaining attachments is consistent with other parts of the TSCR.

1. Proposed RTS pages
2. Not Applicable to Administrative Controls Section.
3. Not Applicable to Administrative Controls Section.
4. STS pages marked to show the differences between RTS and STS
5. Not applicable to Administrative Controls Section.
6. Not Applicable to Administrative Controls Section.

II. TECHNICAL SPECIFICATION CHANGES PROPOSED:

A change request which requests changes to the existing Palisades TS Administrative Controls section was submitted on December 11, 1995, and supplemented on January 18, 1996. That change request proposes revising the existing Administrative Controls section to closely emulate the requirements of the STS. This section of this change request duplicates those requested changes, in the format and numbering scheme of STS, and proposes three additional STS requirements.

The additional requirements are a Fuel Oil Testing Program, 5.5.11, a Safety Functions Determination Program, 5.5.13, and a Pressure Temperature Limits Report, 5.6.6. The Fuel Oil Testing Program includes requirements which are not included in the TS. An identical program was proposed in a Technical Specifications change request, submitted on December 27, 1995, which revised the existing Electrical Power System requirements to emulate STS. The Safety Functions Determination Program and the Pressure Temperature Limits Report support features of the STS, but would be inappropriate in TS.

TS Section 6.0 and RTS Section 5.0 address Administrative Controls. Each proposed change to a requirement in the existing TS is described in Attachment 3. Those proposed RTS requirements which have no counterpart in TS are described in Attachment 6. These new requirements are identified by the word "New" in the third column of Attachment 6.

The Changes From TS to RTS Proposed in This Part of the TSCR are:

1. The numbering of the Administrative Controls section has been changed from 6.0 to 5.0. There is an exact correlation between TS 6.x.y and RTS 5.x.y. The change in numbering is an ADMINISTRATIVE change.

2. Three programs have been added to RTS Section 5.0 which do not appear in TS Section 6.0:

    a. The Fuel Oil Testing Program, 5.5.11, outlines the requirements for assuring that stored fuel oil quality does not jeopardize Diesel Generator Operability. Palisades TS do not currently contain surveillance requirements for the sampling of fuel oil; therefore, this program constitutes a new requirement.

    b. The Safety Function Determination Program, 5.5.13, is a feature of STS which supports LCO 3.0.6 in addressing support system operability.

    c. A Containment Leak Rate Testing Program, 5.5.14, has been included to allow use of 10 CFR 50, Appendix J, Option B performance based testing. The addition of these three requirements is classified as a MORE RESTRICTIVE change.

3. A Pressure Temperature Limits Report, 5.6.6, was includes in RTS. It supports several LCOs which address cycle specific PCS pressure and heatup rate limits. The Addition of a requirement for a Pressure Temperature Limits Report, in itself, is classified as an ADMINISTRATIVE change, because the creation of a report affects no operating requirements or limits. The relocation of LCO limits to that report will be addressed by the part of the TSCR which requests changes of the associated LCOs.

The Major Differences Between RTS and STS in This Part of the TSCR are:

1. The Explosive Gas and Storage Tank Radioactivity Monitoring Program, STS 5.5.12, was omitted from the RTS. Palisades TS contain no equivalent requirements.

2. The RTS Fuel Oil Testing Program, 5.5.11, contains different testing and sampling requirements than its STS counterpart. These differences are necessary because the Palisades Fuel Oil Storage Tank serves several components besides the Diesel Generators, and the turn over rate for the fuel oil is quite high. This results in different limiting conditions than a tank where fuel is stored for a long time.

3. A Containment Leak Rate Testing Program, 5.5.14, has been included to allow use of 10 CFR 50, Appendix J, Option B performance based testing.

III. NO SIGNIFICANT HAZARDS ANALYSIS:

Each change proposed for the Administrative Controls section is classified above as either ADMINISTRATIVE or MORE RESTRICTIVE.

ADMINISTRATIVE changes move requirements, either within the TS or to documents controlled under 10 CFR 50.59, or clarify existing TS requirements, without affecting their technical content. Since ADMINISTRATIVE changes do not alter the technical content of any requirements, they cannot involve a significant increase in the probability or consequences of an accident previously evaluated, create the possibility of a new or different kind of accident from any previously evaluated, or involve a significant reduction in a margin of safety.

MORE RESTRICTIVE changes only add new requirements, or revise existing requirements to result in additional operational restrictions. Since the TS, with all MORE RESTRICTIVE changes incorporated, will still contain all of the requirements which existed prior to the changes, MORE RESTRICTIVE changes cannot involve a significant increase in the probability or consequences of an accident previously evaluated, create the possibility of a new or different kind of accident from any previously evaluated, or involve a significant reduction in a margin of safety.

IV. CONCLUSION

The Palisades Plant Review Committee has reviewed this part of the STS conversion Technical Specifications Change Request and has determined that proposing this change does not involve an unreviewed safety question. Further, the change involves no significant hazards consideration. This change has been reviewed by the Nuclear Performance Assessment Department.

ATTACHMENT 1

CONSUMERS POWER COMPANY
PALISADES PLANT
DOCKET 50-255

STS CONVERSION TECHNICAL SPECIFICATION CHANGE REQUEST

5.0 ADMINISTRATIVE CONTROLS PART

Proposed Revised Technical Specifications Pages

5.0 ADMINISTRATIVE CONTROLS

5.1 Responsibility

5.1.1 The plant superintendent shall be responsible for overall plant operation and shall delegate in writing the succession for this responsibility during his absence.

The plant superintendent or his designee shall approve, prior to implementation, each proposed test, experiment or modification to systems or equipment that affect nuclear safety.

5.1.2 The Shift Supervisor (SS) shall be responsible for the control room command function. During any absence of the SS from the control room while the plant is in MODE 1, 2, 3, or 4 an individual with an active Senior Reactor Operator (SRO) license shall be designated to assume the control room command function. During any absence of the SS from the control room while the plant is in MODE 5 or 6, an individual with an active SRO license or Reactor Operator (RO) license shall be designated to assume the control room command function.

5.0 ADMINISTRATIVE CONTROLS

5.2 Organization

5.2.1 Onsite and Offsite Organizations

Onsite and offsite organizations shall be established for plant operation and corporate management, respectively. The onsite and offsite organizations shall include the positions for activities affecting safety of the Palisades plant.

a. Lines of authority, responsibility, and communication shall be established and defined for the highest management levels through intermediate levels to and including all operating organization positions. These relationships shall be documented and updated, as appropriate, in the form of organization charts, functional descriptions of departmental responsibilities and relationships, and job descriptions for key positions, or in equivalent forms of documentation. These requirements and the plant specific equivalent of those titles referred to in these Technical Specifications shall be documented in the FSAR;

b. The plant superintendent shall be responsible for overall plant safe operation and shall have control over those onsite activities necessary for safe operation and maintenance of the plant;

c. A specified corporate executive shall have corporate responsibility for overall plant nuclear safety and shall take any measures needed to ensure acceptable performance of the staff in operating, maintaining, and providing technical support to the plant to ensure nuclear safety; and

d. The individuals who train the operating staff, carry out radiation safety and, quality assurance functions may report to the appropriate onsite manager; however, these individuals shall have sufficient organizational freedom to ensure their independence from operating pressures.

5.2.2 Plant Staff

The plant staff organization shall include the following:

a. A nonlicensed operator shall be assigned when fuel is in the reactor and an additional non-licensed operator shall be assigned while the plant is in MODE 1, 2, 3, or 4;

b. At least one licensed Reactor Operator (RO) shall be present in the control room when fuel is in the reactor. In addition, while the plant is in MODE 1, 2, 3, or 4 at least one licensed Senior Reactor Operator (SRO) shall be present in the control room;

5.2.2 Plant Staff
(continued)

c. Shift crew composition may be less than the minimum requirements of 10 CFR 50.54(m)(2)(i), and 5.2.2.a and 5.2.2.g for a period of time not to exceed 2 hours in order to accommodate unexpected absence of on-duty shift crew members, provided immediate action is taken to restore the shift crew composition to within the requirements;

d. A radiation safety technician shall be on site when fuel is in the reactor. The position may be vacant for not more than 2 hours, in order to provide for unexpected absence, provided immediate action is taken to fill the required position;

e. Administrative procedures shall be developed and implemented to limit the working hours of plant staff who perform safety-related functions (e.g., licensed SROs, licensed ROs, radiation safety personnel, auxiliary operators, and key maintenance personnel);

Adequate shift coverage shall be maintained without routine heavy use of overtime. The objective shall be to have operating personnel work an 8 or 12 hour day, nominal 40 hour week while the plant is operating. However, in the event that unforeseen problems require substantial amounts of overtime to be used, or during extended periods of shutdown for refueling, major maintenance, or major plant modification, on a temporary basis the following guidelines shall be followed:

1. An individual should not be permitted to work more than 16 hours straight, excluding shift turnover time;

2. An individual should not be permitted to work more than 16 hours in any 24 hour period, nor more than 24 hours in any 48 hour period, nor more than 72 hours in any 7 day period, all excluding shift turnover time;

3. A break of at least 8 hours should be allowed between work periods, including shift turnover time;

4. Except during extended shutdown periods, the use of overtime should be considered on an individual basis and not for the entire staff on a shift.

Any deviation from the above guidelines shall be authorized in advance by the plant superintendent or his designee, in accordance with approved administrative procedures, or by higher levels of management, in accordance with established procedures and with documentation of the basis for granting the deviation.

5.2.2 Plant Staff
(continued)

Controls shall be included in the procedures such that individual overtime shall be reviewed monthly by the plant superintendent or his designee to ensure that excessive hours have not been assigned. Routine deviation from the above guidelines is not authorized.

f. The operations manager or an assistant operations manager shall hold an SRO license. The individual holding the SRO license shall be responsible for directing the activities of the licensed operators;

g. The Shift Technical Advisor (STA) shall provide advisory technical support to the Shift Supervisor (SS) in the areas of thermal hydraulics, reactor engineering, and plant analysis with regard to the safe operation of the plant. If either SRO on shift satisfies the Shift Engineer qualification requirements, then the STA does not need to be stationed.

5.0 ADMINISTRATIVE CONTROLS

5.3 Plant Staff Qualifications

5.3.1 Each member of the plant staff shall meet or exceed the minimum qualifications of ANSI N18.1-1971 for comparable positions.

5.3.2 The radiation safety manager shall meet the qualifications of a Radiation Protection Manager as defined in Regulatory Guide 1.8, September 1975. For the purpose of this section, "Equivalent," as utilized in Regulatory Guide 1.8 for the bachelor's degree requirement, may be met with four years of any one or combination of the following: (a) Formal schooling in science or engineering, or (b) operational or technical experience and training in nuclear power.

5.3.3 The Shift Technical Advisor shall have a bachelor's degree or equivalent and the Shift Engineer shall have a bachelor's degree in a scientific or engineering discipline. Specific training for both the Shift Technical Advisor and the Shift Engineer shall include plant design, operations, and response and analysis of the plant for transients and accidents. The Shift Engineer shall hold a Senior Reactor Operator license.

5.3.4 The plant staff who perform reviews which ensure compliance with 10 CFR 50.59 shall meet or exceed the minimum qualifications of ANS 3.1-1987, Section 4.7.1 and 4.7.2. A Senior Reactor Operator license or certification shall be considered equivalent to a bachelors degree for the purpose of this specification.

5.0 **ADMINISTRATIVE CONTROLS**

5.4 Procedures

5.4.1 Written procedures shall be established, implemented, and maintained covering the following activities:

a. The applicable procedures recommended in Appendix "A" of Regulatory Guide 1.33, Revision 2, February 1978;

b. Refueling operations;

c. Surveillance and test activities of safety-related equipment;

d. Site Fire Protection Program implementation; and

e. All programs specified in Specification 5.5.

5.0 ADMINISTRATIVE CONTROLS

5.5 Programs and Manuals

The following programs shall be established, implemented, and maintained.

5.5.1 Offsite Dose Calculation Manual (ODCM)

a. The ODCM shall contain the methodology and parameters used in the calculation of offsite doses resulting from radioactive gaseous and liquid effluents, in the calculation of gaseous and liquid effluent monitoring alarm and trip setpoints, and in the conduct of the radiological environmental monitoring program; and

b. The ODCM shall also contain (1) the radioactive effluent controls and radiological environmental monitoring activities and (2) descriptions of the information that should be included in the Radiological Environmental Operating Report, and Radioactive Effluent Release Report required by Specification 5.6.2 and Specification 5.6.3;

c. Changes to ODCM:

Licensee initiated changes to the ODCM:

1. Shall be documented and records of reviews performed shall be retained. This documentation shall contain:

    a) Sufficient information to support the change together with the appropriate analyses or evaluations justifying the changes; and

    b) A determination that the change(s) maintain the levels of radioactive effluent control required by 10 CFR 20.1302, 40 CFR 190, 10 CFR 50.36a, and 10 CFR 50, Appendix I, and not adversely impact the accuracy or reliability of effluent, dose, or setpoint calculations;

2. Shall become effective after the approval of the plant superintendent; and

3. Shall be submitted to the NRC in the form of a complete, legible copy of the entire ODCM as a part of or concurrent with the Radioactive Effluent Release Report for the period of the report in which any change in the ODCM was made. Each change shall be identified by markings in the margin of the affected pages, clearly indicating the area of the page that was changed, and shall indicate the date (i.e., month/year) the change was implemented.

5.5.2 Primary Coolant Sources Outside Containment

This program provides controls to minimize leakage to the engineered safeguards rooms, from those portions of systems outside containment that could contain highly radioactive fluids during a serious transient or accident, to as low as practical. The systems include the Containment Spray system, the Safety Injection system, and the containment sump suction piping. This program shall include the following:

a. Provisions establishing preventive maintenance and periodic visual inspection requirements;

b. Integrated leak test requirements for each system at a frequency not to exceed refueling cycle intervals or less;

c. The portion of the shutdown cooling system that is outside the containment shall be tested either by use in normal operation or hydrostatically tested at 255 psig;

d. Piping from Valves CV-3029 and CV-3030 to the discharge of the safety injection pumps and containment spray pumps shall be hydrostatically tested at no less than 100 psig;

e. The maximum allowable leakage from the recirculation heat removal systems' components (which include valve stems, flanges, and pump seals) shall not exceed 0.2 gallon per minute under the normal hydrostatic head from the SIRW tank (approximately 44 psig).

5.5.3 Post Accident Sampling Program

This program provides controls that ensure the capability to accurately determine the airborne iodine concentration in vital areas and which will ensure the capacity to obtain and analyze reactor coolant, radioactive gases, iodines, and particulates in plant gaseous effluents, and containment atmosphere samples under accident conditions. The program shall include the following:

a. Training of personnel;

b. Procedures for sampling and analysis; and

c. Provisions for maintenance of sampling and analysis equipment.

5.5.4 Radioactive Effluent Controls Program

A program shall be provided conforming with 10 CFR 50.36a for the control of radioactive effluents and for maintaining the doses to members of the public from radioactive effluents as low as reasonably achievable. The program (1) shall be contained in the Offsite Dose Calculation Manual (ODCM), (2) shall be implemented by procedures, and (3) shall include remedial actions to be taken whenever the program limits are exceeded. The program shall include the following elements:

a. Limitations on the operability of radioactive liquid and gaseous monitoring instrumentation including surveillance tests and setpoint determination in accordance with the methodology in the ODCM;

b. Limitations on the concentrations of radioactive material released in liquid effluents to unrestricted areas, conforming to 10 CFR 20, Appendix B, Table 2, Column 2;

c. Monitoring, sampling, and analysis of radioactive liquid and gaseous effluents in accordance with 10 CFR 20.1302 and with the methodology and parameters in the ODCM;

d. Limitations on the annual and quarterly doses or dose commitment to a member of the public from radioactive materials in liquid effluents released from each plant to unrestricted areas, conforming to 10 CFR 50, Appendix I;

e. Limitations of the dose rate resulting from radioactive material released in gaseous effluents to areas beyond the site boundary conforming to the doses associated with 10 CFR 20, Appendix B, Table 2, Column 1;

f. Limitations on the annual and quarterly air dose resulting from noble gases released in gaseous effluents from each plant to areas beyond the site boundary conforming to 10 CFR 50, Appendix I;

g. Limitations on the annual and quarterly doses to a member of the public from Iodine-131, Iodine-133, tritium and all radionuclides in particulate form with half-lives greater than 8 days in gaseous effluents released from each plant to areas beyond the site boundary conforming to 10 CFR 50, Appendix I; and

h. Limitations on the annual and quarterly air doses or dose commitment to any member of the public due to releases of radioactivity and to radiation from uranium fuel cycle sources conforming to 40 CFR 190.

5.5.5 Containment Structural Integrity Surveillance Program

This program provides controls for monitoring any tendon degradation in pre-stressed concrete containments, including effectiveness of its corrosion protection medium, to ensure containment structural integrity. The program shall include baseline measurements prior to initial operations. The Containment Structural Integrity Surveillance Program, inspection frequencies, and acceptance criteria shall be in accordance with Regulatory Guide 1.35, Revision 3, 1989.

The provisions of SR 3.0.2 and SR 3.0.3 are applicable to the Containment Structural Integrity Surveillance Program requirements.

5.5.6 Primary Coolant Pump Flywheel Surveillance Program

Surveillance of the primary coolant pump flywheels shall consist of a 100% volumetric inspection of the upper flywheels each refueling.

5.5.7 Inservice Inspection and Testing Program

This program provides controls for inservice inspection and testing of ASME Code Class 1, 2, and 3 components including applicable supports. The program shall include the following:

a. Testing frequencies specified in Section XI of the ASME Boiler and Pressure Vessel Code and applicable Addenda (B&PV Code) as follows:

B&PV Code terminology for inservice testing activities	**Required interval for performing inservice testing activities**
Weekly	≤ 7 days
Monthly	≤ 31 days
Quarterly or every 3 months	≤ 92 days
Semiannually or every 6 months	≤ 184 days
Every 9 months	≤ 276 days
Yearly or annually	≤ 366 days
Biennially or every 2 years	≤ 731 days

b. The provisions of SR 3.0.2 and SR 3.0.3 are applicable to the Inservice Inspection and Testing Program requirements.

c. Nothing in the B&PV Code shall be construed to supersede the requirements of any Technical Specification.

5.5.8 Steam Generator Tube Surveillance Program

This program provides controls for surveillance testing of the Steam Generator (SG) tubes to ensure that the structural integrity of this portion of the Primary Coolant System (PCS) is maintained. The program shall contain controls to ensure:

a. Steam Generator Tube Sample Selection and Inspection -

The inservice inspection may be limited to one SG on a rotating schedule encompassing 6% of the tubes if the results of previous inspections indicate that both SGs are performing in a like manner. If the operating conditions in one SG are found to be more severe than those in the other SG, the sample sequence shall be modified to inspect the most severe conditions.

The SG tube minimum sample size, inspection result classification, and the corresponding action required shall be as specified in Table 5.5.8-1. The tubes selected for each inservice inspection shall include at least 3% of the total number of tubes in all SGs; the tubes selected for these inspections shall be selected on a random basis except:

1. Where experience in similar plants with similar water chemistry indicates critical areas to be inspected, then at least 50% of the tubes inspected shall be from these critical areas;

2. The first sample of tubes selected for each inservice inspection of each SG shall include:

    a) All nonplugged tubes that previously had detectable wall penetrations greater than 20%;

    b) Tubes in those areas where experience has indicated potential problems;

    c) A tube inspection shall be performed on each selected tube. If any selected tube does not permit the passage of the eddy current probe for a tube inspection, this shall be recorded and an adjacent tube shall be selected and subjected to a tube inspection.

5.5.8 Steam Generator Tube Surveillance Program
(continued)

3. The tubes selected as the second and third samples (if required by Table 5.5.8-1) during each inservice inspection may be subjected to a partial tube inspection provided:

   a) The tubes selected for these samples include the tubes from those areas of the tube sheet array where tubes with imperfections were previously found;

   b) The inspections include those portions of the tubes where imperfections were previously found.

4. The results of each sample inspection shall be classified into one of the following three categories:

Category	Inspection Results
C-1	Less than 5% of the total tubes inspected are degraded tubes and none of the inspected tubes are defective.
C-2	One or more tubes, but not more than 1% of the total tubes inspected are defective, or between 5% and 10% of the total tubes inspected are degraded tubes.
C-3	More than 10% of the total tubes inspected are degraded tubes or more than 1% of the inspected tubes are defective.

Note: In all inspections, previously degraded tubes must exhibit significant (greater than 10%) further wall penetrations to be included in the above percentage calculations.

b. Inspection Frequencies

The above required inservice inspection of SG tubes shall be performed at the following frequencies:

1. Inservice inspections shall be performed at intervals of not less than 12 nor more than 24 calendar months after the previous inspection. If two consecutive inspections following service under AVT conditions, not including the preservice inspection, result in all inspections results falling into the C-1 category or if two consecutive inspections demonstrate that previously observed degradation has not continued and no additional degradation has occurred, the inspection interval may be extended to a maximum of once per 40 months;

5.5.8 Steam Generator Tube Surveillance Program
(continued)

2. If the results of the inservice inspection of a SG conducted in accordance with Table 5.5.8-1 at 40 month intervals fall into Category C-3, the inspection frequency shall be increased to at least once per 20 months. The increase in inspection frequency shall apply until the subsequent inspections satisfy the criteria of Specification 5.5.8.b.1; the interval may then be extended to a maximum of once per 40 months;

3. Additional, unscheduled inservice inspections shall be performed on each SG in accordance with the first sample inspection specified in Table 5.5.8-1 during the shutdown subsequent to any of the following conditions:

a) Primary-to-secondary tube leaks (not including leaks originating from tube-to-tube sheet welds) in excess of the limits of LCO 3.4.13;

b) A seismic occurrence greater than the Operating Basis Earthquake;

c) A loss-of-coolant accident resulting in initiation of flow of the engineered safeguards;

d) A main steam line or main feedwater line break.

c. Acceptance Criteria

1. As used in this Specification:

a) Imperfection means an exception to the dimensions, finish or contour of a tube from that required fabrication drawings or specifications. Eddy current testing indications below 20% of the nominal tube wall thickness, if detectable, may be considered as imperfections;

b) Degradation means a service-induced cracking, wastage, wear or general corrosion occurring on either inside or outside of a tube;

c) Degraded Tube means a tube containing imperfections greater than or equal to 20% of the nominal wall thickness caused by degradation;

5.5.8 Steam Generator Tube Surveillance Program
(continued)

d) % Degradation means the percentage of the tube wall thickness affected or removed by degradation;

e) Defect means an imperfection of such severity that it exceeds the plugging limit. A tube containing a defect is defective;

f) Plugging Limit means the imperfection depth at or beyond which the tube shall be removed from service and is equal to 40% of the nominal tube wall thickness;

g) Unserviceable describes the condition of a tube if it leaks or contains a defect large enough to affect its structural integrity in the event of an Operating Basis Earthquake, a loss-of-coolant accident, or a steam line or feedwater line break as specified in 5.5.8.b.3, above;

h) Tube Inspection means an inspection of the SG tube from the point of entry (hot leg side) completely around the U-bend to the top support of the cold leg;

i) Preservice Inspection means an inspection of the full length of each tube in SG performed by eddy current techniques prior to service to establish a baseline condition of the tubing. This inspection shall be performed after the shop hydrostatic test and prior to initial POWER OPERATION using the equipment and techniques expected to be used during subsequent inservice inspections.

2. The SG shall be determined OPERABLE after completing the corresponding actions (plug all tubes exceeding the plugging limit and all tubes containing through-wall cracks) required by Table 5.5.8-1.

TABLE 5.5.8-1
STEAM GENERATOR TUBE INSPECTION

1ST SAMPLE INSPECTION			2ND SAMPLE INSPECTION		3RD SAMPLE INSPECTION	
Sample Size	Result	Action Required	Result	Action Required	Result	Action Required
A minimum of S Tubes per S.G.	C-1	None	N/A	N/A	N/A	N/A
	C-2	Plug defective tubes and inspect additional 2S Tubes in this S.G.	C-1	None	N/A	N/A
			C-2	Plug defective tubes and inspect additional 4S tubes in the S.G.	C-1	None
					C-2	Plug defective tubes
					C-3	Perform action for C-3 result of first Sample
			C-3	Perform action for C-3 result of first Sample	N/A	N/A
	C-3	Inspect all tubes in this S.G., plug defective tubes and inspect 2S tubes in each other S.G. 24 hour verbal notification to NRC with written follow up within next 30 days	All other S.G.s are C-1	None	N/A	N/A
			Some S.G.s C-2 but no additional S.G.are C-3	Perform action for C-2 result of second sample	N/A	N/A
			Additional S.G. is C-3	Inspect all tubes each S.G. and plug defective tubes.	N/A	N/A

S = 6/n % Where n is the number of steam generators inspected during an inspection.

5.5.9 Secondary Water Chemistry Program

A program shall be established, implemented and maintained for monitoring of secondary water chemistry to inhibit steam generator tube degradation and shall include:

a. Identification of a sampling schedule for the critical variables and control points for these variables;

b. Identification of the procedures used to measure the values of the critical variables;

c. Identification of process sampling points, which shall include monitoring the discharge of the condensate pumps for evidence of condenser inleakage;

d. Procedures for the recording and management of data;

e. Procedures defining corrective actions for all offcontrol point chemistry conditions; and

f. A procedure identifying (a) the authority responsible for the interpretation of the data, and (b) the sequence and timing of administrative events required to initiate corrective actions.

5.5.10 Ventilation Filter Testing Program (VFTP)

A program shall be established to implement the following required testing of Control Room Ventilation (CRV) and Fuel Pool Ventilation (FPV) systems at the frequencies specified in Regulatory Guide 1.52, Revision 2, (RG 1.52), and in accordance with RG 1.52 and ASME N510-1989, at the system flowrates and tolerances specified below*:

a. Demonstrate for each of the ventilation systems that an inplace test of the High Efficiency Particulate Air (HEPA) filters shows a penetration and system bypass < 0.05% for the CRV and < 1.00% for the FPV when tested in accordance with RG 1.52 and ASME N510-1989:

Ventilation System	Flowrate (CFM)
V-8A or V-8B	7300 ± 20%
V-8A and V-8B	10,000 ± 20%
V-95 or V-96	12,500 ± 10%

5.5.10 Ventilation Filter Testing Program (VFTP)
(continued)

b. Demonstrate for each of the ventilation systems that an inplace test of the charcoal absorber shows a penetration and system bypass < 0.05% for the CRV and < 1.00% for the FPV when tested in accordance with RG 1.52 and ASME N510-1989:

Ventilation System	Flowrate (CFM)
V-8A and V-8B	10,000 ± 20%
V-26A and V-26B	3200 + 10% -5%

c. Demonstrate for each of the ventilation systems that a laboratory test of a sample of the charcoal absorber, when obtained as described in RG 1.52 shows the methyl iodide penetration less than the value specified below when tested in accordance with ASTM D3803-1989 at a temperature of ≤ 30°C and equal to the relative humidity specified as follows:

Ventilation System	Penetration	Relative Humidity
VF-66	6.00%	95%
VFC-26A and VFC-26B	0.157%	70%

d. For each of the ventilation systems, demonstrate the pressure drop across the combined HEPA filters, the prefilters, and the charcoal absorbers is less than the value specified below when tested in accordance with RG 1.52 and ASME N510-1989:

Ventilation System	Delta P (In H_2O)	Flowrate (CFM)
V-8A and V-8B	6.0	10,000 ± 20%
VF-26A and VF-26B	8.0	3200 + 10% -5%

e. Demonstrate that the heaters for each of the ventilation systems dissipate the following specified value ± 20% when tested in accordance with ASME N510-1989:

Ventilation System	Wattage
VHX-26A and VHX-26B	15 kW

The provisions of SR 3.0.2 and 3.0.3 are applicable to the Ventilation Filter Testing Program requirements.

* Should the 720-hour limitation on charcoal absorber operation occur during a plant operation requiring the use of the charcoal absorber - such as refueling - testing may be delayed until the completion of the plant operation or up to 1,500 hours of filter operation; whichever occurs first.

5.5.11 Fuel Oil Testing Program

A fuel oil testing program to implement required testing of both new fuel oil and stored fuel oil shall be established. The program shall include sampling and testing requirements, and acceptance criteria, in accordance with applicable ASTM Standards. The program shall establish the following:

a. Acceptability of new fuel oil prior to addition to the Fuel Oil Storage Tank, and acceptability of fuel oil stored in the Fuel Oil Storage Tank, by determining that the fuel oil has: a) An API gravity or an absolute specific gravity, b) A kinematic viscosity, and c) Water and sediment content within limits for ASTM 2D fuel oil;

b. Other properties specified in ASTM D 975 for fuel oil in the Fuel Oil Storage Tank are within limits for ASTM 2D fuel oil.

5.5.12 Technical Specifications (TS) Bases Control Program

This program provides a means for processing changes to the Bases of these Technical Specifications.

a. Changes to the Bases of the TS shall be made under appropriate administrative controls and reviews;

b. Licensees may make changes to Bases without prior NRC approval provided the changes do not involve either of the following:

    1. A change in the TS incorporated in the license; or

    2. A change to the updated FSAR or Bases that involves an unreviewed safety question as defined in 10 CFR 50.59.

c. The Bases Control Program shall contain provisions to ensure that the Bases are maintained consistent with the FSAR;

d. Proposed changes that do not meet the criteria of Specification 5.5.12.b above shall be reviewed and approved by the NRC prior to implementation. Changes to the Bases implemented without prior NRC approval shall be provided to the NRC on a frequency consistent with 10 CFR 50.71(e).

5.5.13 Safety Functions Determination Program (SFDP)

This program ensures loss of safety function is detected and appropriate actions taken. Upon entry into LCO 3.0.6, an evaluation shall be made to determine if loss of safety function exists. Additionally, other appropriate limitations and remedial or compensatory actions may be identified to be taken as a result of the support system inoperability and corresponding exception to entering supported system Condition and Required Actions. This program implements the requirements of LCO 3.0.6. The SFDP shall contain the following:

a. Provisions for cross train checks to ensure a loss of the capability to perform the safety function assumed in the accident analyses does not go undetected;

b. Provisions for ensuring the plant is maintained in a safe condition if a loss of function condition exists;

c. Provisions to ensure that an inoperable supported system's Completion Time is not inappropriately extended as a result of multiple support system inoperabilities; and

d. Other appropriate limitations and remedial or compensatory actions.

A loss of safety function exists when, assuming no concurrent single failure, a safety function assumed in the accident analyses cannot be performed. For the purpose of this program, a loss of safety function may exist when a support system is inoperable, and:

a. A required system redundant to system(s) supported by the inoperable support system is also inoperable; or

b. A required system redundant to system(s) in turn supported by the inoperable supported system is also inoperable; or

c. A required system redundant to support system(s) for the supported systems (a) and (b) above is also inoperable.

The SFDP identifies where a loss of safety function exists. If a loss of safety function is determined to exist by this program, the appropriate Conditions and Required Actions of the LCO in which the loss of safety function exists are required to be entered.

5.5.14 Containment Leak Rate Testing Program

Programs shall be established to implement the leak rate testing of the containment as required by 10 CFR 50.54(o) and 10 CFR 50, Appendix J, Option B, as modified by approved exemptions. The Type A test program shall meet the requirements of 10 CFR 50, Appendix J, Option B and shall be in accordance with the guidelines of Regulatory Guide 1.163, "Performance-Based Containment Leakage-Test Program, dated September 1995." The Type B and Type C test program shall meet the requirements of 10 CFR 50, Appendix J, Option A, as modified by the exemption from certain requirements of 10 CFR 50 Appendix J which were granted in an NRC letter to Consumers Power Company dated December 6, 1989.

The peak calculated containment internal pressure for the design basis loss of coolant accident, P_a, is 52.635 psig.

The maximum allowable containment leak rate, L_a, at P_a, shall be 0.1% of containment air weight per day.

Leak rate acceptance criteria are:

a. Containment leak rate acceptance criteria is $\leq 1.0\ L_a$. During the first plant startup following testing in accordance with this program, the leak rate acceptance criteria are $\leq 0.60\ L_a$ for the Type B and Type C tests and $\leq 0.75\ L_a$ for Type A tests;

b. The Air Lock leak rate acceptance criterion for each door is $\leq 0.023\ L_a$ when pressurized to ≥ 10 psig.

Containment OPERABILITY is equivalent to "Containment Integrity" for the purposes of the air lock testing requirements in 10 CFR 50, Appendix J.

The provisions of SR 3.0.2 <u>are not</u> applicable to the Containment Leak Rate Testing Program requirements.

The provisions of SR 3.0.3 <u>are</u> applicable to the Containment Leak Rate Testing Program requirements.

5.0 ADMINISTRATIVE CONTROLS

5.6 Reporting Requirements

The following reports shall be submitted in accordance with 10 CFR 50.4.

5.6.1 Occupational Radiation Exposure Report

This report shall include a tabulation on an annual basis of the number of station, utility and other personnel (including contractors) receiving exposures greater than 100 mrem/year and their associated man rem exposure according to work and job functions (e.g., reactor operations and surveillance, inservice inspection, routine maintenance, special maintenance (describe maintenance), waste processing and refueling). This tabulation supplements the requirements of 10 CFR 20.2206. The dose assignment to various duty functions may be estimates based on pocket dosimeter, electronic dosimeter, TLD, or film badge measurements. Small exposures totaling less than 20% of the individual total dose need not be accounted for. In the aggregate, at least 80% of the total whole body dose received from external sources shall be assigned to specific major work functions. The report shall be submitted by April 30 of each year.

5.6.2 Radiological Environmental Operating Report

The Radiological Environmental Operating Report covering the operation of the plant during the previous calendar year shall be submitted before May 15 of each year. The report shall include summaries, interpretations, and analysis of trends of the results of the radiological environmental monitoring program for the reporting period. The material provided shall be consistent with the objectives outlined in the Offsite Dose Calculation Manual (ODCM) and in 10 CFR 50, Appendix I, Sections IV.B.2, IV.B.3, and IV.C.

5.6.3 Radioactive Effluent Release Report

The Radioactive Effluent Release Report covering the operation of the plant shall be submitted in accordance with 10 CFR 50.36a. The report shall include a summary of the quantities of radioactive liquid and gaseous effluents and solid waste released from the plant. The material provided shall be consistent with the objectives outlined in the ODCM and Process Control Program and in conformance with 10 CFR 50.36a and 10 CFR 50, Appendix I, Section IV.B.1.

5.6.4 Monthly Operating Reports

Routine reports of operating statistics and shutdown experience shall be submitted on a monthly basis to the NRC no later than the fifteenth of each month following the calendar month covered by the report.

5.6.5 Core Operating Limits Report (COLR)

a. Core operating limits shall be established prior to each reload cycle, or prior to any remaining portion of a reload cycle, and shall be documented in the COLR for the following:

1. 3.1.4 Moderator Temperature Coefficient
2. 3.1.7 Regulating Rod Insertion Limits
3. 3.2.1 Linear Heat Rate Limits
4. 3.2.2 Radial Peaking Factor Limits
5. 3.2.4 Axial Shape Index Limits.
6. 3.5.1 Safety Injection Tanks
7. 3.5.4 Safety Injection Refueling Water Tank
8. 3.9.1 Boron Concentration

b. The analytical methods used to determine the core operating limits shall be those previously reviewed and approved by the NRC, specifically those described in the following documents:

1. XN-75-27(A), "Exxon Nuclear Neutronics Design Methods for Pressurized Water Reactors," and Supplements 1(A), 2(A), 3(P)(A), 4(P)(A), and 5(P)(A); Exxon Nuclear Company. (LCOs 3.1.4, 3.1.7, 3.2.1, 3.2.2, 3.2.4)

2. ANF-84-73(P)(A), "Advanced Nuclear Fuels Methodology for Pressurized Water Reactors: Analysis of Chapter 15 Events," and Appendix B(P)(A) and Supplements 1(P)(A), 2(P)(A); Advanced Nuclear Fuels Corporation. (LCOs 3.1.7, 3.2.1, 3.2.2, & 3.2.4)

3. XN-NF-82-21(P)(A), "Application of Exxon Nuclear Company PWR Thermal Margin Methodology to Mixed Core Configurations," Exxon Nuclear Company. (LCOs 3.2.1, 3.2.2, & 3.2.4)

5.6.5 Core Operating Limits Report (COLR)
(continued)

4. ANF-84-093(P)(A), "Steamline Break Methodology for PWRs" and Supplement 1(P)(A); Advanced Nuclear Fuels Corporation.
(LCOs 3.1.7, 3.2.1, & 3.2.2)

5. XN-75-32(P)(A), "Computational Procedure for Evaluating Fuel Rod Bowing," and Supplements 1(P)(A), 2(P)(A), 3(P)(A), and 4(P)(A); Exxon Nuclear Company. (LCOs 3.1.7, 3.2.1, 3.2.2, & 3.2.4)

6. EXEM PWR Large Break LOCA Model as defined by:
(LCOs 3.1.7, 3.2.1, & 3.2.2)

   a) XN-NF-82-20(A), "Exxon Nuclear Company Evaluation Model EXEM/PWR ECCS Model Updates," and Supplements 1(P)(A), 2(P)(A), 3(P)(A), and 4(P)(A); Exxon Nuclear Company.

   b) XN-NF-82-07(P)(A), "Exxon Nuclear Company ECCS Cladding Swelling and Rupture Model," Exxon Nuclear Company.

   c) XN-NF-81-58(A), "RODEX2 Fuel Rod Thermal-Mechanical Response Evaluation Model," and Supplements 1(P)(A), 2(P)(A), 3(P)(A), and 4(P)(A); Exxon Nuclear Company.

   d) XN-NF-85-16(A), "PWR 17x17 Fuel Cooling Tests Program," Volume 1 and Supplements 1(P)(A), 2(P)(A), and 3(P)(A), and Volume 2 and Supplement 1(P)(A); Exxon Nuclear Company.

   e) XN-NF-85-105(A), "Scaling of FCTF Based Reflood Heat Transfer Correlation for other Bundle Designs," and Supplement 1(P)(A); Exxon Nuclear Company.

7. XN-NF-78-44(A), "A Generic Analysis of the Control Rod Ejection Transient for Pressurized Water Reactors," Exxon Nuclear Company. (LCOs 3.1.7, 3.2.1, & 3.2.2)

8. ANF-1224(P)(A), "Departure from Nucleate Boiling Correlation for High Thermal Performance Fuel," and Supplement 1(P)(A); Advanced Nuclear Fuels Corporation.
(LCOs 3.2.1, 3.2.2, & 3.2.4)

9. ANF-89-151(P)(A), "ANF-RELAP Methodology for Pressurized Water Reactors: Analysis of Non-LOCA Chapter 15 Events," Advanced Nuclear Fuels Corporation.
(LCOs 3.1.7, 3.2.1, 3.2.2, & 3.2.4)

5.6.5 Core Operating Limits Report (COLR)
(continued)

10. EMF-92-153(P)(A), "HTP: Departure from Nucleate Boiling Correlation for High Thermal Performance Fuel," Siemens Power Corporation.
(LCOs 3.2.1, 3.2.2, & 3.2.4)

c. The core operating limits shall be determined such that all applicable limits (e.g., fuel thermal mechanical limits, core thermal hydraulic limits, Emergency Core Cooling Systems limits, nuclear limits such as shutdown margin, transient analysis limits, and accident analysis limits) of the safety analysis are met.

d. The COLR, including any mid cycle revisions or supplements, shall be provided, upon issuance for each reload cycle, to the NRC.

5.6.6 Pressure and Temperature Limits Report (PTLR)

a. PCS pressure and temperature limits for heatup, cooldown, low temperature operation, criticality, and hydrostatic testing as well as heatup and cooldown rates, and the power operated relief valve lift settings and enable temperature associated with Low Temperature Overpressure Protection, shall be established and documented in the PTLR for the following:

1. LCO 3.4.3, PCS Pressure and Temperature Limits;

2. LCO 3.4.12, Low Temperature Overpressure Protection System.

b. The analytical methods used to determine the PCS pressure and temperature limits shall be those previously reviewed and approved by the NRC, specifically those described in the following documents:

1. 10 CFR 50, Appendix G;

2. 10 CFR 50.66;

3. Generic Letters 88-11 and 92-01;

4. Regulatory Guide 1.99, Revision 2, May 1988;

5. Regulatory Guide 1.162, 1996;

6. Standard Review Plan Section 5.3.2;

7. ASME Code Case N-514
(Approved for Palisades use March 2, 1995).

5.6.6 Pressure and Temperature Limits Report (PTLR)
(continued)

c. The PTLR shall be provided to the NRC upon issuance for each reactor vessel fluence period and for any revision or supplement thereto.

5.6.7 Accident Monitoring Instrumentation Report

When a report is required by LCO 3.3.7, "Accident Monitoring Instrumentation," a report shall be submitted within the following 14 days. The report shall outline the preplanned alternate method of monitoring, the cause of the inoperability, and the plans and schedule for restoring the instrumentation channels of the Function to OPERABLE status.

5.6.8 Containment Structural Integrity Surveillance Report

Reports shall be submitted to the NRC covering Prestressing, Anchorage, and Liner and Penetration tests within 90 days after completion of the tests.

5.6.9 Steam Generator Tube Surveillance Report

The following reports shall be submitted to the Commission following each inservice inspection of steam generator tubes:

a. The number of tubes plugged in each steam generator shall be reported to the Commission within 15 days following the completion of each inspection; and

b. The complete results of the steam generator tube inservice inspection shall be reported to the Commission within 12 months following completion of the inspection. This report shall include:

   1. Number and extent of tubes inspected;

   2. Location and percent of wall-thickness penetration for each indication of an imperfection;

   3. Identification of tubes plugged.

5.6.9 Steam Generator Tube Surveillance Report
(continued)

c. Results of steam generator tube inspections that fall into Category C-3 shall require 24 hour verbal notification to the NRC prior to resumption of plant operation. A written followup within the next 30 days shall provide a description of investigations and corrective measures taken to prevent recurrence.

5.0 ADMINISTRATIVE CONTROLS

5.7 High Radiation Area

5.7.1 Pursuant to 10 CFR 20, paragraph 20.1601(c), in lieu of the requirements of 10 CFR 20.1601, each high radiation area, as defined in 10 CFR 20, in which the intensity of radiation is > 100 mrem/hr but < 1000 mrem/hr, shall be barricaded and conspicuously posted as a high radiation area and entrance thereto shall be controlled by requiring issuance of a Radiation Work Permit (RWP). Individuals qualified in radiation protection procedures (e.g., health physics technicians) or personnel continuously escorted by such individuals may be exempt from the RWP issuance requirement during the performance of their assigned duties in high radiation areas with exposure rates ≤ 1000 mrem/hr, provided they are otherwise following plant radiation protection procedures for entry into such high radiation areas.

In lieu of the "control device" or "alarm signal" required by 10 CFR 20.1601, each high radiation area in which the intensity of radiation is greater than 100 mrem/hour but less than 1000 mrem/hour at 30 cm from the radiation source or from any surface which the radiation penetrates, shall be barricaded and conspicuously posted as a high radiation area and entrance thereto shall be controlled by requiring issuance of an RWP.

Any individual or group of individuals permitted to enter such areas shall be provided with or accompanied by one or more of the following:

a. A radiation monitoring device that continuously indicates the radiation dose rate in the area.

b. A radiation monitoring device that continuously integrates the radiation dose rate in the area and alarms when a preset integrated dose is received. Entry into such areas with this monitoring device may be made after the dose rate levels in the area have been established and personnel are aware of them.

c. An individual qualified in radiation protection procedures with a radiation dose rate monitoring device, who is responsible for providing positive control over the activities within the area and shall perform periodic radiation surveillance at the frequency specified by the Duty Health Physicist in the RWP.

5.7.2 In addition to the requirements of Specification 5.7.1, except as allowed by 5.7.3, areas with radiation levels ≥ 1000 mrem/hr shall be provided with locked or continuously guarded doors to prevent unauthorized entry and the keys shall be maintained under the administrative control of the Shift Supervisor on duty or health physics supervision. Doors shall remain locked except during periods of access by personnel (High Radiation Area) under an approved RWP that shall specify the dose rate levels in the immediate work areas and the maximum allowable stay times for individuals in those areas. In lieu of the stay time specification of the RWP, direct or remote (such as closed circuit TV cameras) continuous surveillance may be made by personnel qualified in radiation protection procedures to provide positive exposure control over the activities being performed within the area.

5.7.3 For individual high radiation areas with radiation levels of > 1000 mrem/hr, accessible to personnel, that are located within large areas such as reactor containment, where no enclosure exists for purposes of locking, or that cannot be continuously guarded, and where no enclosure can be reasonably constructed around the individual area, that individual area shall be barricaded and conspicuously posted, and a flashing light shall be activated as a warning device.

ATTACHMENT 2

CONSUMERS POWER COMPANY
PALISADES PLANT
DOCKET 50-255

STS CONVERSION TECHNICAL SPECIFICATION CHANGE REQUEST

5.0 ADMINISTRATIVE CONTROLS PART

Bases for the Revised Technical Specifications

Not Applicable

to

This Section

ATTACHMENT 3

CONSUMERS POWER COMPANY
PALISADES PLANT
DOCKET 50-255

STS CONVERSION TECHNICAL SPECIFICATION CHANGE REQUEST

5.0 ADMINISTRATIVE CONTROLS PART

Comparison of Existing and Revised Technical Specifications

Not Applicable

to

This Section

ATTACHMENT 4

CONSUMERS POWER COMPANY
PALISADES PLANT
DOCKET 50-255

STS CONVERSION TECHNICAL SPECIFICATION CHANGE REQUEST

5.0 ADMINISTRATIVE CONTROLS PART

STS Pages Marked to Show the Differences Between RTS and STS

5.0 ADMINISTRATIVE CONTROLS

5.1 Responsibility

5.1.1 The ~~[P~~plant ~~S~~superintendent~~]~~ shall be responsible for overall ~~unit~~ plant operation and shall delegate in writing the succession ~~to~~ for this responsibility during his absence.

The ~~[P~~plant ~~S~~superintendent~~]~~ or his designee shall approve, prior to implementation, each proposed test, experiment or modification to systems or equipment that affect nuclear safety.

5.1.2 The ~~[~~Shift Supervisor (SS)~~]~~ shall be responsible for the control room command function. During any absence of the ~~[~~SS~~]~~ from the control room while the ~~unit~~ plant is in MODE 1, 2, 3, or 4 an individual with an active Senior Reactor Operator (SRO) license shall be designated to assume the control room command function. During any absence of the ~~[~~SS~~]~~ from the control room while the ~~unit~~ plant is in MODE 5 or 6, an individual with an active SRO license or Reactor Operator (RO) license shall be designated to assume the control room command function.

5.0 ADMINISTRATIVE CONTROLS

5.2 Organization

5.2.1 Onsite and Offsite Organizations

Onsite and offsite organizations shall be established for ~~unit~~ plant operation and corporate management, respectively. The onsite and offsite organizations shall include the positions for activities affecting safety of the ~~nuclear~~ Palisades ~~power~~ plant.

a. Lines of authority, responsibility, and communication shall be established and defined ~~throughout~~ for the highest management levels through intermediate levels to and including all operating organization positions. These relationships shall be documented and updated, as appropriate, in the form of organization charts, functional descriptions of departmental responsibilities and relationships, and job descriptions for key ~~personnel~~ positions, or in equivalent forms of documentation. These requirements and the plant specific equivalent of those titles referred to in these Technical Specifications shall be documented in the ~~[~~FSAR~~]~~;

b. The ~~[P~~plant ~~S~~superintendent~~]~~ shall be responsible for overall plant safe operation ~~of the plant~~ and shall have control over those onsite activities necessary for safe operation and maintenance of the plant;

c. ~~The [a~~A specified corporate executive ~~position]~~shall have corporate responsibility for overall plant nuclear safety and shall take any measures needed to ensure acceptable performance of the staff in operating, maintaining, and providing technical support to the plant to ensure nuclear safety; and

d. The individuals who train the operating staff, carry out ~~health physics~~ radiation safety and, quality assurance functions may report to the appropriate onsite manager; however, these individuals shall have sufficient organizational freedom to ensure their independence from operating pressures.

5.2.2 ~~Unit~~ Plant Staff

The ~~unit~~ plant staff organization shall include the following:

a. A non-licensed operator shall be assigned ~~to each reactor containing fuel~~ when fuel is in the reactor and an additional non-licensed operator shall be assigned ~~for each control room from which a reactor is operating~~ while the plant is in MODE~~S~~ 1, 2, 3, or 4;

b. At least one licensed Reactor Operator (RO) shall be present in the control room when fuel is in the reactor. In addition, while the plant is in MODE 1, 2, 3, or 4 at least one licensed Senior Reactor Operator (SRO) shall be present in the control room;

c. Shift crew composition may be less than the minimum requirement of 10 CFR 50.54(m)(2)(i) and 5.2.2.a and 5.2.2.g for a period of time not to exceed 2 hours in order to accommodate unexpected absence of on-duty shift crew members, provided immediate action is taken to restore the shift crew composition to within the ~~minimum~~ requirements;

d. A ~~[Health Physics~~ radiation safety technician~~]~~ shall be on site when fuel is in the reactor. The position may be vacant for not more than 2 hours, in order to provide for unexpected absence, provided immediate action is taken to fill the required position

e. Administrative procedures shall be developed and implemented to limit the working hours of ~~unit~~ plant staff who perform safety-related functions (e.g., licensed SROs, licensed ROs, ~~health physicists~~ radiation safety personnel, auxiliary operators, and key maintenance personnel).

   Adequate shift coverage shall be maintained without routine heavy use of overtime. The objective shall be to have operating personnel work an [8 or 12] hour day, nominal 40 hour week while the ~~unit~~ plant is operating. However, in the event that unforeseen problems require substantial amounts of overtime to be used, or during extended periods of shutdown for refueling, major maintenance, or major plant modification, on a temporary basis the following guidelines shall be followed:

   1. An individual should not be permitted to work more than 16 hours straight, excluding shift turnover time;

   2. An individual should not be permitted to work more than 16 hours in any 24 hour period, nor more than 24 hours in any 48 hour period, nor more than 72 hours in any 7 day period, all excluding shift turnover time;

3. A break of at least 8 hours should be allowed between work periods, including shift turnover time;

4. Except during extended shutdown periods, the use of overtime should be considered on an individual basis and not for the entire staff on a shift.

Any deviation from the above guidelines shall be authorized in advance by the ~~[P~~plant ~~S~~superintendent~~]~~ or his designee, in accordance with approved administrative procedures, or by higher levels of management, in accordance with established procedures and with documentation of the basis for granting the deviation.

Controls shall be included in the procedures such that individual overtime shall be reviewed monthly by the ~~[P~~plant ~~S~~superintendent~~]~~ or his designee to ensure that excessive hours have not been assigned. Routine deviation from the above guidelines is not authorized.

f. The ~~[O~~operations ~~M~~manager or an ~~A~~assistant ~~O~~operations ~~M~~manager~~]~~ shall hold an SRO license. The individual holding the SRO license shall be responsible for directing the activities of the licensed operators;

g. The Shift Technical Advisor (STA) shall provide advisory technical support to the Shift Supervisor (SS) in the areas of thermal hydraulics, reactor engineering, and plant analysis with regard to the safe operation of the plant. ~~In addition, the STA shall meet the qualifications specified by the Commission Policy Statement on Engineering Expertise on Shift.~~ If either SRO on shift satisfies the Shift Engineer qualification requirements, then the STA does not need to be stationed.

5.0 **ADMINISTRATIVE CONTROLS**

5.3 Plant Staff Qualifications

~~5.3.1 Each member of the unit staff shall meet or exceed the minimum qualifications of [Regulatory Guide 1.8, Revision 2, 1987, or more recent revisions, or ANSI Standard acceptable to the NRC staff]. The staff not covered by [Regulatory Guide 1.8] shall meet or exceed the minimum qualifications of [Regulations, Regulatory Guides, or ANSI Standards acceptable to NRC staff].~~

5.3.1 Each member of the plant staff shall meet or exceed the minimum qualifications of ANSI N18.1-1971 for comparable positions.

5.3.2 The radiation safety manager shall meet the qualifications of a Radiation Protection Manager as defined in Regulatory Guide 1.8, September 1975. For the purpose of this section, "Equivalent," as utilized in Regulatory Guide 1.8 for the bachelor's degree requirement, may be met with four years of any one or combination of the following: (a) Formal schooling in science or engineering, or (b) operational or technical experience and training in nuclear power.

5.3.3 The Shift Technical Advisor shall have a bachelor's degree or equivalent and the Shift Engineer shall have a bachelor's degree in a scientific or engineering discipline. Specific training for both the Shift Technical Advisor and the Shift Engineer shall include plant design, operations, and response and analysis of the plant for transients and accidents. The Shift Engineer shall hold a Senior Reactor Operator license.

5.3.4 The plant staff who perform reviews which ensure compliance with 10 CFR 50.59 shall meet or exceed the minimum qualifications of ANS 3.1-1987, Section 4.7.1 and 4.7.2. A Senior Reactor Operator license or certification shall be considered equivalent to a bachelors degree for the purpose of this specification.

5.0 **ADMINISTRATIVE CONTROLS**

5.4 Procedures

5.4.1 Written procedures shall be established, implemented, and maintained covering the following activities:

a. The applicable procedures recommended in Appendix "A" of Regulatory Guide 1.33, Revision 2, ~~Appendix A,~~ February 1978;

b. ~~The emergency operating procedures required to implement the requirements of NUREG 0737 and to NUREG 0737, Supplement 1, as stated in [Generic Letter 82 33];~~Refueling operations;

c. ~~Quality assurance for effluent and environmental monitoring;~~Surveillance and test activities of safety-related equipment;

d. Site Fire Protection Program implementation; and

e. All programs specified in Specification 5.5~~;~~.

~~f. Modification of core protection calculator (CPC) addressable constants. These procedures shall include provisions to ensure that sufficient margin is maintained in CPC type I addressable constants to avoid excessive operator interaction with CPCs during reactor operation.~~

~~Modifications to the CPC software (including changes of algorithms and fuel cycle specific data) shall be performed in accordance with the most recent version of "CPC Protection Algorithm Software Change Procedure," CEN 39(A) P, which has been determined to be applicable to the facility. Additions or deletions to CPC addressable constants or changes to addressable constant software limit values shall not be implemented without prior NRC approval.~~

5.0 ADMINISTRATIVE CONTROLS

5.5 Programs and Manuals

The following programs shall be established, implemented, and maintained.

5.5.1 Offsite Dose Calculation Manual (ODCM)

a. The ODCM shall contain the methodology and parameters used in the calculation of offsite doses resulting from radioactive gaseous and liquid effluents, in the calculation of gaseous and liquid effluent monitoring alarm and trip setpoints, and in the conduct of the radiological environmental monitoring program; and

b. The ODCM shall also contain (1) the radioactive effluent controls and radiological environmental monitoring activities and (2) descriptions of the information that should be included in the ~~Annual~~ Radiological Environmental Operating Report, and Radioactive Effluent Release Report~~s~~ required by Specification ~~[~~5.6.2.~~]~~ and Specification ~~[~~5.6.3~~]~~;

c. Changes to ODCM:

Licensee initiated changes to the ODCM:

~~a~~1. Shall be documented and records of reviews performed shall be retained. This documentation shall contain:

~~1~~a) Sufficient information to support the change~~(s)~~ together with the appropriate analyses or evaluations justifying the change~~(s)~~; and

~~2~~b) A determination that the change(s) maintain the levels of radioactive effluent control required by 10 CFR 20.1302, 40 CFR 190, 10 CFR 50.36a, and 10 CFR 50, Appendix I, and not adversely impact the accuracy or reliability of effluent, dose, or setpoint calculations;

~~b~~2. Shall become effective after the approval of the ~~[P~~plant ~~S~~superintendent~~]~~; and

~~c~~3. Shall be submitted to the NRC in the form of a complete, legible copy of the entire ODCM as a part of or concurrent with the Radioactive Effluent Release Report for the period of the report in which any change in the ODCM was made. Each change shall be identified by markings in the margin of the affected pages, clearly indicating the area of the page that was changed, and shall indicate the date (i.e., month ~~and~~/year) the change was implemented.

5.5.2 Primary Coolant Sources Outside Containment

This program provides controls to minimize leakage to the engineered safeguards rooms, from those portions of systems outside containment that could contain highly radioactive fluids during a serious transient or accident, to levels as low as practicable. The systems include the Containment Spray system, ~~Recirculation Spray,~~ the Safety Injection system, and the containment sump suction piping. ~~Chemical and Volume Control, gas stripper, and Hydrogen Recombiner].~~ The program shall include the following:

a. ~~Preventive maintenance and periodic visual inspection requirements; and~~ Provisions establishing preventive maintenance and periodic visual inspection requirements;

b. Integrated leak test requirements for each system at a frequency not to exceed refueling cycle intervals or less;

c. The portion of the shutdown cooling system that is outside the containment shall be tested either by use in normal operation or hydrostatically tested at 255 psig;

d. Piping from Valves CV-3029 and CV-3030 to the discharge of the safety injection pumps and containment spray pumps shall be hydrostatically tested at no less than 100 psig;

e. The maximum allowable leakage from the recirculation heat removal systems' components (which include valve stems, flanges, and pump seals) shall not exceed 0.2 gallon per minute under the normal hydrostatic head from the SIRW tank (approximately 44 psig).

5.5.3 Post Accident Sampling Program

This program provides controls that ensure the capability to accurately determine the airborne iodine concentration in vital areas and which will ensure the capacity to obtain and analyze reactor coolant, radioactive gases, iodines, and particulates in plant gaseous effluents, and containment atmosphere samples under accident conditions. The program shall include the following:

a. Training of personnel;

b. Procedures for sampling and analysis; and

c. Provisions for maintenance of sampling and analysis equipment.

5.5.4 Radioactive Effluent Controls Program

~~This~~ A program shall be provided ~~conforms~~ conforming ~~to~~ with 10 CFR 50.36a for the control of radioactive effluents and for maintaining the doses to members of the public from radioactive effluents as low as reasonably achievable. The program (1) shall be contained in the Offsite Dose Calculation Manual (ODCM), (2) shall be implemented by procedures, and (3) shall include remedial actions to be taken whenever the program limits are exceeded. The program shall include the following elements:

a. Limitations on the operability of radioactive liquid and gaseous monitoring instrumentation including surveillance tests and setpoint determination in accordance with the methodology in the ODCM;

b. Limitations on the concentrations of radioactive material released in liquid effluents to unrestricted areas, conforming to 10 CFR 20, Appendix B, Table 2, Column 2;

c. Monitoring, sampling, and analysis of radioactive liquid and gaseous effluents in accordance with 10 CFR 20.1302 and with the methodology and parameters in the ODCM;

d. Limitations on the annual and quarterly doses or dose commitment to a member of the public from radioactive materials in liquid effluents released from each plant to unrestricted areas, conforming to 10 CFR 50, Appendix I;

e. ~~Determination of cumulative and projected dose contributions from radioactive effluents for the current calendar quarter and current calendar year in accordance with the methodology and parameters in the ODCM at least every 31 days;~~Limitations of the dose rate resulting from radioactive material released in gaseous effluents to areas beyond the site boundary conforming to the doses associated with 10 CFR 20, Appendix B, Table 2, Column 1;

f. Limitations on the ~~functional capability and use of the liquid and gaseous effluent treatment systems to ensure that appropriate portions of these systems are used to reduce releases of radioactivity when the projected doses in a period of 31 days would exceed 2% of the guidelines for the annual dose or dose commitment, conforming to 10 CFR 50, Appendix I;~~annual and quarterly air dose resulting from noble gases released in gaseous effluents from each plant to areas beyond the site boundary conforming to 10 CFR 50, Appendix I;

g. Limitations on the ~~dose rate resulting from radioactive material released in gaseous effluents to areas beyond the site boundary conforming to the dose associated with 10 CFR 20, Appendix B, Table 2, Column 1;~~annual and quarterly doses to a member of the public from Iodine-131, Iodine-133, tritium and all radionuclides in particulate form with half-lives greater than 8 days in gaseous effluents released from each plant to areas beyond the site boundary conforming to 10 CFR 50, Appendix I; and

h. Limitations on the annual and quarterly air doses or dose commitment to any member of the public due to releases of radioactivity and to radiation from uranium fuel cycle sources conforming to 40 CFR 190. ~~resulting from noble gases released in gaseous effluents from each plant to areas beyond the site boundary, conforming to 10 CFR 50, Appendix I;~~

~~5.5.5 Component Cyclic or Transient Limit~~

~~This program provides controls to track the FSAR Section [ ] cyclic and transient occurrences to ensure that components are maintained within the design limits.~~

~~5.5.7 Pre Stressed Concrete Containment Tendon Surveillance Program~~
5.5.6 Containment Structural Integrity Surveillance Program

~~This program provides controls for monitoring any tendon degradation in pre stressed concrete containments, including effectiveness of its corrosion protection medium, to ensure containment structural integrity. The program shall include baseline measurements prior to initial operations. The Tendon Surveillance Program, inspection frequencies, and acceptance criteria shall be in accordance with [Regulatory Guide 1.35, Revision 3, 1989].~~

This program provides controls for monitoring any tendon degradation in pre-stressed concrete containments, including effectiveness of its corrosion protection medium, to ensure containment structural integrity. The program shall include baseline measurements prior to initial operations. The Containment Structural Integrity Surveillance Program, inspection frequencies, and acceptance criteria shall be in accordance with Regulatory Guide 1.35, Revision 3, 1989.

The provisions of SR 3.0.2 and SR 3.0.3 are applicable to the ~~Tendon~~ Containment Structural Integrity Surveillance Program ~~inspection frequencies~~ requirements.

~~5.5.7 Reactor Coolant Pump Flywheel Inspection Program~~
5.5.6 Primary Coolant Pump Flywheel Surveillance Program

~~This program shall provide for the inspection of each reactor coolant pump flywheel per the recommendations of regulatory position c.4.b of Regulatory Guide 1.14, Revision 1, August 1975.~~

Surveillance of the primary coolant pump flywheels shall consist of a 100% volumetric inspection of the upper flywheels each refueling.

~~5.5.8 Inservice Testing Program~~

~~This program provides controls for inservice testing of ASME Code Class 1, 2, and 3 components including applicable supports. The program shall include the following:~~

~~a. Testing frequencies specified in Section XI of the ASME Boiler and Pressure Vessel Code and applicable Addenda as follows:~~

~~ASME Boiler and Pressure Vessel Code and applicable Addenda terminology for inservice testing activities~~	~~Required Frequencies for performing inservice testing activities~~
~~Weekly~~	~~At least once per 7 days~~
~~Monthly~~	~~At least once per 31 days~~
~~Quarterly or every 3 months~~	~~At least once per 92 days~~
~~Semiannually or every 6 months~~	~~At least once per 184 days~~
~~Every 9 months~~	~~At least once per 276 days~~
~~Yearly or annually~~	~~At least once per 366 days~~
~~Biennially or every 2 years~~	~~At least once per 731 days~~

~~b. The provisions of SR 3.0.2 are applicable to the above required Frequencies for performing inservice testing activities;~~

~~c. The provisions of SR 3.0.3 are applicable to inservice testing activities; and~~

~~d. Nothing in the ASME Boiler and Pressure Vessel Code shall be construed to supersede the requirements of any TS.~~

This program provides controls for inservice inspection and testing of ASME Code Class 1, 2, and 3 components including applicable supports. The program shall include the following:

a. Testing frequencies specified in Section XI of the ASME Boiler and Pressure Vessel Code and applicable Addenda (B&PV Code) as follows:

B&PV Code terminology for inservice testing activities	Required interval for performing inservice testing activities
Weekly	≤ 7 days
Monthly	≤ 31 days
Quarterly or every 3 months	≤ 92 days
Semiannually or every 6 months	≤ 184 days
Every 9 months	≤ 276 days
Yearly or annually	≤ 366 days
Biennially or every 2 years	≤ 731 days

b. The provisions of SR 3.0.2 and SR 3.0.3 are applicable to the Inservice Inspection and Testing Program requirements.

c. Nothing in the B&PV Code shall be construed to supersede the requirements of any Technical Specification.

~~5.5.9 Steam Generator (SG) Tube Surveillance Program~~
5.5.8 Steam Generator Tube Surveillance Program

~~Reviewer's Note: The Licensees current licensing basis steam generator tube surveillance requirements shall be relocated from the LCO and included here. An appropriate administrative controls program format should be used.~~

This program provides controls for surveillance testing of the Steam Generator (SG) tubes to ensure that the structural integrity of this portion of the Primary Coolant System (PCS) is maintained. The program shall contain controls to ensure:

a. Steam Generator Tube Sample Selection and Inspection

The inservice inspection may be limited to one SG on a rotating schedule encompassing 6% of the tubes if the results of previous inspections indicate that both SGs are performing in a like manner. If the operating conditions in one SG are found to be more severe than those in the other SG, the sample sequence shall be modified to inspect the most severe conditions.

The SG tube minimum sample size, inspection result classification, and the corresponding action required shall be as specified in Table 5.5.8-1. The tubes selected for each inservice inspection shall include at least 3% of the total number of tubes in all SGs; the tubes selected for these inspections shall be selected on a random basis except:

1. Where experience in similar plants with similar water chemistry indicates critical areas to be inspected, then at least 50% of the tubes inspected shall be from these critical areas;

2. The first sample of tubes selected for each inservice inspection of each SG shall include:

   a) All nonplugged tubes that previously had detectable wall penetrations greater than 20%;

   b) Tubes in those areas where experience has indicated potential problems;

   c) A tube inspection shall be performed on each selected tube. If any selected tube does not permit the passage of the eddy current probe for a tube inspection, this shall be recorded and an adjacent tube shall be selected and subjected to a tube inspection.

3. The tubes selected as the second and third samples (if required by Table 5.5.8-1) during each inservice inspection may be subjected to a partial tube inspection provided:

   a) The tubes selected for these samples include the tubes from those areas of the tube sheet array where tubes with imperfections were previously found;

   b) The inspections include those portions of the tubes where imperfections were previously found.

4. The results of each sample inspection shall be classified into one of the following three categories:

Category	Inspection Results
C-1	Less than 5% of the total tubes inspected are degraded tubes and none of the inspected tubes are defective.
C-2	One or more tubes, but not more than 1% of the total tubes inspected are defective, or between 5% and 10% of the total tubes inspected are degraded tubes.
C-3	More than 10% of the total tubes inspected are degraded tubes or more than 1% of the inspected tubes are defective.

Note: In all inspections, previously degraded tubes must exhibit significant (greater than 10%) further wall penetrations to be included in the above percentage calculations.

b. Inspection Frequencies

The above required inservice inspection of SG tubes shall be performed at the following frequencies:

1. Inservice inspections shall be performed at intervals of not less than 12 nor more than 24 calendar months after the previous inspection. If two consecutive inspections following service under AVT conditions, not including the preservice inspection, result in all inspections results falling into the C-1 category or if two consecutive inspections demonstrate that previously observed degradation has not continued and no additional degradation has occurred, the inspection interval may be extended to a maximum of once per 40 months;

2. If the results of the inservice inspection of a SG conducted in accordance with Table 5.5.8-1 at 40 month intervals fall into Category C-3, the inspection frequency shall be increased to at least once per 20 months. The increase in inspection frequency shall apply until the subsequent inspections satisfy the criteria of Specification 5.5.8.b.1; the interval may then be extended to a maximum of once per 40 months;

3. Additional, unscheduled inservice inspections shall be performed on each SG in accordance with the first sample inspection specified in Table 5.5.8-1 during the shutdown subsequent to any of the following conditions:

   a) Primary-to-secondary tube leaks (not including leaks originating from tube-to-tube sheet welds) in excess of the limits of Specification 3.1.5;

   b) A seismic occurrence greater than the Operating Basis Earthquake;

   c) A loss-of-coolant accident resulting in initiation of flow of the engineered safeguards;

   d) A main steam line or main feedwater line break.

c. Acceptance Criteria

1. As used in this Specification:

   a) Imperfection means an exception to the dimensions, finish or contour of a tube from that required fabrication drawings or specifications. Eddy current testing indications below 20% of the nominal tube wall thickness, if detectable, may be considered as imperfections;

   b) Degradation means a service-induced cracking, wastage, wear or general corrosion occurring on either inside or outside of a tube;

   c) Degraded Tube means a tube containing imperfections greater than or equal to 20% of the nominal wall thickness caused by degradation;

   d) % Degradation means the percentage of the tube wall thickness affected or removed by degradation;

   e) Defect means an imperfection of such severity that it exceeds the plugging limit. A tube containing a defect is defective;

   f) Plugging Limit means the imperfection depth at or beyond which the tube shall be removed from service and is equal to 40% of the nominal tube wall thickness;

g) Unserviceable describes the condition of a tube if it leaks or contains a defect large enough to affect its structural integrity in the event of an Operating Basis Earthquake, a loss-of-coolant accident, or a steam line or feedwater line break as specified in 5.5.8.b.3, above;

h) Tube Inspection means an inspection of the SG tube from the point of entry (hot leg side) completely around the U-bend to the top support of the cold leg;

i) Preservice Inspection means an inspection of the full length of each tube in SG performed by eddy current techniques prior to service to establish a baseline condition of the tubing. This inspection shall be performed after the shop hydrostatic test and prior to initial POWER OPERATION using the equipment and techniques expected to be used during subsequent inservice inspections.

2. The SG shall be determined OPERABLE after completing the corresponding actions (plug all tubes exceeding the plugging limit and all tubes containing through-wall cracks) required by Table 5.5.8-1.

TABLE 5.5.8-1
STEAM GENERATOR TUBE INSPECTION

1ST SAMPLE INSPECTION			2ND SAMPLE INSPECTION		3RD SAMPLE INSPECTION	
Sample Size	Result	Action Required	Result	Action Required	Result	Action Required
A minimum of S Tubes per S.G.	C-1	None	N/A	N/A	N/A	N/A
	C-2	Plug defective tubes and inspect additional 2S Tubes in this S.G.	C-1	None	N/A	N/A
			C-2	Plug defective tubes and inspect additional 4S tubes in the S.G.	C-1	None
					C-2	Plug defective tubes
					C-3	Perform action for C-3 result of first Sample
			C-3	Perform action for C-3 result of first Sample	N/A	N/A
	C-3	Inspect all tubes in this S.G., plug defective tubes and inspect 2S tubes in each other S.G. 24 hour verbal notification to NRC with written follow up within next 30 days	All other S.G.s are C-1	None	N/A	N/A
			Some S.G.s C-2 but no additional S.G.are C-3	Perform action for C-2 result of second sample	N/A	N/A
			Additional S.G. is C-3	Inspect all tubes each S.G. and plug defective tubes.	N/A	N/A

S = 6/n % Where n is the number of steam generators inspected during an inspection.

5.0 ADMINISTRATIVE CONTROLS

~~5.5.10 Secondary Water Chemistry Program~~

~~This program provides controls for monitoring secondary water chemistry to inhibit SG tube degradation and low pressure turbine disc stress corrosion cracking. The program shall include:~~

~~a. Identification of a sampling schedule for the critical variables and control points for these variables;~~

~~b. Identification of the procedures used to measure the values of the critical variables;~~

~~c. Identification of process sampling points which shall include monitoring the discharge of the condensate pumps for evidence of condenser in leakage;~~

~~d. Procedures for the recording and management of data;~~

~~e. Procedures defining corrective actions for all off control point chemistry conditions; and~~

~~f. A procedure identifying the authority responsible for the interpretation of the data and the sequence and timing of administrative events, which is required to initiate corrective action.~~

5.5.9 Secondary Water Chemistry Program

A program shall be established, implemented and maintained for monitoring of secondary water chemistry to inhibit steam generator tube degradation and shall include:

a. Identification of a sampling schedule for the critical variables and control points for these variables;

b. Identification of the procedures used to measure the values of the critical variables;

c. Identification of process sampling points, which shall include monitoring the discharge of the condensate pumps for evidence of condenser in-leakage;

d. Procedures for the recording and management of data;

e. Procedures defining corrective actions for all off-control point chemistry conditions; and

f. A procedure identifying (a) the authority responsible for the interpretation of the data, and (b) the sequence and timing of administrative events required to initiate corrective actions.

~~5.5.11 Ventilation Filter Testing Program (VFTP)~~

~~A program shall be established to implement the following required testing of Engineered Safety Feature (ESF) filter ventilation systems at the frequencies specified in [Regulatory Guide], and in accordance with [Regulatory Guide 1.52, Revision 2, ASME N510-1989, and AG-1] at the system flowrate specified below [± 10%]:~~

~~a. Demonstrate for each of the ESF systems that an inplace test of the high efficiency particulate air (HEPA) filters shows a penetration and system bypass < [0.05]% when tested in accordance with [Regulatory Guide 1.52, Revision 2, and ASME N510-1989, at the system flowrate specified as follows [± 10%]:~~

~~ESF Ventilation System~~		~~Flowrate~~

~~b. Demonstrate for each of the ESF systems that an inplace test of the charcoal adsorber shows a penetration and system bypass < [0.05]% when tested in accordance with [Regulatory Guide 1.52, Revision 2, and ASME N510-1989] at the system flowrate specified as follows [± 10%]:~~

~~ESF Ventilation System~~		~~Flowrate~~

~~c. Demonstrate for each of the ESF systems that a laboratory test of a sample of the charcoal adsorber, when obtained as described in [Regulatory Guide 1.52, Revision 2], shows the methyl iodide penetration less than the value specified below when tested in accordance with [ASTM D3803-1989] at a temperature of ≤ [30°C] and greater than or equal to the relative humidity specified as follows:~~

~~ESF Ventilation System~~		~~Penetration~~		~~RH~~

~~Reviewer's Note: Allowable penetration = [100% - methyl iodide efficiency for charcoal credited in staff safety evaluation]/(safety factor).~~

~~Safety factor = [5] for systems with heaters.~~

~~- [7] for systems without heaters.~~

~~d. For each of the ESF systems, demonstrate the pressure drop across the combined HEPA filters, the prefilters, and the charcoal adsorbers is less than the value specified below when tested in accordance with [Regulatory Guide 1.52, Revision 2, and ASME N510-1989] at the system flowrate specified as follows [± 10%]:~~

~~ESF Ventilation System~~		~~Delta P~~		~~Flowrate~~

~~e. Demonstrate that the heaters for each of the ESF systems dissipate the following specified value [± 10%] when tested in accordance with [ASME N510-1989]:~~

~~ESF Ventilation System~~		~~Wattage~~

~~The provisions of SR 3.0.2 and SR 3.0.3 are applicable to the VFTP test frequencies.~~

5.5.10 Ventilation Filter Testing Program (VFTP)

A program shall be established to implement the following required testing of Control Room Ventilation (CRV) and Fuel Pool Ventilation (FPV) systems at the frequencies specified in Regulatory Guide 1.52, Revision 2 (RG 1.52), and in accordance with RG 1.52 and ASME N510-1989, at the system flowrates and tolerances specified below*:

a. Demonstrate for each of the ventilation systems that an inplace test of the high efficiency particulate air (HEPA) filters shows a penetration and system bypass < 0.05% for the CRV and < 1.00% for the FPV when tested in accordance with RG 1.52 and ASME N510-1989:

Ventilation System	Flowrate (CFM)
V-8A or V-8B	7300 ± 20%
V-8A and V-8B	10,000 ± 20%
V-95 or V-96	12,500 ± 10%

b. Demonstrate for each of the ventilation systems that an inplace test of the charcoal adsorber shows a penetration and system bypass < 0.05% for the CRV and < 1.00% for the FPV when tested in accordance with RG 1.52 and ASME N510-1989;

Ventilation System	Flowrate (CFM)
V-8A and V-8B	10,000 ± 20%
V-26A and V-26B	3200 +10% -5%

c. Demonstrate for each of the ventilation systems that a laboratory test of a sample of the charcoal adsorber, when obtained as described in RG 1.52 shows the methyl iodide penetration less than the value specified below when tested in accordance with ASTM D3803-1989 at a temperature of ≤ 30°C and equal to the relative humidity specified as follows:

Ventilation System	Penetration	Relative Humidity
VF-66	6.00%	95%
VFC-26A and VFC-26B	0.157%	70%

d. For each of the ventilation systems, demonstrate the pressure drop across the combined HEPA filters, the prefilters, and the charcoal adsorbers is less than the value specified below when tested in accordance with RG 1.52 and ASME N510-1989:

Ventilation System	Delta P (In H_2O)	Flowrate (CFM)
V-8A and V-8B	6.0	10,000 ± 20%
VF-26A and VF-26B	8.0	3200 +10% -5%

e. Demonstrate that the heaters for each of the ventilation systems dissipate the following specified value ± 20% when tested in accordance with ASME N510-1989:

Ventilation System	Wattage
VHX-26A and VHX-26B	15 kW

The provisions of Specifications 4.0.2 and 4.0.3 are applicable to the Ventilation Filter Testing Program frequencies.

* Should the 720-hour limitation on charcoal adsorber operation occur during a plant operation requiring the use of the charcoal adsorber - such as refueling - testing may be delayed until the completion of the plant operation or up to 1,500 hours of filter operation; whichever occurs first.

~~5.5.12 Explosive Gas and Storage Tank Radioactivity Monitoring Program~~

~~This program provides control for potentially explosive gas mixtures contained in the [Waste Gas Holdup System], [the quantity of radioactivity contained in gas storage tanks or fed into the offgas treatment system, and the quantity of radioactivity contained in unprotected outdoor liquid storage tanks]. The gaseous radioactivity quantities shall be determined following the methodology in [Branch Technical Position (BTP) ETSB 11-5, "Postulated Radioactive Release due to Waste Gas System Leak or Failure"]. The liquid radwaste quantities shall be determined in accordance with [Standard Review Plan, Section 15.7.3, "Postulated Radioactive Release due to Tank Failures"].~~

~~The program shall include:~~

~~a. The limits for concentrations of hydrogen and oxygen in the [Waste Gas Holdup System] and a surveillance program to ensure the limits are maintained. Such limits shall be appropriate to the system's design criteria (i.e., whether or not the system is designed to withstand a hydrogen explosion);~~

~~b. A surveillance program to ensure that the quantity of radioactivity contained in [each gas storage tank and fed into the offgas treatment system] is less than the amount that would result in a whole body exposure of ≥ 0.5 rem to any individual in an unrestricted area, in the event of [an uncontrolled release of the tanks' contents]; and~~

~~c. A surveillance program to ensure that the quantity of radioactivity contained in all outdoor liquid radwaste tanks that are not surrounded by liners, dikes, or walls, capable of holding the tanks' contents and that do not have tank overflows and surrounding area drains connected to the [Liquid Radwaste Treatment System] is less than the amount that would result in concentrations less than the limits of 10 CFR Part 20, Appendix B, Table 2, Column 2, at the nearest potable water supply and the nearest surface water supply in an unrestricted area, in the event of an uncontrolled release of the tanks' contents.~~

~~The provisions of SR 3.0.2 and SR 3.0.3 are applicable to the Explosive Gas and Storage Tank Radioactivity Monitoring Program surveillance frequencies.~~

~~5.5.13 Diesel Fuel Oil Testing Program~~

~~A diesel fuel oil testing program to implement required testing of both new fuel oil and stored fuel oil shall be established. The program shall include sampling and testing requirements, and acceptance criteria, all in accordance with applicable ASTM Standards. The purpose of the program is to establish the following:~~

~~a. Acceptability of new fuel oil for use prior to addition to storage tanks by determining that the fuel oil has:~~
   ~~1. An API gravity or an absolute specific gravity within limits,~~
   ~~2. A flash point and kinematic viscosity within limits for ASTM 2D fuel oil, and~~
   ~~3. A clear and bright appearance with proper color;~~

~~b. Other properties for ASTM 2D fuel oil are within limits within 31 days following sampling and addition to storage tanks; and~~

~~c. Total particulate concentration of the fuel oil is ≤ 10 mg/l when tested every 31 days in accordance with ASTM D 2276, Method A 2 or A 3.~~

c. Fuel Oil Testing Program

A fuel oil testing program to implement required testing of both new fuel oil and stored fuel oil shall be established. The program shall include sampling and testing requirements, and acceptance criteria, in accordance with applicable ASTM Standards. The program shall establish the following:

1. Acceptability of new fuel oil prior to addition to the Fuel Oil Storage Tank, and acceptability of fuel oil stored in the Fuel Oil Storage Tank, by determining that the fuel oil has: a) An API gravity or an absolute specific gravity, b) A kinematic viscosity, and c) Water and sediment content within limits for ASTM 2D fuel oil.

2. Other properties specified in ASTM D 975 for fuel oil in the Fuel Oil Storage Tank are within limits for ASTM 2D fuel oil.

~~5.5.14~~ 5.5.12 Technical Specifications (TS) Bases Control Program

This program provides a means for processing changes to the Bases of these Technical Specifications.

a. Changes to the Bases of the TS shall be made under appropriate administrative controls and reviews;

b. Licensees may make changes to Bases without prior NRC approval provided the changes do not involve either of the following:

1. A change in the TS incorporated in the license; or

2. A change to the updated FSAR or Bases that involves an unreviewed safety question as defined in 10 CFR 50.59.

c. The Bases Control Program shall contain provisions to ensure that the Bases are maintained consistent with the FSAR;

d. Proposed changes that do not meet the criteria of Specification ~~5.5.14~~ 5.5.12.b above shall be reviewed and approved by the NRC prior to implementation. Changes to the Bases implemented without prior NRC approval shall be provided to the NRC on a frequency consistent with 10 CFR 50.71(e).

~~5.5.16~~ 5.5.13 Safety Functions Determination Program (SFDP)

This program ensures loss of safety function is detected and appropriate actions taken. Upon entry into LCO 3.0.6, an evaluation shall be made to determine if loss of safety function exists. Additionally, other appropriate limitations and remedial or compensatory actions may be identified to be taken as a result of the support system inoperability and corresponding exception to entering supported system Condition and Required Actions. This program implements the requirements of LCO 3.0.6. The SFDP shall contain the following:

a. Provisions for cross train checks to ensure a loss of the capability to perform the safety function assumed in the accident analyses does not go undetected;

b. Provisions for ensuring the plant is maintained in a safe condition if a loss of function condition exists;

c. Provisions to ensure that an inoperable supported system's Completion Time is not inappropriately extended as a result of multiple support system inoperabilities; and

d. Other appropriate limitations and remedial or compensatory actions.

A loss of safety function exists when, assuming no concurrent single failure, a safety function assumed in the accident analyses cannot be performed. For the purpose of this program, a loss of safety function may exist when a support system is inoperable, and:

a. A required system redundant to system(s) supported by the inoperable support system is also inoperable; or

b. A required system redundant to system(s) in turn supported by the inoperable supported system is also inoperable; or

c. A required system redundant to support system(s) for the supported systems (a) and (b) above is also inoperable.

The SFDP identifies where a loss of safety function exists. If a loss of safety function is determined to exist by this program, the appropriate Conditions and Required Actions of the LCO in which the loss of safety function exists are required to be entered.

5.5.14 Containment Leak Rate Testing Program

Programs shall be established to implement the leak rate testing of the containment as required by 10 CFR 50.54(o) and 10 CFR 50, Appendix J, Option B, as modified by approved exemptions. The Type A test program shall meet the requirements of 10 CFR 50, Appendix J, Option B and shall be in accordance with the guidelines of Regulatory Guide 1.163, "Performance-Based Containment Leakage-Test Program, dated September 1995." The Type B and Type C test program shall meet the requirements of 10 CFR 50, Appendix J, Option A, as modified by the exemption from certain requirements of 10 CFR 50 Appendix J which were granted in an NRC letter to Consumers Power Company dated December 6, 1989.

The peak calculated containment internal pressure for the design basis loss of coolant accident, P_a, is 52.635 psig.

The maximum allowable containment leak rate, L_a, at P_a, shall be 0.1% of containment air weight per day.

Leak rate acceptance criteria are:

a. Containment leak rate acceptance criteria is $\leq 1.0\ L_a$. During the first plant startup following testing in accordance with this program, the leak rate acceptance criteria are $\leq 0.60\ L_a$ for the Type B and Type C tests and $\leq 0.75\ L_a$ for Type A tests;

b. The Air Lock leak rate acceptance criterion for each door is $\leq 0.023\ L_a$ when pressurized to ≥ 10 psig.

Containment OPERABILITY is equivalent to "Containment Integrity" for the purposes of the air lock testing requirements in 10 CFR 50, Appendix J.

The provisions of SR 3.0.2 are not applicable to the Containment Leak Rate Testing Program requirements.

The provisions of SR 3.0.3 are applicable to the Containment Leak Rate Testing Program requirements.

5.0 ADMINISTRATIVE CONTROLS

5.6 Reporting Requirements

The following reports shall be submitted in accordance with 10 CFR 50.4.

5.6.1 Occupational Radiation Exposure Report

~~A tabulation on an annual basis of the number of station, utility, and other personnel (including contractors) receiving exposures > 100 mrem/yr and their associated man-rem exposure according to work and job functions (e.g., reactor operations and surveillance, inservice inspection, routine maintenance, special maintenance [describe maintenance], waste processing, and refueling). This tabulation supplements the requirements of 10 CFR 20.2206. The dose assignments to various duty functions may be estimated based on pocket dosimeter, thermo luminescent dosimeter (TLD), or film badge measurements. Small exposures totalling < 20% of the individual total dose need not be accounted for. In the aggregate, at least 80% of the total whole body dose received from external sources should be assigned to specific major work functions. The report shall be submitted by April 30 of each year. [The initial report shall be submitted by April 30 of the year following initial criticality.]~~This report shall include a tabulation on an annual basis of the number of station, utility and other personnel (including contractors) receiving exposures greater than 100 mrem/year and their associated man rem exposure according to work and job functions (e.g., reactor operations and surveillance, inservice inspection, routine maintenance, special maintenance [describe maintenance], waste processing and refueling). This tabulation supplements the requirements of 10 CFR 20.2206. The dose assignment to various duty functions may be estimates based on pocket dosimeter, electronic dosimeter, TLD, or film badge measurements. Small exposures totaling less than 20% of the individual total dose need not be accounted for. In the aggregate, at least 80% of the total whole body dose received from external sources shall be assigned to specific major work functions. The report shall be submitted by April 30 of each year.

~~The Annual Radiological Environmental Operating Report covering the operation of the plant during the previous calendar year shall be submitted by May 15 of each year. The report shall include summaries, interpretations, and analyses of trends of the results of the radiological environmental monitoring program for the reporting period. The material provided shall be consistent with the objectives outlined in the Offsite Dose Calculation Manual (ODCM), and in 10 CFR 50, Appendix I, Sections IV.B.2, IV.B.3, and IV.C.~~

~~The Annual Radiological Environmental Operating Report shall include the results of analyses of all radiological environmental samples and of all environmental radiation measurements taken during the period pursuant to the locations specified in the table and figures in the ODCM, as well as summarized and tabulated results of these analyses and measurements [in the format of the table in the Radiological Assessment Branch Technical Position, Revision 1, November 1979]. [The report shall identify the TLD results that represent collocated dosimeters in relation to the NRC TLD program and the exposure period associated with each result.] In the event that some individual results are not available for inclusion with the report, the report shall be submitted noting and explaining the reasons for the missing results. The missing data shall be submitted in a supplementary report as soon as possible.~~The Radiological Environmental Operating Report covering the operation of the plant during the previous calendar year shall be submitted before May 15 of each year. The report shall include summaries, interpretations, and analysis of trends of the results of the radiological environmental monitoring program for the reporting period. The material provided shall be consistent with the objectives outlined in the Offsite Dose Calculation Manual (ODCM) and in 10 CFR 50, Appendix I, Sections IV.B.2, IV.B.3, and IV.C.

5.6.3 Radioactive Effluent Release Report

The Radioactive Effluent Release Report covering the operation of the plant shall be submitted in accordance with 10 CFR 50.36a. The report shall include a summary of the quantities of radioactive liquid and gaseous effluents and solid waste released from the plant. The material provided shall be consistent with the objectives outlined in the ODCM and Process Control Program and in conformance with 10 CFR 50.36a and 10 CFR 50, Appendix I, Section IV.B.1.

5.6.4 Monthly Operating Reports

Routine reports of operating statistics and shutdown experience~~[, including documentation of all challenges to the pressurizer power operated relief valves or pressurizer safety valves,]~~ shall be submitted on a monthly basis to the NRC no later than the ~~15th~~ fifteenth of each month following the calendar month covered by the report.

5.6.5 Core Operating Limits Report (COLR)

a. Core operating limits shall be established prior to each reload cycle, or prior to any remaining portion of a reload cycle, and shall be documented in the COLR for the following:

1. 3.1.4 Moderator Temperature Coefficient

2. 3.1.7 Regulating Rod Insertion Limits

3. 3.2.1 Linear Heat Rate Limits

4. 3.2.2 Radial Peaking Factor Limits

5. 3.2.4 Axial Shape Index Limits.

6. 3.5.1 Safety Injection Tanks

7. 3.5.4 Safety Injection Refueling Water Tank

8. 3.9.1 Boron Concentration

b. The analytical methods used to determine the core operating limits shall be those previously reviewed and approved by the NRC, specifically those described in the following documents:

1. XN-75-27(A), "Exxon Nuclear Neutronics Design Methods for Pressurized Water Reactors," and Supplements 1(A), 2(A), 3(P)(A), 4(P)(A), and 5(P)(A); Exxon Nuclear Company. (LCOs 3.1.4, 3.1.7, 3.2.1, 3.2.2, 3.2.4)

2. ANF-84-73(P)(A), "Advanced Nuclear Fuels Methodology for Pressurized Water Reactors: Analysis of Chapter 15 Events," and Appendix B(P)(A) and Supplements 1(P)(A), 2(P)(A); Advanced Nuclear Fuels Corporation. (LCOs 3.1.7, 3.2.1, 3.2.2, & 3.2.4)

3. XN-NF-82-21(P)(A), "Application of Exxon Nuclear Company PWR Thermal Margin Methodology to Mixed Core Configurations," Exxon Nuclear Company. (LCOs 3.2.1, 3.2.2, & 3.2.4)

4. ANF-84-093(P)(A), "Steamline Break Methodology for PWRs," and Supplement 1(P)(A); Advanced Nuclear Fuels Corporation. (LCOs 3.1.7, 3.2.1, & 3.2.2)

5. XN-75-32(P)(A), "Computational Procedure for Evaluating Fuel Rod Bowing," and Supplements 1(P)(A), 2(P)(A), 3(P)(A), and 4(P)(A); Exxon Nuclear Company. (LCOs 3.1.7, 3.2.1, 3.2.2, & 3.2.4)

6. EXEM PWR Large Break LOCA Model as defined by: (LCOs 3.1.7, 3.2.1, & 3.2.2)

   a) XN-NF-82-20(A), "Exxon Nuclear Company Evaluation Model EXEM/PWR ECCS Model Updates," and Supplements 1(P)(A), 2(P)(A), 3(P)(A), and 4(P)(A); Exxon Nuclear Company.

   b) XN-NF-82-07(P)(A), "Exxon Nuclear Company ECCS Cladding Swelling and Rupture Model," Exxon Nuclear Company.

c) XN-NF-81-58(A), "RODEX2 Fuel Rod Thermal-Mechanical Response Evaluation Model," and Supplements 1(P)(A), 2(P)(A), 3(P)(A), and 4(P)(A); Exxon Nuclear Company.

d) XN-NF-85-16(A), "PWR 17x17 Fuel Cooling Tests Program," Volume 1 and Supplements 1(P)(A), 2(P)(A), and 3(P)(A), and Volume 2 and Supplement 1(P)(A); Exxon Nuclear Company.

e) XN-NF-85-105(A), "Scaling of FCTF Based Reflood Heat Transfer Correlation for other Bundle Designs," and Supplement 1(P)(A); Exxon Nuclear Company.

7. XN-NF-78-44(A), "A Generic Analysis of the Control Rod Ejection Transient for Pressurized Water Reactors," Exxon Nuclear Company. (LCOs 3.1.7, 3.2.1, & 3.2.2)

8. ANF-1224(P)(A), "Departure from Nucleate Boiling Correlation for High Thermal Performance Fuel," and Supplement 1(P)(A); Advanced Nuclear Fuels Corporation. (LCOs 3.2.1, 3.2.2, & 3.2.4)

9. ANF-89-151(P)(A), "ANF-RELAP Methodology for Pressurized Water Reactors: Analysis of Non-LOCA Chapter 15 Events," Advanced Nuclear Fuels Corporation. (LCOs 3.1.7, 3.2.1, 3.2.2, & 3.2.4)

10. EMF-92-153(P)(A), "HTP: Departure from Nucleate Boiling Correlation for High Thermal Performance Fuel," Siemens Power Corporation. (LCOs 3.2.1, 3.2.2, & 3.2.4)

c. The core operating limits shall be determined such that all applicable limits (e.g., fuel thermal mechanical limits, core thermal hydraulic limits, Emergency Core Cooling Systems ~~(ECCS)~~ limits, nuclear limits such as shutdown margin, transient analysis limits, and accident analysis limits) of the safety analysis are met.

d. The COLR, including any mid cycle revisions or supplements, shall be provided, upon issuance for each reload cycle, to the NRC.

5.6.6 ~~Reactor Coolant System (RCS)~~ Pressure and Temperature Limits Report (PTLR)

a. ~~R~~PCS pressure and temperature limits for heatup, cooldown, low temperature operation, critically, and hydrostatic testing as well as heatup and cooldown rates, and the power operated relief valve lift settings and enable temperature associated with Low Temperature Overpressure Protection, shall be established and documented in the PTLR for the following: ~~[The individual specifications that address RCS pressure and temperature limits must be referenced here.]~~

1. LCO 3.4.3, PCS Pressure and Temperature Limits.

2. LCO 3.4.12, Low Temperature Overpressure Protection System.

b. The analytical methods used to determine the ~~RCS~~ PCS pressure and temperature limits shall be those previously reviewed and approved by the NRC, specifically those described in the following documents: ~~[Identify the NRC staff approval document by date.]~~

1. 10 CFR 50, Appendix G;

2. 10 CFR 50.66;

3. Generic Letters 88-11 and 92-01;

4. Regulatory Guide 1.99, Revision 2, May 1988;

5. Regulatory Guide 1.162, 1996;

6. Standard Review Plan Section 5.3.2;

7. ASME Code Case N-514
(Approved for Palisades use March 2, 1995.

c. The PTLR shall be provided to the NRC upon issuance for each reactor vessel fluence period and for any revision or supplement thereto.

~~5.6.7 EDG Failures Report~~

~~If an individual emergency diesel generator (EDG) experiences four or more valid failures in the last 25 demands, these failures and any non valid failures experienced by that EDG in that time period shall be reported within 30 days. Reports on EDG failures shall include the information recommended in Regulatory Guide 1.9, Revision 3, Regulatory Position C.5, or existing Regulatory Guide 1.108 reporting requirement.~~

~~5.6.8~~

5.6.7 ~~PAM~~ Accident Monitoring Instrumentation Report

When a report is required by ~~Condition B or G of~~ LCO ~~3.3.[11]~~ 3.3.7, "~~Post~~ Accident Monitoring ~~(PAM)~~ Instrumentation," a report shall be submitted within the following 14 days. The report shall outline the preplanned alternate method of monitoring, the cause of the inoperability, and the plans and schedule for restoring the instrumentation channels of the Function to OPERABLE status.

~~5.6.9 Tendon Surveillance Report~~

~~Any abnormal degradation of the containment structure detected during the tests required by the Pre-Stressed Concrete Containment Tendon Surveillance Program shall be reported to the NRC within 30 days. The report shall include a description of the tendon condition, the condition of the concrete (especially at tendon anchorages), the inspection procedures, the tolerances on cracking, and the corrective action taken.~~

5.6.8 Containment Structural Integrity Surveillance Report

Reports shall be submitted to the NRC covering Prestressing, Anchorage, and Liner and Penetration tests within 90 days after completion of the tests.

~~5.6.10 Steam Generator Tube Inspector Report~~

[~~Reviewer's Note: Reports required by the Licensee's current licensing basis regarding steam generator tube surveillance requirements shall be included here. An appropriate administrative controls format should be used.~~]

[~~Reviewer's Note: These reports may be required covering inspection, test, and maintenance activities. These reports are determined on an individual basis for each unit and their preparation and submittal are designated in the Technical Specifications.~~]

5.6.9 Steam Generator Tube Surveillance Report

The following reports shall be submitted to the Commission following each inservice inspection of steam generator tubes:

a. The number of tubes plugged in each steam generator shall be reported to the Commission within 15 days following the completion of each inspection, and

b. The complete results of the steam generator tube inservice inspection shall be reported to the Commission within 12 months following completion of the inspection. This report shall include:

1. Number and extent of tubes inspected.

2. Location and percent of wall-thickness penetration for each indication of an imperfection.

3. Identification of tubes plugged.

c. Results of steam generator tube inspections that fall into Category C-3 shall require 24 hour verbal notification to the NRC prior to resumption of plant operation. A written followup within the next 30 days shall provide a description of investigations and corrective measures taken to prevent recurrence.

5.0 **ADMINISTRATIVE CONTROLS**

5.7 High Radiation Area

5.7.1 Pursuant to 10 CFR 20, paragraph 20.1601(c), in lieu of the requirements of 10 CFR 20.1601, each high radiation area, as defined in 10 CFR 20, in which the intensity of radiation is > 100 mrem/hr but < 1000 mrem/hr, shall be barricaded and conspicuously posted as a high radiation area and entrance thereto shall be controlled by requiring issuance of a Radiation Work Permit (RWP). Individuals qualified in radiation protection procedures (e.g., ~~{~~Health Physics Technicians~~}~~) or personnel continuously escorted by such individuals may be exempt from the RWP issuance requirement during the performance of their assigned duties in high radiation areas with exposure rates ≤ 1000 mrem/hr, provided they are otherwise following plant radiation protection procedures for entry into such high radiation areas.

In lieu of the "control device" or "alarm signal" required by 10 CFR 20.1601, each high radiation area in which the intensity of radiation is greater than 100 mrem/hour but less than 1000 mrem/hour at 30 cm from the radiation source or from any surface which the radiation penetrates, shall be barricaded and conspicuously posted as a high radiation area and entrance thereto shall be controlled by requiring issuance of ~~a radiation work permit~~ an RWP.

Any individual or group of individuals permitted to enter such areas shall be provided with or accompanied by one or more of the following:

a. A radiation monitoring device that continuously indicates the radiation dose rate in the area.

b. A radiation monitoring device that continuously integrates the radiation dose rate in the area and alarms when a preset integrated dose is received. Entry into such areas with this monitoring device may be made after the dose rate levels in the area have been established and personnel are aware of them.

c. An individual qualified in radiation protection procedures with a radiation dose rate monitoring device, who is responsible for providing positive control over the activities within the area and shall perform periodic radiation surveillance at the frequency specified by the ~~[Radiation Protection Manager]~~ Duty Health Physicist in the RWP.

5.7.2 In addition to the requirements of Specification 5.7.1, except as allowed by 5.7.3, areas with radiation levels $\geq$ 1000 mrem/hr shall be provided with locked or continuously guarded doors to prevent unauthorized entry and the keys shall be maintained under the administrative control of the Shift ~~Foreman~~ Supervisor on duty or health physics supervision. Doors shall remain locked except during periods of access by personnel [High Radiation Area] under an approved RWP that shall specify the dose rate levels in the immediate work areas and the maximum allowable stay times for individuals in those areas. In lieu of the stay time specification of the RWP, direct or remote (such as closed circuit TV cameras) continuous surveillance may be made by personnel qualified in radiation protection procedures to provide positive exposure control over the activities being performed within the area.

5.7.3 For individual high radiation areas with radiation levels of > 1000 mrem/hr, accessible to personnel, that are located within large areas such as reactor containment, where no enclosure exists for purposes of locking, or that cannot be continuously guarded, and where no enclosure can be reasonably constructed around the individual area, that individual area shall be barricaded and conspicuously posted, and a flashing light shall be activated as a warning device.

ATTACHMENT 5

CONSUMERS POWER COMPANY
PALISADES PLANT
DOCKET 50-255

STS CONVERSION TECHNICAL SPECIFICATION CHANGE REQUEST

5.0 ADMINISTRATIVE CONTROLS PART

STS Bases Pages Marked to Show the Differences Between RTS and STS

Not Applicable

to

This Section

ATTACHMENT 6

CONSUMERS POWER COMPANY
PALISADES PLANT
DOCKET 50-255

STS CONVERSION TECHNICAL SPECIFICATION CHANGE REQUEST

5.0 ADMINISTRATIVE CONTROLS PART

Comparison of Revised and Standard Technical Specifications

Not Applicable

to

This Section

ENCLOSURE 2

CONSUMERS POWER COMPANY
PALISADES PLANT
DOCKET 50-255

TECHNICAL SPECIFICATION CHANGE REQUEST

Comparison of Existing and Revised Technical Specifications

Palisades Tech Spec Requirement List. Corrected through Amendment 170

A list of the existing Palisades Tech Specs (TS) correlated to Palisades Revised Technical Specifications (RTS).

First Column; Existing Palisades Tech Spec (TS) number

Each numbered TS item is listed in the left-most column. Items which contain more than one requirement are listed once for each requirement.

Second Column; Palisades Revised Tech Spec (RTS) number

The nearest corresponding numbered RTS item is listed in the second column. If the item does not appear in RTS, it is noted as 'Deleted' or 'Relocated.'

Deleted is used where an item has been eliminated as a tech spec, ie deleting, iaw GL 84-15, the requirement to test a D.G. when an ECCS pump in the opposite train becomes inoperable.

Relocated is used where an item has been moved to a controlled program or document because it does not meet the "Criteria" of 10 CFR 50.36(2)(c)(ii).

Where an item is relocated or deleted, the number of the associated RTS section has been added to allow sorting the list by section number. Relocated items, such as heavy load restrictions, which are not associated with any particular RTS section are arbitrarily assigned the number 5.0.

Third Column; TS Item Description

An abbreviation of the TS requirement appears in the third column. Each item is identified as: LCO, ACTION, SR, Admin, Exception, etc. Some items are implied, rather than explicit, ie a LCO is implied when an ACTION exists without a stated LCO.

Description Key;	TS requirement type:	Column 3 syntax:
	Safety Limit	SL: Safety limit; Applicable conditions
	Surveillance Requirement	SR: Equipment to be tested; Test description; Frequency
	Limiting Safety Setting	LSS: RPS Trip Channel & required setting
	Limiting Condition for Operation	LCO: Equipment to be operable; Applicable conditions
	Action	ACTN: Condition requiring action; Required action; Completion time
	Administrative Requirement	ADMN: Administrative requirement
	Permitted Instrument Bypass	Byps: Bypassable component; conditions when bypass permitted
	Defined Term	DEF: Name of defined item
	Exception to other Requirement	XCPT: Excepted spec or condition; Applicable conditions
	Descriptive material	DESC: Subject matter
	Table	TBL: Table

Forth Column; Classification of Changes:

Each change is identified as ADMINISTRATIVE, RELOCATED, MORE RESTRICTIVE, or LESS RESTRICTIVE.

Fifth Column; Discussion of Changes:

Each change is discussed briefly.

Comparison of existing Palisades Tech Specs and Proposed Palisades Tech Specs. (03/28/96)

TS Number	RTS Number	TS requirement description	Classification and Description of Changes	
1.0	1.1	Definitions		
New	1.1(1)	DEF: Actions	ADMINISTRATIVE:	Added STS definition.
1.1(1)	1.1(2)	DEF: Assembly Radial Peaking Factor (F_r^A)	ADMINISTRATIVE:	Definition was reworded slightly to agree more closely with the analytical documents which it supports. There is no change in intent or effect.
1.1(2)	1.1(3)	DEF: $\bar{E}$ - Average Disintegration Energy	ADMINISTRATIVE:	Requirement unchanged.
1.1(3)	1.1(4)/1.1(5)	DEF: Axial Offset or Axial Shape Index	ADMINISTRATIVE:	Redefined as separate definitions to agree with actual plant usage.
1.1(4)	1.1(6)	DEF: Channel Calibration	ADMINISTRATIVE:	Requirement unchanged.
1.1(5)	1.1(7)	DEF: Channel Check	ADMINISTRATIVE:	Changed to agree with STS.
1.1(6)	1.1(8)	DEF: Channel Functional Test	ADMINISTRATIVE:	Changed to agree more closely with STS.
1.1(7)	1.1 (Tbl 1.1-1)	DEF: Cold Shutdown; Shutdown Boron & <210°F	ADMINISTRATIVE:	Changed to "MODE 5"; <200°F, iaw STS.
1.1(8)	1.1 Deleted	DEF: Containment Integrity	ADMINISTRATIVE:	Not a defined term in STS.
1.1(9)	1.1 Deleted	DEF: Control Rods; Full-length rods	ADMINISTRATIVE:	Not a defined term in STS.
1.1(10)	1.1(10)	DEF: COLR; Core Op Limits Report	ADMINISTRATIVE:	Requirement unchanged.
1.1(11)	1.1(11)	DEF: Dose Equivalent I-131	ADMINISTRATIVE:	Requirement unchanged.
1.1(12)	1.1 (Tbl 1.1-1)	DEF: Hot Shutdown; Sub crit, SDM >LCO 3.10, >525°F	ADMINISTRATIVE:	Changed to "MODE 3"; K_{eff} <0.99 & >300°F, iaw STS.
1.1(13)	1.1 (Tbl 1.1-1)	DEF: Hot Standby; >525°F, any rods out, <2% RTP	ADMINISTRATIVE:	Changed to "MODE 2"; K_{eff} >0.99 & <5%, iaw STS.
New	1.1(13)	DEF: MODE; see Table 1.1-1	ADMINISTRATIVE:	Added STS definition.
1.1(14)	1.1(15)	DEF: Low Power Physics testing	ADMINISTRATIVE:	Changed to "PHYSICS TESTS", iaw STS.
1.1(15)	1.1(14)	DEF: Operable; capable of its required function	ADMINISTRATIVE:	Changed to agree with STS.
1.1(16)	1.1 (Tbl 1.1-1)	DEF: Power Operation; >2% RTP	ADMINISTRATIVE:	Changed to "MODE 1"; >5%, iaw STS.
1.1(17)	1.1(17)	DEF: Quadrant Power Tilt (T_q)	ADMINISTRATIVE:	Requirement unchanged.
1.1(18)	1.1(18)	DEF: Rated Power; 2530 Mwt	ADMINISTRATIVE:	Changed to "RATED THERMAL POWER"; used STS definition.
1.1(19)	1.1 Deleted	DEF: Reactor Critical; >10^{-4}%	ADMINISTRATIVE:	Not a defined term in STS.

TS Number	RTS Number	TS requirement description	Classification and Description of Changes	
1.1(20)	1.1 Deleted	DEF: Refueling Boron Concentration; K-eff <0.95	ADMINISTRATIVE:	Not a defined term in STS.
1.1(21)	1.1(9)	DEF: Refueling Operation; Moving core parts	ADMINISTRATIVE:	Changed to "CORE ALTERATION", iaw STS.
1.1(22)	1.1 (Tbl 1.1-1)	DEF: Refueling Shutdown; >Ref Boron & <210°F	ADMINISTRATIVE:	Changed to "MODE 6"; Rx vessel head not tensioned, iaw STS.
1.1(23)	1.1 Deleted	DEF: Shutdown Boron Concentration; K-eff <0.98	ADMINISTRATIVE:	Not a defined term in STS.
1.1(24)	1.1(19)	DEF: Shutdown Margin; Amount subcritical W/Rx trip	ADMINISTRATIVE:	Changed definition slightly to agree W/STS.
New	1.1(20)	DEF: Staggered Test Basis	ADMINISTRATIVE:	Added STS definition.
New	1.1(21)	DEF: Thermal Power	ADMINISTRATIVE:	Added STS definition.
1.1(25)	1.1(22)	DEF: Total Radial Peaking Factor	ADMINISTRATIVE:	Definition was reworded slightly to agree more closely with the analytical documents which it supports. There is no change in intent or effect.

Comparison of existing Palisades Tech Specs and Proposed Palisades Tech Specs. (03/28/96)

TS Number	RTS Number	TS requirement description		Classification and Description of Changes	
2.0	2.0, 3.3		Safety Limits and Limiting Safety Settings		
2.1	2.1.1	SL:	DNBR >1.17/1.154/1.141; Hot Standby & Power ops	ADMINISTRATIVE:	Requirement unchanged.
2.1.1	2.0 Deleted	ACTN:	SL exceeded; SD & no restart w/o NRC, etc	ADMINISTRATIVE:	Requirement redundant to 10 CFR 50.36(c)(1)(i)(A).
2.2	2.1.3	SL:	PCS Press <2750; W/ fuel in Rx	ADMINISTRATIVE:	Requirement unchanged.
2.2.1	2.0 Deleted	ACTN:	SL exceeded; SD & no restart w/o NRC, etc	ADMINISTRATIVE:	Requirement redundant to 10 CFR 50.36(c)(1)(i)(A).
2.3	3.3		Limiting Safety Settings - RPS		
2.3	3.3.1	LSS:	RPS settings iaw Tbl 2.3.1; When RPS req by 3.17.1	ADMINISTRATIVE:	Unchanged in intent. The explicit statement is eliminated in STS format. Implicit in LCO 3.0.1 definition/stated in Bases.
2.3.1	3.3.1	ACTN:	Setting not w/in limits; declare inop; Immediately	ADMINISTRATIVE:	Unchanged in intent. The explicit statement is eliminated in STS format. The intent is satisfied by LCO 3.0.2 wording.
2.3.1	3.3.1	TBL:	RPS Trip Settings	MORE RESTRICTIVE:	Unchanged for 4 PCP operation. Only 4 PCP values listed, as 2 or 3 PCP operation is no longer permitted.
2.3.1.1	3.3.1	LSS:	Variable Hi power Trip settings	ADMINISTRATIVE:	Requirement Unchanged.
2.3.1.2	3.3.1	LSS:	PCS Flow trip settings	ADMINISTRATIVE:	Requirement Unchanged.
2.3.1.3	3.3.1	LSS:	Hi Pressurizer Press trip setting	ADMINISTRATIVE:	Requirement Unchanged.
2.3.1.4	3.3.1	LSS:	TM/LP Trip settings	ADMINISTRATIVE:	Requirement Unchanged.
2.3.1.5	3.3.1	LSS:	SG Lo level trip setting	ADMINISTRATIVE:	Requirement Unchanged.
2.3.1.6	3.3.1	LSS:	SG Lo Press trip setting	ADMINISTRATIVE:	Requirement Unchanged.
2.3.1.7	3.3.1	LSS:	CHP Trip setting	ADMINISTRATIVE:	Requirement Unchanged.

TS Number	RTS Number	TS requirement description	Classification and Description of Changes	
3.0	3.0 (LCOs)	Limiting Conditions for Operation		
3.0.1	3.0.1(LCO)	LCO: Compliance with LCOs required	ADMINISTRATIVE:	Changed wording to agree with STS. Very similar; used STS wording.
3.0.1	3.0.2(LCO)	LCO: Follow Action when not meeting LCO	ADMINISTRATIVE:	Changed wording to agree with STS. Very similar; used STS wording.
3.0.2	3.0.2(LCO)	LCO: Exit Action when LCO restored	ADMINISTRATIVE:	Changed wording to agree with STS. Very similar; used STS wording.
3.0.3	3.0.3(LCO)	ACTN: Required when beyond LCO & Actions	ADMINISTRATIVE:	Changed wording to agree with STS. Very similar; used STS wording; Note, however, that the changed definitions for operating conditions affects the actual requirements. Below the requirements of TS 3.0.3 and RTS 3.0.3 are compared step by step below. The requirements are essentially unchanged. Actions TS-3.0.3.2 and RTS-3.0.3.b are not alike due to the difference in the definitions involved. The total time to MODE 5 (formerly Cold Shutdown) is unchanged.
3.0.3	3.0.3(LCO)	ACTN: Initiate action to SD in 1 hr	ADMINISTRATIVE:	Requirement unchanged.
3.0.3.1	3.0.3.a(LCO)	ACTN: Be in Hot Standby (<2%) in next 6 (7 total) hrs	MORE RESTRICTIVE:	Changed to: Be in MODE 3 (Subcritical) in 7 hrs (total).
3.0.3.2	3.0.3.b(LCO)	ACTN: Be in HSD (subcritical) in next 6 (13 total) hrs	MORE RESTRICTIVE:	Changed to: Be in MODE 4 (<300°F) in 31 hrs (total).
3.0.3.3	3.0.3.c(LCO)	ACTN: Be in CSD (<210°F) in next 24 (37 total) hrs	MORE RESTRICTIVE:	Changed to: Be in MODE 5 (<200°F) in 37 hrs (total).
3.0.4	3.0.4(LCO)	LCO: Limits mode entry unless LCOs met	ADMINISTRATIVE:	Very similar; used STS wording.

TS Number	RTS Number	TS requirement description	Classification	Description of Changes
3.1	3.4	PCS Requirements		
3.1.1.a	3.4.6	LCO: PCS flow >2810; During boron changes	ADMINISTRATIVE:	Requirement unchanged.
3.1.1.b	3.4.4	LCO: Four PCP's running; >Hot SD	ADMINISTRATIVE:	Requirement unchanged.
3.1.1.b	3.4 Deleted	ACTN: <4 PCPs; Reduce power iaw Tbl 2.3.1	MORE RESTRICTIVE:	Not required to be specifically called out; if power is not reduced before flow, reactor will trip.
3.1.1.b	3.4 Deleted	ACTN: <4 PCPs; restore 4 PCPs; 12 hrs	MORE RESTRICTIVE:	<4 PCP power operations not allowed.
3.1.1.b	3.4 Deleted	ACTN: <4 PCPs >12 hrs; Trip Rx from CO-6	MORE RESTRICTIVE:	<4 PCP power operations not allowed.
3.1.1.b	3.4.4/3.0.4	LCO: No startup; W/ <4 pumps	ADMINISTRATIVE:	Requirement unchanged. LCO 3.4.4 requires 4 pumps to be running, 3.0.4 prohibits changing modes when not in compliance with LCOs.
3.1.1.b	3.4.4	LCO: No power operations; <3 pumps	ADMINISTRATIVE:	Requirement unchanged.
3.1.1.c	3.4.1	LCO: 4 PCP flow >140.7E6 #/hr at 532°F;	ADMINISTRATIVE:	Requirement unchanged - flow rate limit changed to reflect RTP conditions.
3.1.1.d	3.4.4/3.4.5	LCO: Both SG's required operable; >300°F	ADMINISTRATIVE:	Requirement unchanged.
3.1.1.e	3.2.4	LCO: ASI maintained iaw COLR;	ADMINISTRATIVE:	Requirement unchanged.
3.1.1.e.(1)a	3.2.4 A.1	ACTN: ASI not w/in limit; initiate action; 15 min	ADMINISTRATIVE:	RTS does not specify action initiation time, but completion time remains unchanged.
3.1.1.e.(1)b	3.2.4 A.1	ACTN: ASI not w/in limit; Restore w/in 1 hr	ADMINISTRATIVE:	Requirement unchanged.
3.1.1.e.(1)c	3.2.4 B.1	ACTN: ASI >limit >1 hr; Be <70%; 2 hrs	MORE RESTRICTIVE:	Action simplified & single completion time stipulated. RTS requirement is more conservative than TS requirement, and reflects actual plant operating practice.
3.1.1.f	3.4.1	ADMN: Nominal PCS operating pressure <2100#	MORE RESTRICTIVE:	Allowed operating pressure range is specified in RTS.
3.1.1.g	3.4.1	LCO: Rx Tc ≤limit (formula); Power operation	ADMINISTRATIVE:	Requirement unchanged.
3.1.1.g	3.4.1	ADMN: No credit to be taken for flow >150E^6 lb/hr	ADMINISTRATIVE:	Requirement unchanged.
3.1.1.g(1)	3.4.1 C.1	ACTN: T_c ≥limit; Restore <30 minutes	LESS RESTRICTIVE:	Completion Time increased to 2 hrs iaw STS.
3.1.1.g(1)	3.4.1 D.1	ACTN: Actions not met, be in HSD w/in 12 hrs (LCO 3.0.3)	LESS RESTRICTIVE:	Reduce power to ≤30% RTP iaw STS. At the reduced power level, the potential for violation of the DNB limits is greatly reduced.

Comparison of existing Palisades Tech Specs and Proposed Palisades Tech Specs. (03/28/96)

TS Number	RTS Number	TS requirement description	Classification and Description of Changes	
3.1.1.h	3.4.5 N 2 3.4.6 N 2 3.4.7 N 3	LCO: 1st PCP start prohibited unless condition met	ADMINISTRATIVE:	Requirement unchanged.
3.1.1.h(1)	3.4.5 N 2a	LCO: Tc >430°F	ADMINISTRATIVE:	Requirement unchanged.
3.1.1.h(2)	3.4.5 N 2b 3.4.6 N 2a 3.4.7 N 3a	LCO: SG temp <Tc	ADMINISTRATIVE:	Requirement unchanged.
3.1.1.h(3)	3.4.5 N 2c 3.4.6 N 2b 3.4.7 N 3b	LCO: SG <100>Tc & SDC isolated & isothermal	ADMINISTRATIVE:	Requirement unchanged.
3.1.1.h(4)	3.4.5 N 2d 3.4.6 N 2c 3.4.7 N 3d	LCO: SG <100>Tc & SDC isolated & pressurizer lvl <57%	ADMINISTRATIVE:	Requirement unchanged.
3.1.1.i	3.4.6 N 3 3.4.7 N 4	LCO: PCS <300°F, don't operate P-50 A & B	ADMINISTRATIVE:	Requirement unchanged.
3.1.1.j	3.4.9	LCO: 375 kw Press Heaters from 1D & 1E req'd; >300°F	ADMINISTRATIVE:	Requirement unchanged.
3.1.1.j	3.4.9 B.1	ACTN: Heaters <375 Kw; Restore heaters in 72 hrs or HSD	ADMINISTRATIVE:	Requirement unchanged.
3.1.2	3.4	Heatup and Cooldown Rates		
3.1.2	3.4.3	LCO: PCS P&T & HU & CD iaw following, at all times	ADMINISTRATIVE:	Requirement unchanged.
3.1.2.a	3.4 PTLR	LCO: PCS P&T & HU & CD rates iaw fig 3-1 & 2 and:	RELOCATED:	PTLR - Requirements unchanged.
3.1.2.b	3.4 PTLR	LCO: Pressurizer HU/CD rate 100°F/hr	RELOCATED:	PTLR - Requirements unchanged.
3.1.2.c.1	3.4 PTLR	LCO: HU/CD rate W/T ≤170°F, <20/40°F/hr	RELOCATED:	PTLR - Requirements unchanged.
3.1.2.c.2	3.4 PTLR	LCO: HU/CD rate W/250°F ≥T >170°F <40°F/hr	RELOCATED:	PTLR - Requirements unchanged.
3.1.2.c.3	3.4 PTLR	LCO: HU/CD rate W/350°F >T >250°F <60°F/hr	RELOCATED:	PTLR - Requirements unchanged.
3.1.2.c.4	3.4 PTLR	LCO: HU/CD rate W/T ≥350°F <100°F/hr	RELOCATED:	PTLR - Requirements unchanged.
3.1.2 Aa.1	3.4.3 A.1	ACTN: LCO 3.1.2 limits exceeded, restore w/in 30 min	ADMINISTRATIVE:	Requirement unchanged.
3.1.2 Aa.2	3.4.3 A.2	ACTN: LCO 3.1.2 limits exceeded, determine PCS OK, 72 hrs	ADMINISTRATIVE:	Requirement unchanged.

TS Number	RTS Number	TS requirement description	Classification and Description of Changes	
3.1.2 Ab.1	3.4.3 B.1	ACTN: LCO 3.1.2 Completion Time exceeded, HSD; 12 hrs	MORE RESTRICTIVE:	MODE 3 in 6 hrs iaw STS.
3.1.2 Ab.2	3.4.3 B.2	ACTN: LCO 3.1.2 Completion Time exceeded, CSD; PCS <270 psia 48 hrs	MORE RESTRICTIVE:	MODE 5 in 36 hrs iaw STS.
3.1.3.a	3.4.2	LCO: PCS >525°F; critical	ADMINISTRATIVE:	Requirement unchanged.
3.1.3.a	3.4.17	XCPT: 3.1.3.a (>525°F when critical) N/A; Physics Testing	MORE RESTRICTIVE:	Minimum criticality temperature limit during physics tests increased from fracture mechanics temp limit to 500°F.
3.1.3.b	3.4.17	LCO: PCS >385°F; When critical	MORE RESTRICTIVE:	Minimum temperature is 500°F.
3.1.3.c	3.1.2	LCO: Rx subcritical by required amount; <525°F	LESS RESTRICTIVE:	Using STS requirements.
3.1.3.d	3.1 Deleted	LCO: Only 1 rod out w/o bubble & normal lvl	LESS RESTRICTIVE:	Protection provided by new SDM definition and LCO 3.3.1.
3.1.3.e	3.1 Deleted	LCO: No dilution w/o bubble & normal lvl	LESS RESTRICTIVE:	SDM requirements are given in LCO 3.1.1 and LCO 3.1.2.
3.1.4	3.4	PCS Radioactivity Limits		
3.1.4.a.1	3.4.16	LCO: DE I-131 <1.0 μCi/gm	ADMINISTRATIVE:	Requirement unchanged.
3.1.4.a.2	3.4.16	LCO: Specific activity <100/$\bar{E}$ μCi/gm	ADMINISTRATIVE:	Requirement unchanged.
3.1.4.b	3.4.16 A.2	ACTN: 1.0 <I-131 <40 μCi/gm; fix w/in 72 hrs	MORE RESTRICTIVE:	Completion Time reduced to 48 hrs iaw STS.
3.1.4.b	3.4 Deleted	LCO: Operations w/1.0 <I-131 <40 μCi/gm <36 days/yr	LESS RESTRICTIVE:	Completion Time to restore limits reduced to 48 hrs, but STS has no limit on integrated time above limit (ie, 36 d/yr).
3.1.4.c	3.4.16 B.1	ACTN: I-131 >40 μCi/gm; be <500°F in 6 hrs	ADMINISTRATIVE:	Requirement unchanged.
3.1.4.c	3.4.16 B.1	ACTN: I-131 >1 μCi/gm >72 hrs; be <500°F in 6 hrs	MORE RESTRICTIVE:	Completion Time reduced to 48 hrs iaw STS.
3.1.4.d	3.4.16 C.2	ACTN: >100/$\bar{E}$ μCi/gm; be <500°F in 6 hrs	ADMINISTRATIVE:	Requirement unchanged.
3.1.4.e	3.4.16 A.1/C.1 3.4.16.2	ACTN: Sampling assoc with b, c, & d	ADMINISTRATIVE:	Requirements unchanged.

TS Number	RTS Number	TS requirement description	Classification and Description of Changes	
3.1.4.e	3.4 Deleted	ADMN: Reporting assoc with b, c, & d	ADMINISTRATIVE:	The reporting requirement was added to the TS by Amendment No. 20, dated 04/26/76 following the format of the then existing CE STS. For any operation or condition prohibited by plant TS, the reporting requirements are covered by 10CFR50.73(a)(2)(i)(B).
3.1.5	3.4	PCS Leakage Limits		
3.1.5.a	3.4.13	LCO: PCS unidentified leakage <1 gpm	ADMINISTRATIVE:	Requirement unchanged.
3.1.5.a	3.4.13 A.1	ACTN: >1 gpm unidentified leakage; Fix in 6 hrs or SD	MORE RESTRICTIVE:	Time for restoration reduced to 4 hrs iaw STS.
3.1.5.b	3.4.13 C	LCO: PCS total leakage <10 gpm	ADMINISTRATIVE:	Requirement unchanged.
3.1.5.b	3.4.13 A.1	ACTN: >10 gpm total leakage; Fix in 6 hrs or SD	MORE RESTRICTIVE:	Time for restoration reduced to 4 hrs iaw STS.
3.1.5.c	3.7.13	LCO: Secondary activity <0.1 μCi/gm DE I-131	ADMINISTRATIVE:	Requirement unchanged.
3.1.5.c	3.7.13	ACTN: Secondary activity >limit; SD w/in 6 hrs	ADMINISTRATIVE:	Requirement unchanged.
3.1.5.d	3.4.13.d	LCO: Max pri-sec leakage <0.3 gpm; Steady state	ADMINISTRATIVE:	Requirement unchanged.
3.1.5.d	3.4.13.e	LCO: Max pri-sec leakage <0.6 gpm; Transients	ADMINISTRATIVE:	Requirement unchanged.
3.1.6	3.4 Relocated	PCS Oxygen & Halogen Limits	RELOCATED:	The primary coolant chemistry requirements do not meet the criteria of 10 CFR 50.36(2)(c)(ii), they do not appear in STS, and they have been relocated.
3.1.6.a	3.4 Relocated	LCO: PCS O_2 <0.1 ppm	RELOCATED:	These requirements do not meet the criteria of 10 CFR 50.36(2)(c)(ii) and have been relocated.
3.1.6.a	3.4 Relocated	ACTN: O_2 <0.1 ppm; take action w/in 8 hrs	RELOCATED:	These requirements do not meet the criteria of 10 CFR 50.36(2)(c)(ii) and have been relocated.
3.1.6.b	3.4 Relocated	LCO: PCS Cl <0.12 ppm	RELOCATED:	These requirements do not meet the criteria of 10 CFR 50.36(2)(c)(ii) and have been relocated.
3.1.6.b	3.4 Relocated	ACTN: Cl <0.12 ppm; action w/in 8 hrs	RELOCATED:	These requirements do not meet the criteria of 10 CFR 50.36(2)(c)(ii) and have been relocated.
3.1.6.c	3.4 Relocated	LCO: Fl <0.10 ppm; following welding on PCS	RELOCATED:	These requirements do not meet the criteria of 10 CFR 50.36(2)(c)(ii) and have been relocated.

TS Number	RTS Number	TS requirement description	Classification	Description of Changes
3.1.6.c	3.4 Relocated	ACTN: Fl <0.10 ppm; Action w/in 8 hrs	RELOCATED:	These requirements do not meet the criteria of 10 CFR 50.36(2)(c)(ii) and have been relocated.
3.1.6.d	3.4 Relocated	ACTN: O_2 & (Cl or Fl) >limit; Immediate action	RELOCATED:	These requirements do not meet the criteria of 10 CFR 50.36(2)(c)(ii) and have been relocated.
3.1.6.e	3.4 Relocated	ACTN: O_2 & (Cl or Fl) >limit >24 hrs; HSD in 12 hrs	RELOCATED:	These requirements do not meet the criteria of 10 CFR 50.36(2)(c)(ii) and have been relocated.
3.1.6.e	3.4 Relocated	ACTN: O_2 & (Cl or Fl) >limit >36 hrs; CSD in 24 hrs	RELOCATED:	These requirements do not meet the criteria of 10 CFR 50.36(2)(c)(ii) and have been relocated.
3.1.7	3.4.10/3.7.1	Primary and Secondary Safety Valves		
3.1.7.1	3.4.10	LCO: 3 Primary safeties; >CSD	LESS RESTRICTIVE:	LCO 3.4.10 applicability is MODES 1, 2, and 3 with PCS temperature >430°F. Primary safeties provide overpressure protection when PCS temperature is above 430°F. Applicability for LCO 3.4.10 written iaw STS.
3.1.7.1 Aa	3.4.10 B.1	ACTN: 1 or more primary safeties inop, HSD in 12 hrs	MORE RESTRICTIVE:	Completion Time to MODE 3 decreased to 6 hrs iaw STS.
3.1.7.1 Ab	3.4.10 B.2	ACTN: 1 or more primary safeties inop, CSD in 48 hrs	LESS RESTRICTIVE:	TS 3.1.7.1 is applicable above cold shutdown (MODES 1-4) while LCO 3.4.10 is applicable for MODES 1, 2, and 3 iaw STS. Cooldown to MODE 5 is not required because LCO 3.4.12 provides overpressure protection when PCS temperature is less than 430°F iaw STS.
3.1.7.2	3.7.1	LCO: 23 Sec safeties; Above CSD	LESS RESTRICTIVE:	Existing TS require safeties to be operable above Cold Shutdown (above 210°F); Proposed RTS require safeties to be operable in MODES 1, 2 and 3 (above 300°F). The required settings are between 985 and 1025 psig; The safeties provided no real function between 210 and 300°F.
3.1.7.2.a	3.7.1.a/b	ACTN: 1 or more secondary safeties inop, HSD in 12 hrs	MORE RESTRICTIVE:	Proposed RTS allow 4 hrs for repair, but only 6 to MODE 3; total hours to hot shutdown (MODE 3) is reduced to 10 hrs.
3.1.7.2.b	3.7.1.b	ACTN: 1 or more secondary safeties inop, CSD in 48 hrs	LESS RESTRICTIVE:	Existing Action requires cooldown to Cold Shutdown; proposed RTS only require cooling plant to MODE 4 because proposed applicability is MODES 1, 2, 3.
3.1.8	3.4.11/3.4.12	PCS Overpressure Protection Systems		
3.1.8.1	3.4.11	LCO: 2 PORV flow paths; Tc ≥430°F	ADMINISTRATIVE:	Requirement unchanged.
3.1.8.1 Aa	3.4.11 A & B	ACTN: 1 path inop; close path in 1 hr & fix in 72 hrs	ADMINISTRATIVE:	Requirement unchanged. (ACTN A.2 is New)

TS Number	RTS Number	TS requirement description	Classification and Description of Changes	
3.1.8.1 Aa.1	3.4.11 B.1	ACTN: PORV "CLOSE" position in 1 hr	ADMINISTRATIVE:	Requirement unchanged.
3.1.8.1 Aa.2	3.4.11 A.1	ACTN: Close block valve in 1 hr	ADMINISTRATIVE:	Requirement unchanged.
3.1.8.1 Aa.3	3.4.11 A.3/B.2	ACTN: Restore PORV flow path in 72 hrs	ADMINISTRATIVE:	Requirement unchanged.
3.1.8.1 Ab	3.4.11 D & E	ACTN: 2 paths inop; Close paths in 1 hr & fix 1 path in 2 hrs	ADMINISTRATIVE:	Requirement unchanged.
3.1.8.2 Ab.1	3.4.11 F.1	ACTN: PORV "CLOSE" position in 1 hr	ADMINISTRATIVE:	Requirement unchanged.
3.1.8.2 Ab.2	3.4.11 D.1	ACTN: Close block valve in 1 hr	ADMINISTRATIVE:	Requirement unchanged. (ACTN D.2 is NEW)
3.1.8.2 Ab.3	3.4.11 D.3/E.2	ACTN: Restore 1 PORV flow path in 2 hrs	ADMINISTRATIVE:	Requirement unchanged.
3.1.8.1 Ac	3.4.11 C & F	ACTN: Required Actions not met, HSD w/in 12 hrs	LESS RESTRICTIVE:	Requirement unchanged - TS 3.1.8.1 is applicable when PCS temperature is less than 430°F. Going to HOT SHUTDOWN (MODE 4 - 300°F >PCS temp >200°F) is not required. Plant placed in condition where LCO is no longer applicable iaw STS.
3.1.8.2	3.4.12	LCO: 2 PORV flow paths; Tc <430°F	ADMINISTRATIVE:	Requirements unchanged - Figure 3-4, LTOP setpoint limit relocated to the PTLR.
3.1.8.2 Aa	3.4.12 B.1/C.1	ACTN: 1 PORV inop; Restore both w/in 1 day with PZR level >57% and 7 days with PZR level ≤57%	ADMINISTRATIVE:	Requirements unchanged.
3.1.8.2 Ab	3.4.12 D.1/D.2	ACTN: 2 PORVs inop; Vent PCS w/in 24 hrs	LESS RESTRICTIVE:	Increased completion time for cooldown and venting to 24 hrs.
3.1.8.2 Ab.1	3.4.12.2	ACTN: 2 PORVs inop; Verify unlocked vent each 12 hrs	ADMINISTRATIVE:	Requirements unchanged.
3.1.8.2 Ab.2	3.4.12.2	ACTN: 2 PORVs inop; verify locked vent each 31 days	ADMINISTRATIVE:	Requirements unchanged.
3.1.9	3.4	Shutdown Cooling (SDC)		
3.1.9.1	3.4.6	LCO: 1 SDC train/PCS loop running& 2 operable; 300 ≥T >200	ADMINISTRATIVE:	Requirements unchanged.
3.1.9.1.1	3.4.6	LCO: Acceptable loop: SDC Train A	ADMINISTRATIVE:	Requirements unchanged.
3.1.9.1.2	3.4.6	LCO: Acceptable loop: SDC Train B	ADMINISTRATIVE:	Requirements unchanged.
3.1.9.1.3	3.4.6	LCO: Acceptable loop: PCS loop 1	ADMINISTRATIVE:	Requirements unchanged.

Comparison of existing Palisades Tech Specs and Proposed Palisades Tech Specs. (03/28/96)

TS Number	RTS Number	TS requirement description	Classification and Description of Changes	
3.1.9.1.4	3.4.6	LCO: Acceptable loop: PCS loop 2	ADMINISTRATIVE:	Requirements unchanged.
3.1.9.1 E1	3.4.6 N1	XCPT: No flow ok if no dilute & CETs ≥10°F above sat	ADMINISTRATIVE:	Requirements unchanged.
3.1.9.1 A1.a	3.4.6 A.1	ACTN: <req loops operable; take action to restore; Immed	ADMINISTRATIVE:	Requirements unchanged.
3.1.9.1 A1.b	3.4 Deleted	ACTN: <req loops op; Main PCS as cool as possible	LESS RESTRICTIVE:	If PCS temperature increases above applicability range, then a MORE RESTRICTIVE LCO is required.
3.1.9.1 A1.c	3.4.6 B.1	ACTN: <req loops operable but sdc OK; Be <200°F; 24 hrs	ADMINISTRATIVE:	Requirements unchanged.
3.1.9.1 A2.a	3.4.6 C.1	ACTN: <req flow; stop dilution; Immediately	ADMINISTRATIVE:	Requirements unchanged.
3.1.9.1 A2.b	3.4.6 C.2	ACTN: <req flow; take action to restore; Immediately	ADMINISTRATIVE:	Requirements unchanged.
3.1.9.2	3.4.7	LCO: 1 SDC train/PCS loop running & 2 decay heat paths operable; T <200 & filled	MORE RESTRICTIVE:	One SDC train required to be operating and S/G level >25%.
3.1.9.2.1	3.4.7	LCO: Acceptable loop: SDC Train A	ADMINISTRATIVE:	Requirements unchanged.
3.1.9.2.2	3.4.7	LCO: Acceptable loop: SDC Train B	ADMINISTRATIVE:	Requirements unchanged.
3.1.9.2.3	3.4 Deleted	LCO: Acceptable loop: PCS loops 1 & 2	MORE RESTRICTIVE:	Rely only on SDC and natural circulation heat transfer to full SGs.
3.1.9.2 E1	3.4.7 N1	XCPT: No flow ok if no dilute & CETs ≤200°F & 2 SDC trains	ADMINISTRATIVE:	Requirements unchanged.
3.1.9.2 E2	3.4.7 N2	XCPT: No trains ok if flow ok, CETs ≤200°F, & 2 SGs >-84%	MORE RESTRICTIVE:	No credit for PCPs and minimum S/G level increases to 25%.
3.1.9.2 A1.a	3.4.7 A.1	ACTN: <req loops operable; take action to restore; Immed	ADMINISTRATIVE:	Requirements unchanged.
3.1.9.2 A1.b	3.4 Deleted	ACTN: <req loops operable; maintain PCS as cool as possible	LESS RESTRICTIVE:	If PCS temperature increases above applicability range, then a more restrictive LCO is required.
3.1.9.2 A2.a	3.4.7 C.1	ACTN: <req flow; stop dilution; Immediately	ADMINISTRATIVE:	Requirements unchanged.
3.1.9.2 A2.b	3.4.7 C.2	ACTN: <req flow; take action to restore; Immediately	MORE RESTRICTIVE:	Minimum flow rate increased from 650 gpm (TS 3.10.1.6) to 1000 gpm.
3.1.9.3	3.4.8	LCO: 1 SDC train loop running & 2 operable; T<200 & not filled	ADMINISTRATIVE:	Requirements unchanged.
3.1.9.3.1	3.4.8	LCO: Acceptable loop: SDC Train A	ADMINISTRATIVE:	Requirements unchanged.
3.1.9.3.2	3.4.8	LCO: Acceptable loop: SDC Train B	ADMINISTRATIVE:	Requirements unchanged.

Comparison of existing Palisades Tech Specs and Proposed Palisades Tech Specs. (03/28/96)

TS Number	RTS Number	TS requirement description	Classification and Description of Changes	
3.1.9.3 E1	3.4.8 N1	XCPT: No flow ok if no dilute & CETs ≤200°F & 2 SDC trains	MORE RESTRICTIVE:	Require 10°F subcooling.
3.1.9.3 E2	3.4.8 N2	XCPT: No trains ok if flow ok, CETs ≤200°F, & cavity ≥647'	ADMINISTRATIVE:	Requirement unchanged. One SDC train must be OPERABLE, for MODE 5, Loops not filled iaw STS.
3.1.9.3 E2	3.9.4 N	XCPT: No trains ok if flow ok, CETs ≤200°F, & cavity ≥647'	ADMINISTRATIVE:	Requirements unchanged.
3.1.9.3 A1.a	3.4.8 A.1	ACTN: <2 loops operable; take action to restore; Immed	ADMINISTRATIVE:	Requirements unchanged.
3.1.9.3 A1.b	3.4 Deleted	ACTN: <2 loops op; main PCS as cool as possible	LESS RESTRICTIVE:	If PCS temperature increases above applicability range, then a more restrictive LCO is required.
3.1.9.3 A2.a	3.4.8 C.1	ACTN: <req flow; stop dilution; Immediately	ADMINISTRATIVE:	Requirements unchanged.
3.1.9.3 A2.b	3.4.8 C.2	ACTN: <req flow; take action to restore; Immediately	ADMINISTRATIVE:	Requirements unchanged.

TS Number	RTS Number	TS requirement description	Classification and Description of Changes	
3.2	3.5 Relocated	Chemical and Volume Control System (CVCS)	RELOCATED:	The concentrated boric acid requirements of Section 3.2 have been relocated to the Operating Requirements Manual. The initial Main Steam Line Break (MSLB) analyses assumed addition of concentrated boric acid by the charging pumps. This addition was necessary to limit the extent of the return to power which was predicted for a MSLB late in core life. The MSLB accident was reanalyzed when new steam generators were installed in 1990-1991. The reanalyses did not assume charging pump operation or concentrated boric acid addition. The new steam generators incorporate a flow restrictor in the outlet nozzle which reduces the maximum steam flow rate sufficiently to show satisfactory analytical results without the CVCS system. No other accident analyses assume functioning of the charging pumps or addition of concentrated boric acid to mitigate the consequences of an accident. Therefore the Concentrated Boric Acid requirements do not meet any criteria of 10 CFR 50.36(2)(c)(ii) and the associated requirements have been relocated. The charging pump requirements have been moved to RTS Section 3.5.
3.2.1	3.5 Relocated	LCO: 1 CBA flow path; W/ fuel in Rx	RELOCATED:	These requirements do not meet the criteria of 10 CFR 50.36(2)(c)(ii) and have been relocated.
3.2.2.a	3.5.2	LCO: 2 chg pumps operable; W/ crit	MORE RESTRICTIVE:	The applicability for the existing charging pump requirements is "when the reactor is critical" (MODES 1 and 2); The proposed applicability for LCO 3.5.2, which requires the charging pumps to be Operable, is MODES 1 and 2, and MODE 3 with T_{avg} ≥325°F.
3.2.2.b	3.5 Relocated	LCO: 1 BA pump operable; W/ crit	RELOCATED:	These requirements do not meet the criteria of 10 CFR 50.36(2)(c)(ii) and have been relocated.
3.2.2.c	3.5 Relocated	LCO: 2 CBATs; W/ crit	RELOCATED:	These requirements do not meet the criteria of 10 CFR 50.36(2)(c)(ii) and have been relocated.
3.2.2.c	3.5 Relocated	LCO: CBAT combined volume >118in; W/ crit	RELOCATED:	These requirements do not meet the criteria of 10 CFR 50.36(2)(c)(ii) and have been relocated.
3.2.2.c	3.5 Relocated	LCO: CBAT boron conc 6.25 - 10%; W/ crit	RELOCATED:	These requirements do not meet the criteria of 10 CFR 50.36(2)(c)(ii) and have been relocated.
3.2.2.c	3.5 Relocated	LCO: CBAT temp >25°F above sat; W/ crit	RELOCATED:	These requirements do not meet the criteria of 10 CFR 50.36(2)(c)(ii) and have been relocated.

TS Number	RTS Number	TS requirement description	Classification and Description of Changes	
3.2.2.d	3.5 Relocated	LCO: 2 flow paths, CBAT to PCS; W? crit	RELOCATED:	These requirements do not meet the criteria of 10 CFR 50.36(2)(c)(ii) and have been relocated.
3.2.2.d	3.5.2	LCO: Flow path, SIRWT-Chg pumps; W/ crit	MORE RESTRICTIVE:	The charging pumps are required by LCO 3.5.2. While not explicitly required, the SIRWT suction path is part of the support equipment necessary for charging pump operation and is therefore required by the Operability definition in RTS Section 1.1.
3.2.2.e	3.5 Relocated	LCO: 2 chnls ht trace CBAT-PCS; W/ crit	RELOCATED:	These requirements do not meet the criteria of 10 CFR 50.36(2)(c)(ii) and have been relocated.
3.2.3	3.5.2 A.1	LCO: Only 1 condition below at a time; Pwr ops	ADMINISTRATIVE:	The conditions addressed by 3.2.3, which are retained in the RTS, address only the charging pumps. Condition 3.5.2 A only applies when 100% of ECCS flow is available.
3.2.3.a	3.5.2 A.1	ACTN: 1 Chg pump oper; Fix in 24 hrs	LESS RESTRICTIVE:	The charging pump AOT has been extended to agree with the AOT for ECCS systems in STS.
3.2.3.b	3.5 Relocated	ACTN: 1 CBAT inop; Fix in 24 hrs	RELOCATED:	These requirements do not meet the criteria of 10 CFR 50.36(2)(c)(ii) and have been relocated.
3.2.3.c	3.5 Relocated	ACTN: 1 flow path CBAT-PCS; Restore in 24 hrs	RELOCATED:	These requirements do not meet the criteria of 10 CFR 50.36(2)(c)(ii) and have been relocated.
3.2.3.d	3.5 Relocated	ACTN: 1 Heat trace chnl inop; Fix in 24 hrs	RELOCATED:	These requirements do not meet the criteria of 10 CFR 50.36(2)(c)(ii) and have been relocated.

TS Number	RTS Number	TS requirement description	Classification and Description of Changes	
3.3	3.5	Emergency Core Cooling System (ECCS)		
3.3.1.a	3.5.4	LCO: SIRWT, >250kgal, 1720-2500ppm, >40°F; W/crit	MORE RESTRICTIVE:	Added upper temp limit iaw STS; added MODE 3 to applicability.
3.3.1.b	3.5.1	LCO: SIT; >200#, 174-200", 1720-2500ppm; W/crit	ADMINISTRATIVE:	Required Unchanged.
3.3.1.c	3.5.2	LCO: 2 LPSI pumps operable; W/crit	MORE RESTRICTIVE:	Added MODE 3 (>325°F) to applicability.
3.3.1.d	3.5.2	LCO: 2 HPSI pumps operable; W/crit	MORE RESTRICTIVE:	Added MODE 3 (>325°F) to applicability.
3.3.1.e	3.6.7	LCO: Both SDC HX operable; W/crit	MORE RESTRICTIVE:	Added MODE 3 to applicability. HX operability is considered as part of Cont Spray train operability iaw STS.
3.3.1.e	3.7.7	LCO: Both CCW HX operable; W/crit	MORE RESTRICTIVE:	Added MODES 3 & 4 to operability iaw STS. HX operability is considered as part of CCW train operability iaw STS.
3.3.1.f	3.5.2	LCO: 2 flow paths, SIRWT-PCS; W/crit	MORE RESTRICTIVE:	Added MODE 3 (>325°F) to applicability. Flow paths are considered as part of the ECCS train operability, iaw STS.
3.3.1.g	3.5.1/3.5.2	ADMN: All req assoc SIS equip operable	MORE RESTRICTIVE:	Added MODE 3 (>325°F) to applicability. actual requirement inferred by LCO 3.5.2 by OPERABILITY definition, as in STS.
3.3.1.g	3.6.7	ADMN: All req assoc SDC HX equip operable	MORE RESTRICTIVE:	Added MODE 3 to applicability. actual requirement inferred by LCO 3.6.7 by OPERABILITY definition, as in STS.
3.3.1.g	3.7.7	ADMN: All req assoc CCW HX equip operable	MORE RESTRICTIVE:	Added MODE 3 and 4 to applicability. actual requirement inferred by LCO 3.7.7 by OPERABILITY definition, as in STS.
3.3.1.h	3.5.2.1&.3	LCO: CV-3006 disabled in OPEN position; W/crit	MORE RESTRICTIVE:	Added MODE 3 (>325°F) to applicability. Requirement for valve condition unchanged; RTS requires SRs in MODES 1, 2, & 3.
3.3.1.i	3.5.1.1	LCO: SIT valves open & de-energized; W/crit	ADMINISTRATIVE:	Requirement Unchanged.
3.3.1.j	3.5.2.1	LCO: CV-3027 & 3056 open; W/crit	MORE RESTRICTIVE:	Added MODE 3 (>325°F) to applicability. Requirement for valve condition unchanged; RTS requires SRs in MODES 1, 2, & 3 (>325F).

TS Number	RTS Number	TS requirement description	Classification and Description of Changes	
3.3.2	3.5 Deleted	LCO: Only 1 condition below at a time; Power ops	LESS RESTRICTIVE:	RTS will allow more than one item to be inop at one time. Existing paragraph 3.3.2 lumps actions for inoperable equipment. RTS distributes these requirements into individual required actions.
3.3.2.a	3.5.1.A,B,&C	ACTN: 1 SIT inop; Fix in 1 hr or HSD in 12 hrs	LESS RESTRICTIVE:	Restoration time increased to 72 hrs for boron concentration, Time to be in MODE 3 (HSD) shortened to 6 hrs; no other changes.
3.3.2.b	3.5.2.A&B	ACTN: 1 LPSI inop; Fix in 24 hrs or HSD in 12 hrs	LESS RESTRICTIVE:	Restoration time increased to 72 hrs Time to be in MODE 3 (HSD) shortened to 6 hrs, iaw STS. RTS lumps HPSI & LPSI component inoperability into a single Action condition iaw STS.
3.3.2.b	3.5 Deleted	ACTN: 1 LPSI inop; Test other LPSI	LESS RESTRICTIVE:	There is no similar requirement in STS. Normal operating practice assures checking redundant components in cases of possible common mode failure.
3.3.2.c	3.5.2.A & B	ACTN: 1 HPSI inop; Fix in 24 hrs or HSD in 12 hrs	LESS RESTRICTIVE:	Restoration time increased to 72 hrs Time to be in MODE 3 (HSD) shortened to 6 hrs; iaw STS. RTS lumps HPSI & LPSI component inoperability into a single Action condition iaw STS.
3.3.2.c	3.5 Deleted	ACTN: 1 HPSI inop; Test other HPSI	LESS RESTRICTIVE:	There is no similar requirement in STS. Normal operating practice assures checking redundant components in cases of possible common mode failure.
3.3.2.d	3.6.7 A	ACTN: 1 SDHX inop; Fix in 24 hrs or HSD in 12 hrs	MORE RESTRICTIVE:	Existing TS 3.3.2.d allows one SDHX to be inoperable for up to 24 hrs. Since an inoperable SDHX would affect the operability of both trains, the 24 hrs is inappropriate (and has not been used). RTS would require a shutdown and cooldown iaw LCO 3.0.3.
3.3.2.d	3.7.7 A & B	ACTN: 1 CCW HX inop; Fix in 24 hrs or HSD in 12 hrs	MORE RESTRICTIVE:	Existing TS 3.3.2.d allows one CCW HX to be inoperable for up to 24 hrs. Since an inoperable CCW HX would affect the operability of both trains, the 24 hrs is inappropriate (and has not been used). RTS would require a shutdown and cooldown iaw LCO 3.0.3.
3.3.2.e	3.5.2	ADMN: Inop directly assoc equip makes item inop	ADMINISTRATIVE:	Covered by OPERABILITY definition.
3.3.2.f	3.5.2	ACTN: Req assoc equip inop; Fix in 24 hrs	LESS RESTRICTIVE:	Restoration time increased to 72 hrs. Time to be in MODE 3 (HSD) shortened to 6 hrs, iaw STS. Covered by OPERABILITY definition and associated LCOs & Actions.

TS Number	RTS Number	TS requirement description	Classification and Description of Changes	
3.3.2.f	3.5 Deleted	ACTN: Req assoc equip inop; Test red. equip	LESS RESTRICTIVE:	There is no similar requirement in STS. Normal operating practice assures checking redundant components in cases of possible common mode failure.
3.3.3	3:4	Pressure Boundary Valves		
3.3.3	3.4.14.1	SR: Verify Tbl 4.3.1 vlv lkg; B4 power ops	MORE RESTRICTIVE:	Added requirement to test valves w/in 24 hrs after opening and added 2 HLI check valves.
3.3.3.a	3.4.14.1	SR: Verify Tbl 4.3.1 vlv lkg	ADMINISTRATIVE:	Requirement unchanged.
3.3.3.b	3.4.14 A.1/A.2	ACTN: Tbl 4.3.1 not met; Shut 2 vlvs (see 4.3.i)	MORE RESTRICTIVE:	ACTN 3.4.14 A.1 requires isolation of low pressure pipe with 1 valve and 3.4.14 A.2 requires restoration of PIV within 72 hrs. Restoration requirement is required since affected systems do not have a second isolation valve available for closure in the high pressure pipe without making a train of safety inspection inoperable.
3.3.3.c	3.4.14 B.1	ACTN: 3.3.3.a & b not met; HSD in 12 hrs (LCO 3.0.3) or in LCO for inoperable safety injection flow path after deenergizing the flow control valve.	MORE RESTRICTIVE:	Time to HSD (MODE 3) reduced to 6 hrs iaw STS.
3.3.4	3.5.2	LCO: 2 HPSI operable; PCS >325°F	ADMINISTRATIVE:	Requirement Unchanged.
3.3.4.a	3.5.2 A.1	ACTN: 1 HPSI inop; Follow 3.3.2.c	LESS RESTRICTIVE:	See discussion following 3.3.2.c.
3.3.5	3.4.12	LCO: 2 HPSIs inop; <300°F	ADMINISTRATIVE:	Requirement unchanged.
3.3.5(n)	3.4.12 N	XCPT: This LCO doesn't prohibit emerg use	ADMINISTRATIVE:	Requirement unchanged.

TS Number	RTS Number	TS requirement description	Classification and Description of Changes	
3.4	3.6.7/3.7.7/3.7.8	Containment Cooling	ADMINISTRATIVE:	RTS requirements provided in 3.6.7 for containment spray and cooling, 3.7.7 for component cooling water and 3.7.8 for service water iaw STS.
3.4.1	3.6 Deleted	XCPT: 3.4.1 (Cont clg LCO) N/A; Low Temp Phy Tests	MORE RESTRICTIVE:	RTS doesn't provide exception, exception is not required.
3.4.1.a	3.6.7	LCO: Air Clr V1A, V2A, V3A; W/crit	MORE RESTRICTIVE:	RTS requires 2 trains of containment coolers and spray to be operable in MODES 1 - 3 ≥ 325°F. One train uses V1A, V2A, V3A and P-54A. The other train uses P-54B and P-54C. Existing TS requires that the equipment be operable only prior to criticality.
3.4.1.a	3.6.7	LCO: Spray Pump P54A; W/crit	MORE RESTRICTIVE:	RTS requires 2 trains of containment coolers and spray to be operable in MODES 1 - 3 ≥ 325°F. One train uses V1A, V2A, V3A and P-54A. The other train uses P-54B and P-54C. Existing TS requires that the equipment be operable only prior to criticality.
3.4.1.a	3.7.8	LCO: Serv wtr pumps P7A, P7C; W/crit	MORE RESTRICTIVE:	RTS require 2 trains of Service water to be operable in MODES 1 - 4 prior to criticality. One train uses Pumps P-7A AND P-7C, and the other P-7B. Existing T.S. requires that the equipment be OPERABLE only prior to criticality.
3.4.1.a	3.7.7	LCO: CCW Pump P52B; W/crit	MORE RESTRICTIVE:	RTS requires 2 trains of CCW to be operable in MODES 1-4. One train uses Pump P-52A OR P-52C, and the other P-52B. Existing T.S. requires that the equipment be OPERABLE only prior to criticality.
3.4.1.b	3.7.8	LCO: Service Water Pump P7B; W/crit	MORE RESTRICTIVE:	RTS require 2 trains of Service water to be operable in MODES 1 - 4. One train uses pumps P-7A AND P-7C, and the other P-7B. Existing T.S. requires that the equipment be OPERABLE only prior to criticality.
3.4.1.b	3.6.7	LCO: Cont Spray Pump P54B, P54C; W/crit	MORE RESTRICTIVE:	RTS requires 2 trains of containment coolers and spray to be operable in MODES 1 - 3 ≥ 325°F. One train uses V1A, V2A, V3A and P-54A. The other train uses P-54B and P-54C. Existing TS requires that the equipment be operable only prior to criticality.
3.4.1.b	3.7.7	LCO: CCW Pump P52A, P52C; W/crit	MORE RESTRICTIVE:	RTS requires 2 trains of CCW to be operable in MODES 1-4. One train uses Pump P-52A OR P-52C, and the other P-52B. Existing T.S. requires that the equipment be OPERABLE only prior to criticality.
3.4.1.c	3.6.7	ADMN: All req assoc CSS/CAC equip operable	ADMINISTRATIVE:	Requirement unchanged. Covered by OPERABILITY definition.

TS Number	RTS Number	TS requirement description	Classification and Description of Changes	
3.4.1.c	3.7.7	ADMN: All req assoc CCW equip operable	ADMINISTRATIVE:	Requirement unchanged. Covered by OPERABILITY definition.
3.4.1.c	3.7.8	ADMN: All req assoc SWS equip operable	ADMINISTRATIVE:	Requirement unchanged. Covered by OPERABILITY definition.
3.4.2	3.6.7	ACTN: Req Action when 3.4.1 not met during power ops	ADMINISTRATIVE:	TS LCO 3.4.1 covers equipment in several systems, Item 3.4.2 formerly addressed these items under a single Action statement. The new RTS treat each system separately iaw STS.
3.4.2	3.7.7	ACTN: Req Action when 3.4.1 not met during power ops	ADMINISTRATIVE:	TS LCO 3.4.1 covers equipment in several systems, Item 3.4.2 formerly addressed these items under a single Action statement. The new RTS treat each system separately iaw STS.
3.4.2	3.7.8	ACTN: Req Action when 3.4.1 not met during power ops	ADMINISTRATIVE:	TS LCO 3.4.1 covers equipment in several systems, Item 3.4.2 formerly addressed these items under a single Action statement. The new RTS treat each system separately iaw STS.
3.4.2	3.6.7 A 1	ACTN: One CAC inop; Fix in 7 days	MORE RESTRICTIVE:	TS 3.4.2 addresses the inoperability of a single listed component, and allows an allowed outage time of 7 days. RTS combines Containment Coolers and spray components into a single LCO to reflect the analyses and installed equipment capabilities. RTS allows an allowed outage time of only 72 hrs.
3.4.2	3.7.8 A.1	ACTN: One SW pump inop; Fix in 7 days	MORE RESTRICTIVE:	TS 3.4.2 addresses the inoperability of a single listed component, and allows an allowed outage time of 7 days. RTS allows an allowed outage time of only 72 hrs.
3.4.2	3.7.7 A.1	ACTN: One CCW pump inop; Fix in 7 days	MORE RESTRICTIVE:	TS 3.4.2 addresses the inoperability of a single listed component, and allows an allowed outage time of 7 days. RTS allows an allowed outage time of only 72 hrs.
3.4.2	3.6.7 A 1	ACTN: One CS pump/CAC inop; Fix in 7 days	MORE RESTRICTIVE:	TS 3.4.2 addresses the inoperability of a single listed component, and allows an allowed outage time of 7 days. RTS combines Containment Coolers and spray components into a single LCO to reflect the analyses and installed equipment capabilities. RTS allows an allowed outage time of only 72 hrs.
3.4.2	3.6.7 B.1	ACTN: CS pump/CAC not restored in 7 days; HSD in 12 hrs	MORE RESTRICTIVE:	RTS requires MODE 3 in 6 hrs. PAL TS defines hot shutdown to be similar to STS MODE 3.
3.4.2	3.7.7 B.1	ACTN: CCW pump not restored in 7 days; HSD in 12 hrs	MORE RESTRICTIVE:	RTS requires MODE 3 in 6 hrs. PAL TS defines hot shutdown to be similar to STS MODE 3.

Comparison of existing Palisades Tech Specs and Proposed Palisades Tech Specs. (03/28/96)

TS Number	RTS Number	TS requirement description	Classification and Description of Changes	
3.4.3	3.7.8	ACTN: Req Action when 3.4.1 not met during power ops	ADMINISTRATIVE:	TS Item 3.4.3 groups equipment from several systems into a single Action. RTS Actions group Spray pumps and CACs into LCO 3.6.7, and SWS and CCW pumps are treated separately Section 3.7, Plant Systems.
3.4.3	3.6.7 A 1	ACTN: Two 3.4.1.a or b items inop; Fix 1 in 24 hrs	LESS RESTRICTIVE:	Spray pumps and CACs are addressed in LCO 3.6.7. Repair time increased to 72 hrs iaw STS. The issue of single vs multiple components being inoperable is addressed in RTS by the number of trains affected. One train inop is covered by Condition 3.6.7 A; Two trains inop is covered by LCO 3.0.3. CCW and SWS pumps are treated similarly in LCOs 3.7.7 and 3.7.8 of the Plant Systems Section. RTS adds MODE 3 to applicability which is more restrictive.
3.4.3	3.7.7 A1	ACTN: Two 3.4.1.a or b items inop; Fix 1 in 24 hrs	LESS RESTRICTIVE:	Spray pumps and CACs are addressed in LCO 3.6.7. Repair time increased to 72 hrs iaw STS. The issue of single vs multiple components being inoperable is addressed in RTS by the number of trains affected. One train inop is covered by Condition 3.6.7 A; Two trains inop is covered by LCO 3.0.3. CCW and SWS pumps are treated similarly in LCOs 3.7.7 and 3.7.8 of the Plant Systems Section. RTS adds MODE 3 to applicability which is more restrictive.
3.4.3	3.7.8 A1	ACTN: Two 3.4.1.a or b items inop; Fix 1 in 24 hrs	LESS RESTRICTIVE:	Spray pumps and CACs are addressed in LCO 3.6.7. Repair time increased to 72 hrs iaw STS. The issue of single vs multiple components being inoperable is addressed in RTS by the number of trains affected. One train inop is covered by Condition 3.6.7 A; Two trains inop is covered by LCO 3.0.3. CCW and SWS pumps are treated similarly in LCOs 3.7.7 and 3.7.8 of the Plant Systems Section. RTS adds MODE 3 to applicability which is more restrictive.
3.4.3	3.6.7 B.1	ACTN: 1 CS pump/CAC not fixed in 24 hrs; HSD in 12 hrs	MORE RESTRICTIVE:	RTS requires MODE 3 in 6 hrs. PAL TS defines hot shutdown to be similar to STS MODE 3.
3.4.3	3.7.7 B.1	ACTN: 1 CCW pump not fixed in 24 hrs; HSD in 12 hrs	MORE RESTRICTIVE:	RTS requires MODE 3 in 6 hrs. PAL TS defines hot shutdown to be similar to STS MODE 3.
3.4.3	3.7.8 B.1	ACTN: 1 SWS pump not fixed in 24 hrs; HSD in 12 hrs	MORE RESTRICTIVE:	RTS requires MODE 3 in 6 hrs. PAL TS defines hot shutdown to be similar to STS MODE 3.

TS Number	RTS Number	TS requirement description	Classification and Description of Changes	
3.4.3	3.6.7 B2	ACTN: CS pump/CAC not restored in 48 hrs; CSD in 24 hrs	MORE RESTRICTIVE:	RTS 3.6.7 applicability is MODES 1, 2, and 3 ≥ 325°F. TS applicability is MODES 1 and 2. Since continuation of required actions is not required when plant is no longer in applicable conditions of LCO, proposed action requires cooldown to < 325°F, where existing Action may be exited when MODE 3 is reached.
3.4.3	3.7.7 B2	ACTN: CCW pump not restored in 48 hrs; CSD in 24 hrs	MORE RESTRICTIVE:	RTS 3.7.7 applicability is MODES 1, 2, 3, and 4. TS applicability is MODES 1 and 2. Since continuation of required actions is not required when plant is no longer in applicable conditions of LCO, proposed action requires cooldown to at least MODE 5, where existing Action may be exited when MODE 3 is reached.
3.4.3	3.7.8 B2	ACTN: SWS pump not restored in 48 hrs; CSD in 24 hrs	MORE RESTRICTIVE:	RTS 3.7.8 applicability is MODES 1, 2, 3, and 4. TS applicability is MODES 1 and 2. Since continuation of required actions is not required when plant is no longer in applicable conditions of LCO, proposed action requires cooldown to at least MODE 5, where existing Action may be exited when MODE 3 is reached.
3.4.3	3.6 Deleted	ACTN: Two 3.4.1.a or b CS/CAC items inop; Test opposite DG	LESS RESTRICTIVE:	There is no similar requirement in STS. Deleted iaw GL 84-15 recommendations.
3.4.3	3.7 Deleted	ACTN: Two 3.4.1.a or b CCW items inop; Test opposite DG	LESS RESTRICTIVE:	There is no similar requirement in STS. Deleted iaw GL 84-15 recommendations.
3.4.3	3.7 Deleted	ACTN: Two 3.4.1.a or b SWS items inop; Test opposite DG	LESS RESTRICTIVE:	There is no similar requirement in STS. Deleted iaw GL 84-15 recommendations.
3.4.4	3.6.7	ADMN: Inop directly assoc CS/CAC equip makes equip inop	ADMINISTRATIVE:	Covered by OPERABILITY definition.
3.4.4	3.7.7	ADMN: Inop directly assoc CCW equip makes equip inop	ADMINISTRATIVE:	Covered by OPERABILITY definition.
3.4.4	3.7.8	ADMN: Inop directly assoc SWS equip makes equip inop	ADMINISTRATIVE:	Covered by OPERABILITY definition.
3.4.5	3.6.7	ACTN: Req assoc CS/CAC equip inop; Fix in 24 hrs	LESS RESTRICTIVE:	Restoration time increases to 72 hrs. Time to be in MODE 3 (HDS) shortened to 6 hrs, iaw STS. Covered by OPERABILITY definition and associated LCO's and ACTIONS. PAL TS defines hot shutdown to be similar to STS MODE 3.
3.4.5	3.7.7	ACTN: Req assoc CCW equip inop; Fix in 24 hrs	LESS RESTRICTIVE:	Restoration time increases to 72 hrs. Time to be in MODE 3 (HDS) shortened to 6 hrs, iaw STS. Covered by OPERABILITY definition and associated LCO's and ACTIONS. PAL TS defines hot shutdown to be similar to STS MODE 3.

TS Number	RTS Number	TS requirement description	Classification and Description of Changes	
3.4.5	3.7.8	ACTN: Req assoc SWS equip inop; Fix in 24 hrs	LESS RESTRICTIVE:	Restoration time increases to 72 hrs. Time to be in MODE 3 (HDS) shortened to 6 hrs, iaw STS. Covered by OPERABILITY definition and associated LCO's and ACTIONS. PAL TS defines hot shutdown to be similar to STS MODE 3.
3.4.5	3.6 Deleted	ACTN: Req assoc CS/CAC equip; Test redundant equip	LESS RESTRICTIVE:	There is no similar requirement in STS. Normal operating practice assures checking redundant components in cases of possible common mode failure.
3.4.5	3.7 Deleted	ACTN: Req assoc CCW equip; Test redundant equip	LESS RESTRICTIVE:	There is no similar requirement in STS. Normal operating practice assures checking redundant components in cases of possible common mode failure.
3.4.5	3.7 Deleted	ACTN: Req assoc SWS equip; Test redundant equip	LESS RESTRICTIVE:	There is no similar requirement in STS. Normal operating practice assures checking redundant components in cases of possible common mode failure.

TS Number	RTS Number	TS requirement description	Classification and Description of Changes	
3.5	3.7	Steam and Feedwater System		
3.5.1.a	3.7.5	LCO: P-8A & P-8C OPERABLE w/PCS >300°F	MORE RESTRICTIVE:	Added requirement for 1 AFW pump in MODE 4 when using S/G for decay heat removal, iaw STS.
3.5.1.a	3.7.6	LCO: 1 Fire Protection Pump OPERABLE w/PCS >300°F	MORE RESTRICTIVE:	Added requirement for Fire Protection Pump in MODE 4 when using S/G for decay heat removal, iaw STS.
3.5.1.a	3.7.5 Note 2	LCO: P-8B OPERABLE prior to criticality	ADMINISTRATIVE:	Move prior to criticality requirement to a NOTE. The NOTE clarifies the applicability of LCO 3.7.5 to AFW pump P-8B.
3.5.1.b	3.7.5	LCO: AFW system instruments OPERABLE iaw TS 3.17	ADMINISTRATIVE:	The requirement for operable instrumentation is included, by definition, in the requirement to have both AFW trains operable.
3.5.1.c	3.7.5	LCO: All AFW Flow Control Valves OPERABLE, >300°F	ADMINISTRATIVE:	The requirement for all AFW flow control valves to be operable is included, by definition, in the requirement to have both AFW trains operable.
3.5.1.d	3.7.5	LCO: All req'd associated equipment OPERABLE, >300°F	ADMINISTRATIVE:	The requirement for all equipment associated with the AFW trains to be operable is included, by definition, in the requirement to have both AFW trains operable.
3.5.1.e	3.7.6	LCO: Min 100,000 gals in CST & PMST w/PCS >300°F	MORE RESTRICTIVE:	Added the requirement for 100,000 gallons to be available in MODE 4 when a steam generator is being used for heat removal. Current Technical Specifications only require the 100,000 gallons to be available when the PCS is at or above 300°F.
3.5.1.f	3.7.2.1	LCO: MSIVs operable & close in <5 sec w/>300°F	ADMINISTRATIVE:	Requirement unchanged.
3.5.2.a	3.7.5 A.1	ACTN: P-8A or P-8B inoperable; Restore w/in 7 days	LESS RESTRICTIVE:	The ACTION time is extended on AFW pumps P-8A and P-8B because they are redundant within the 'A/B' AFW train. Inoperability of one pump does not prevent the train from fulfilling it's safety function. Current Technical Specifications have an ACTION time of 72 hrs.
3.5.2.a	3.7.5 B.1	ACTN: P-8C inoperable; Restore w/in 72 hrs	ADMINISTRATIVE:	The ACTION time for AFW pump P-8C is unchanged because a redundant pump does not exist in the 'C' AFW train. This RTS ACTION statement also applies to all failures, except those of P-8A or P-8B, occurring in the 'A/B' AFW train.
3.5.2.b	3.7.5 Note 3	ACTN: 2 AFW Pumps in MANUAL for testing for ≤4 hrs	ADMINISTRATIVE:	Changed to a NOTE to clarify applicability of the LCO.

TS Number	RTS Number	TS requirement description	Classification and	Description of Changes
3.5.2.c	3.7.6 B.1, B.2, B.3	ACTN: FPS makeup inoperable w/PCS >300°F; Fix w/in 7 days	MORE RESTRICTIVE:	RTS still requires other makeup supply (SWS) and the other AFW train ('C') to be operable. Current Technical Specifications do not place a time limit on determining the operability of the other makeup supply and AFW train. The new ACTION statements require operability to be verified within 4 hrs.
3.5.2.d	3.7.6 B.1, B.2, B.3	ACTN: SWS makeup inoperable w/PCS >300°F; Fix w/in 7 days	LESS RESTRICTIVE:	Current Technical Specifications require that both P-8A and P-8B be operable when the service water makeup supply to P-8C is inoperable. The proposed RTS requires the 'A/B' AFW train to be operable. As discussed for Action 3.7.5 A.1, the 'A/B' AFW train is considered operable even if either P-8A or P-8B is inoperable. This is less restrictive than currently allowed. In addition to the change discussed above, the new ACTION statement applies a 4 hrs time limit in determining the operability of the other makeup supply (fire protection system) and AFW train ('A/B'). Current Technical Specifications do not have a time limit on completing these actions.
3.5.2.e	3.7.5 B.1	ACTN: 1 FCV inoperable, redundant pump operable; Fix 72 hrs	ADMINISTRATIVE:	Inoperability of one flow control valve (FCV) is defined as rendering the associated AFW train inoperable. In this situation, the Plant would be in Action 3.7.5 B.1 which requires the valve to be declared OPERABLE within 72 hrs. This is the same as current Technical Specifications.
3.5.3	3.7.5 C.1	ACTN: Action 3.5.1 not met, except as noted in 3.5.4	ADMINISTRATIVE:	Under existing Technical Specifications, this ACTION statement requires Plant shutdown to a Cold Shutdown condition within 36 hrs. This overall time frame is retained in the proposed RTS.
3.5.3	3.7.5 C.1	ACTN: Action 3.5.2 not met, except as noted in 3.5.4	ADMINISTRATIVE:	Under existing Technical Specifications, this ACTION statement requires Plant shutdown to a Cold Shutdown condition within 36 hrs. This overall time frame is retained in the proposed RTS.
3.5.4	3.7.5 D.1	ACTN: 3 inoperable AFW pumps; Restore 1 Immediately	ADMINISTRATIVE:	Requirement to restore at least one AFW pump to OPERABLE status changed to require the restoration of at least one AFW train to OPERABLE status.

TS Number	RTS Number	TS requirement description	Classification and Description of Changes	
3.5.4	3.5 Deleted	ACTN: 3 inoperable AFW pumps; Reduce Rx pwr	LESS-RESTRICTIVE:	The proposed RTS eliminates the requirement to reduce Rx power iaw STS. Instead, reactor power is left unchanged. This is done to reduce the probability of initiating a Plant transient (loss of a Main Feedwater pump, etc.) that would require the use of AFW at a time when all AFW is inoperable. The elimination of the power reduction requirement is less restrictive in that, while the current Technical Specifications require the Plant to perform actions that could lead to a transient, the proposed RTS does not.

TS Number	RTS Number	TS requirement description	Classification and Description of Changes	
3.6	3.6	Containment System	ADMINISTRATIVE:	Requirement Unchanged.
3.6.1.a	3.6.1/2/3	LCO: Integrity; >Cold Shutdown	ADMINISTRATIVE:	Requirement unchanged in RTS. RTS doesn't use the term Containment Integrity. RTS uses operability iaw STS. RTS 3.6.1/2/3 are equivalent to containment integrity.
3.6.1.b	3.9.1	LCO: Integrity Req; W/head off & <refueling Boron	ADMINISTRATIVE:	RTS (and STS) require >5% SDM when MODE 6, but do not tie this requirement to Containment Integrity.
3.6.1.c	3.1.2, 3.3.1 3.6.1, 3.9.1	LCO: No reactivity addn; w/o integrity	ADMINISTRATIVE:	Proposed RTS do not explicitly prohibit dilution or multiple rod withdrawal without containment integrity; they do, however, contain requirements which accomplish the same thing: LCO 3.3.1 effectively prohibits withdrawal capability of more than one control rod while in conditions where containment Operability (integrity is not required. LCO 3.3.1 requires the Low Flow trip to be operable whenever more than one rod is capable of being withdrawn; with less than four pumps operating a low flow trip would block all rod withdrawal. Although not a RTS requirement, four pumps cannot be operated simultaneously until PCS temperature is well above 200°F, where containment integrity is required. LCO 3.9.1 required sufficient boron concentration to maintain K_{eff} <.95 and prohibits dilution if this LCO is not met; LCO 3.1.2 requires a SDM ≥3.75% while in MODE 5, and requires immediate boration if this LCO is not met. LCO 3.6.1 requires the containment to be Operable above MODE 5.
3.6.1 A	3.6.3 A.1	ACTN: ≥1 inop iso vlv; keep 1 op iso vlv, and	ADMINISTRATIVE:	Requirement unchanged in RTS.
3.6.1 A a	3.6.3 A.1	ACTN: a. fix w/in 4 hrs, or	ADMINISTRATIVE:	Requirement unchanged in RTS. RTS doesn't use the words fix in 4 hrs, but this intent is obvious by providing the 4 hrs AOT.
3.6.1 A b	3.6.3 A.1	ACTN: b. iso w/deactivated vlv w/in 4 hrs, or	ADMINISTRATIVE:	Requirement unchanged in RTS.
3.6.1 A c	3.6.3 A.1	ACTN: c. iso w/flange or man vlv w/in 4 hrs, or	ADMINISTRATIVE:	Requirement unchanged in RTS.
3.6.1 A d	3.6.3 E	ACTN: d. be in HSD w/in 6 hrs & CSD w/in next 30 hrs	ADMINISTRATIVE:	Requirement unchanged in RTS. PAL TS define hot shutdown to be similar to STS MODE 3.
3.6.1	3.6 Relocated	TBL: Iso vlvs & closure times	RELOCATED:	Lists are not located in STS. The lists of valves is provided in FSAR and implemented by RTS 3.6.3.4 and 5.5.7, Inservice and Testing Program.

TS Number	RTS Number	TS requirement description	Classification	Description of Changes
3.6.2	3.6.4	LCO: Containment press ≤3#	MORE RESTRICTIVE:	Maximum pressure specified in RTS LCO is 1 psig in MODES 1 and 2.
3.6.2	3.6.5	LCO: Containment press ≤3#	MORE RESTRICTIVE:	Maximum pressure specified in RTS LCO is 1.5 psig in MODES 3 and 4.
3.6.2	3.6 Deleted	XCPT: 3.6.2 (Cont press LCO) N/A; Leak tests	ADMINISTRATIVE:	Covered by applicability of LCO 3.6.4 and 3.6.5; ILRT performed in MODE 5, when RTS LCOs are not applicable.
3.6.3	3.6 Relocated	SR: Verify locked manual iso vlvs; B4 crit	RELOCATED:	This requirement was not added to RTS; it does not appear in STS. This requirement is not necessary because the subject valves are verified to be in the correct position prior to locking, sealing, or securing.
3.6.4	3.6.8	LCO: 2 H Recomb operable; At pwr & Hot stdby	ADMINISTRATIVE:	Requirement unchanged. Pal-TS defines Hot Standby to be similar to STS MODE 2.
3.6.4	3.6.8 A	ACTN: 1 H recomb inop; Fix in 30 days	ADMINISTRATIVE:	Requirement unchanged in RTS. Present TS defines power operations and hot standby similar to STS MODES 1 and 2.
3.6.4	3.6.8 B	ACTN: H recomb no fixed in 30 days; HSD in 12 hrs	MORE RESTRICTIVE:	RTS requires MODE 3 in 6 hrs; PAL TS define hot shutdown to be similar to STS MODE 3.
3.6.5	3.6.3	Cont Purge & Ventilation Sys	ADMINISTRATIVE:	RTS 3.6.3 contains the requirements iaw STS.
3.6.5.a	3.6.3.1	LCO: Cont Purge & Vent Iso Vlvs ELC; >525	ADMINISTRATIVE:	Requirement unchanged., except RTS applicable MODES 1-4 iaw STS.
3.6.5.a	3.6.3.1	LCO: Air Room Iso Vlvs ELC; >525	ADMINISTRATIVE:	Requirement unchanged., except RTS applicable MODES 1-4 iaw STS.
3.6.5.b	3.6.3 B	ACTN: 3.6.5.a not met; Close open vlv in 1 hr	ADMINISTRATIVE:	RTS Actions allow 1 hr to verify 1 valve shut iaw STS. RTS doesn't limit the action to closing the open valve but instead requires closing 1 valve to isolate the flow path in 1 hr. These are essentially the same actions.
3.6.5.b	3.6.3 E	ACTN: Vlv not closed in 1 hr hot standby in 6 hrs and CSD within 30 hrs	ADMINISTRATIVE:	Requirement unchanged. Total time to cold shutdown 36 hrs.

TS Number	RTS Number	TS requirement description	Classification and Description of Changes	
3.7	3.8	Electrical Systems		
3.7.1.a	3.8.1.a	LCO: Sta Pwr Xfmr 1-2; >300°F	LESS RESTRICTIVE:	This change is less restrictive because it is less specific about which off-site circuits are required. Proposed LCO 3.8.1 replaces existing 3.7.1 a & b. It is more general and requires 2 qualified offsite sources. Bases for proposed LCO state that Station power transformer 1-2 may only be used as a required source in MODE 5 or 6. Applicability of the proposed LCO extended from >300°F to MODES 1 - 4, iaw STS.
3.7.1.b	3.8.1.a	LCO: Startup Xfmr 1-2; >300°F	MORE RESTRICTIVE:	The applicable conditions when Startup Transformer 1-2 is required have been extended from above 300°F to MODES 1 - 4. Proposed LCO 3.8.1 replaces existing 3.7.1 a & b. It is more general and requires 2 qualified offsite sources. Qualifying circuits at PAL (during operation) are Safeguards Transformer 1-1 and Startup Transformer 1-2. Applicability extended from >300°F to MODES 1 - 4, iaw STS.
3.7.1.c	3.8.9	LCO: Eng Safeguards Buses 1C and 1D; >300°F	MORE RESTRICTIVE:	Applicability extended through MODE 4 iaw STS. RTS LCO 3.8.9 requires all buses required by TS LCO 3.7.1.a through g, and also requires buses which were listed in TSCR of 3/25/86. The required buses are listed in RTS table 3.7.9-1.
3.7.1.d	3.8.9	LCO: 480 V Distribution Buses 11 & 12; >300°F	MORE RESTRICTIVE:	See 3.7.1.c comment, above.
3.7.1.e	3.8.9	LCO: MCC No 1, 2, 7, and 8; >300°F	MORE RESTRICTIVE:	See 3.7.1.c comment, above.
3.7.1.f	3.8.9	LCO: 125 V D-C Buses 1 and 2; >300°F	MORE RESTRICTIVE:	See 3.7.1.c comment, above.
3.7.1.g	3.8.9	LCO: Four preferred A-C Buses; >300°F	MORE RESTRICTIVE:	See 3.7.1.c comment, above.
3.7.1.h	3.8.4	LCO: 2 station Batteries; >300°F	MORE RESTRICTIVE:	Applicability extended through MODE 4 iaw STS. Restricted acceptable chargers to the directly connected chargers.
3.7.1.h	3.8.9	LCO: The DC distribution systems; >300°F	MORE RESTRICTIVE:	Applicability extended through MODE 4 iaw STS.
3.7.1.h	3.8.4	LCO: 1 battery charger per bus; >300°F	MORE RESTRICTIVE:	Applicability extended through MODE 4 iaw STS.
3.7.1.i	3.8.1.b	LCO: DG 1-1 & 1-2; >300°F	MORE RESTRICTIVE:	Applicability extended through MODE 4 iaw STS.
3.7.1.i	3.8.1.5	LCO: 2500 gal fuel per day tank; >300°F	MORE RESTRICTIVE:	Applicability extended iaw STS. Requirement moved to SR. RTS requires day tank check whenever DG is required to be operable.

TS Number	RTS Number	TS requirement description	Classification and Description of Changes	
3.7.1.i	3.8.3.1	LCO: 16000 gal in storage tank; >300°F	MORE RESTRICTIVE:	Applicability extended iaw STS. Requirement moved to SR. RTS requires day tank check whenever DG is required to be operable. Required inventory increased iaw DG accident loading analyses and DG fuel oil consumption testing.
3.7.1.j	3.8 Relocated	LCO: Switchyard Battery; >300°F	RELOCATED:	Switchyard equipment requirements relocated to the Operating Requirements Manual. The operation of equipment in the switchyard is not assumed in the safety analysis, and does not meet any of the criteria of 10 CFR 50.36.
3.7.1.j	3.8 Relocated	LCO: Switchyard D-C system; >300°F	RELOCATED:	See 3.7.1.j comment, above.
3.7.1.j	3.8 Relocated	LCO: 1 swyd battery charger; >300°F	RELOCATED:	See 3.7.1.j comment, above.
3.7.1.k	3.8 Relocated	LCO: Swyd 240V A-C Panels 1 & 2 and Dist sys; >300°F	RELOCATED:	See 3.7.1.j comment, above.
3.7.1.l	3.8 Relocated	LCO: 2400 V Bus 1E; >300°F	RELOCATED:	The requirement to have Bus 1E energized above 300°F has been relocated to the Operating Requirements Manual. Bus 1E is not a safety grade bus. Its operability is not assumed in any safety analysis, and it does not meet any of the criteria of 10 CFR 50.36.
3.7.2	3.8 LCOs	ACTN: Required action not met	LESS RESTRICTIVE:	Proposed conditions and actions do not include the existing limitation on one condition at a time. Specific Conditions and Actions are listed in 3.7.2.a through m, below.
3.7.2.a	3.8.1.A	ACTN: Sta Pwr Xfmr inop; restore w/in 24 hrs	LESS RESTRICTIVE:	AOT extended to 72 hrs iaw STS. No feature at PAL makes the AOT approved for STS inappropriate.
3.7.2.a	3.8 Deleted	ACTN: Sta Pwr Xfmr inop; test both DGs	LESS RESTRICTIVE:	No equivalent requirement exists in STS. Current guidance suggests this extra testing and the reduced DG availability which results is inadvisable. Deleted iaw STS and GL 84-15.
3.7.2.b	3.8.1.A	ACTN: SU Xfmr inop; notify NRC of >24 hrs outage	MORE RESTRICTIVE:	Proposed AOT limits operation to 72 hrs; existing AOT allows unlimited operation provided report is submitted. Reporting requirement replaced with restoration requirement. No similar reporting requirement in STS; Proposed LCO requires 2 circuits from off-site, and limits operation to 72 hrs with <2 circuits.
3.7.2.b	3.8 Deleted	ACTN: SU Xfmr inop; Test both DGs	LESS RESTRICTIVE:	Deleted this additional testing iaw STS and GL 84-15.
3.7.2.c	3.8.9.A	ACTN: Bus 1C inop; Restore w/in 8 hrs	ADMINISTRATIVE:	Requirement unchanged.

TS Number	RTS Number	TS requirement description	Classification and Description of Changes	
3.7.2.c	5.5.13	ACTN: Bus 1C inop; No inop equip on 1D	ADMINISTRATIVE:	This function of verifying that there is no loss of function is accomplished by the Safety Function Determination Program.
3.7.2.c	3.8 Deleted	ACTN: Bus 1C inop; Test opposite DG	LESS RESTRICTIVE:	Deleted this additional testing iaw STS and GL 84-15.
3.7.2.c	3.8.9.A	ACTN: Bus 1D inop; Restore w/in 8 hrs	ADMINISTRATIVE:	Requirement unchanged.
3.7.2.c	5.5.13	ACTN: Bus 1D inop; No inop equip on 1C	ADMINISTRATIVE:	This function of verifying that there is no loss of function is accomplished by the Safety Function Determination Program.
3.7.2.c	3.8 Deleted	ACTN: Bus 1D inop; Test opposite DG	LESS RESTRICTIVE:	Deleted this additional testing iaw STS and GL 84-15.
3.7.2.d	3.8.9.A	ACTN: Bus 11 inop; Restore w/in 8 hrs	ADMINISTRATIVE:	Requirement unchanged.
3.7.2.d	5.5.13	ACTN: Bus 11 inop; No inop equip on 12	ADMINISTRATIVE:	This function of verifying that there is no loss of function is accomplished by the Safety Function Determination Program.
3.7.2.d	3.8.9.A	ACTN: Bus 12 inop; Restore w/in 8 hrs	ADMINISTRATIVE:	Requirement unchanged.
3.7.2.d	5.5.13	ACTN: Bus 12 inop; No inop equip on 11	ADMINISTRATIVE:	This function of verifying that there is no loss of function is accomplished by the Safety Function Determination Program.
3.7.2.e	3.8.9.A	ACTN: MCC 1&7 inop; Restore w/in 8 hrs	ADMINISTRATIVE:	Requirement unchanged.
3.7.2.e	5.5.13	ACTN: MCC 1&7 inop; No inop equip on good MCCs	ADMINISTRATIVE:	This function of verifying that there is no loss of function is accomplished by the Safety Function Determination Program.
3.7.2.e	3.8.9.A	ACTN: MCC 1&2 inop; Restore w/in 8 hrs	ADMINISTRATIVE:	Requirement unchanged.
3.7.2.e	5.5.13	ACTN: MCC 1&2 inop; No inop equip on good MCCs	ADMINISTRATIVE:	This function of verifying that there is no loss of function is accomplished by the Safety Function Determination Program.
3.7.2.f	3.8.9.C	ACTN: 125VDC Bus 1 inop; Restore w/in 8 hrs	ADMINISTRATIVE:	Requirement unchanged.
3.7.2.f	5.5.13	ACTN: 125VDC Bus 1 inop; No inop equip on Bus 1	ADMINISTRATIVE:	This function of verifying that there is no loss of function is accomplished by the Safety Function Determination Program.
3.7.2.f	3.8.9.C	ACTN: 125VDC Bus 2 inop; Restore w/in 8 hrs	ADMINISTRATIVE:	Requirement unchanged.

TS Number	RTS Number	TS requirement description	Classification and Description of Changes	
3.7.2.f	5.5.13	ACTN: 125VDC Bus 2 inop; No inop equip on Bus 2	ADMINISTRATIVE:	This function of verifying that there is no loss of function is accomplished by the Safety Function Determination Program.
3.7.2.f	3.8 Relocated	ACTN: 125VDC Bus 2 inop; Provide emerg lighting	RELOCATED:	Emergency lighting requirements relocated to the Operating Requirements Manual. Emergency lighting is not addressed in accident analyses, nor in STS. It does not meet any of the criterion in 10 CFR 50.36.
3.7.2.g	3.8.9 B	ACTN: 1 Pref AC bus inop; Restore w/in 8 hrs	ADMINISTRATIVE:	Requirement unchanged.
3.7.2.g	5.5.13	ACTN: 1 Pref AC bus inop; No inop equip on op buses	ADMINISTRATIVE:	This function of verifying that there is no loss of function is accomplished by the Safety Function Determination Program.
3.7.2.h	3.8.4 B.2	ACTN: 1 battery inop; Restore w/in 24 hrs	ADMINISTRATIVE:	Requirement unchanged.
3.7.2.h	3.8.4 B.1	ACTN: 1 battery inop; Run both chgrs on affected bus	ADMINISTRATIVE:	Requirement unchanged.
3.7.2.i	3.8.1.B.3.2	ACTN: 1 DG inop; Test other DG	LESS RESTRICTIVE:	RTS and STS Action 3.8.1 B.3.1 allows an alternative; verification that DG is OPERABLE w/o actual start. Verification that the fault is not common is modeled after STS.
3.7.2.i	3.8.1.b	ACTN: 1 DG inop; Controls on other DG in auto	ADMINISTRATIVE:	If the difficulty with the inop DG involved lineup of controls, Action 3.8.1.B.3.1 would require verifying lineup of controls on the OPERABLE DG.
3.7.2.i	3.8.1.B.4	Actn: Restore DG w/in 7 days/month (for both)	ADMINISTRATIVE:	Requirement unchanged.
3.7.2.i	3.8.1.B.2	ACTN: 1 DG inop; No inop equip on other side	LESS RESTRICTIVE:	The Action wording is changed to that used in STS. The proposed wording allows 4 hrs in Condition 3.8.1.B with inoperable required equipment where the existing requirement allows no time. There is no design feature at PAL which would make the action approved for STS to be inappropriate for PAL.
3.7.2.j	3.8 Relocated	ACTN: Swyd 240 VAC pnl inop; Keep its ACBs operable	RELOCATED:	See 3.7.1.j comment, above.
3.7.2.j	3.8 Relocated	ACTN: Swyd 240 VAC pnl & ACBs inop; Fix w/in 24 hrs	RELOCATED:	See 3.7.1.j comment, above.
3.7.2.j	3.8 Relocated	ACTN: Swyd 240 VAC pnl & ACBs inop; Keep ACBs open	RELOCATED:	See 3.7.1.j comment, above.
3.7.2.k	3.8 Relocated	ACTN: Swyd batt inop; Restore w/in 24 hrs	RELOCATED:	See 3.7.1.j comment, above.
3.7.2.k	3.8 Relocated	ACTN: Swyd batt inop; Both chgrs must be operable	RELOCATED:	See 3.7.1.j comment, above.

TS Number	RTS Number	TS requirement description	Classification and Description of Changes	
3.7.2.l	3.8 Relocated	ACTN: 2400 VAC Bus 1E inop; Restore w/in 24 hrs	RELOCATED:	See 3.7.1.l comment, above.
3.7.2.m	3.8 Relocated	ACTN: Swyd 125 VDC pnl inop; Keep its ACBs operable	RELOCATED:	See 3.7.1.j comment, above.
3.7.2.m	3.8 Relocated	ACTN: Swyd 125 VDC pnl & ACBs inop; Fix w/in 24 hrs	RELOCATED:	See 3.7.1.j comment, above.
3.7.2.m	3.8 Relocated	ACTN: Swyd 125 VDC pnl & ACBs inop; Keep ACBs open	RELOCATED:	See 3.7.1.j comment, above.
3.7.3	3.8.2	LCO: Bus 1C & 1D AC sources, ≤300°F	ADMINISTRATIVE:	Proposed LCO 3.8.2 requires one offsite source and 1 DG when in MODES 5 & 6. Since an operable offsite source, at PAL, is capable of supplying both Bus 1C and Bus 1D, the proposed requirement for AC sources is equivalent to the existing TS. Proposed LCO 3.8.10 requires AC buses which support required equipment to be operable. These two proposed LCOs contain all of the requirements of existing LCO 3.7.3. The existing LCO is applicable ≤300°F; proposed LCOs 3.8.2 and 3.8.10 are applicable in MODES 5 and 6. Proposed LCOs 3.8.1 and 3.8.9 require the AC sources and buses in MODE 4 (≤300°F and above MODE 5).
3.7.3 A	3.8.2 A.2.1 3.8.2.B.1	ACTN: Source inop; Suspend refueling ops; Immediately	ADMINISTRATIVE:	Requirement unchanged.
3.7.3 B	3.8.2 A.2.2 3.8.2.B.2	ACTN: Source inop; Suspend movement of irradiated fuel	ADMINISTRATIVE:	Requirement unchanged.
3.7.3 C	3.8 Relocated	ACTN: Source Inop; Suspend crane operation; Immediately	RELOCATED:	This action omitted from proposed TS. Heavy Load considerations are to be handled in plant procedures rather than in TS.
3.7.3 D	3.8 Deleted	ACTN: Source inop; Suspend PCS draining; Immediately	LESS RESTRICTIVE:	This action was added to the existing TS due to its existence in an early draft of the STS. Since that time the action has been determined as inappropriate for PWRs and eliminated from STS.
3.7.3 E	3.8.2 A.2.4 3.8.2.B.4	ACTN: Source inop; Initiate action to restore source	ADMINISTRATIVE:	Requirement unchanged.

TS Number	RTS Number	TS requirement description		Classification and Description of Changes	
3.8	3.9		Refueling Operations		
3.8.1.a	3.9.3.b	LCO:	One Emerg air lock door closed	ADMINISTRATIVE:	Requirement unchanged.
3.8.1.a	3.9.3.a	LCO:	2 pers lock doors open; Equip hatch open	ADMINISTRATIVE:	Requirement unchanged.
3.8.1.a	3.9.3.a	LCO:	2 pers lock doors open; Run vent sys & fltr	ADMINISTRATIVE:	Requirement unchanged.
3.8.1.b	3.9.3	LCO:	All auto Iso vlvs operable or isolated	LESS RESTRICTIVE:	Only those valves which provide direct path are required to be operable in RTS, as in STS.
3.8.1.c	3.9.3.2	SR:	Cont Vent & purge valves; Verify operable; B4 refuel	LESS RESTRICTIVE:	SR frequency changed from "immediately before refueling" to "18 months." Proposed SR, like its STS counterpart has an 18 month frequency. Therefore, it does not require valves to be tested "immediately" before refueling.
3.8.1.c	3.3.6.1, 2, 3	SR:	2 radiation monit; verify oper; B4 refuel	MORE RESTRICTIVE:	Proposed SRs, like STS counterpart require verifications on a periodic basis, not "immediately" before refueling. Like most instrumentation channels, a channel check is required each 12 hrs, a channel functional test each 31 days, and a channel calibration each 18 months.
3.8.1.d	3.3.6	LCO:	Monitor CB Rad lvl; Refueling	ADMINISTRATIVE:	Requirement unchanged. Proposed LCO requires two radiation monitor channels to be operable during Core Alterations. These monitors actuate containment isolation during refueling.
3.8.1.d	3.3.10	LCO:	Monitor SFP Rad lvl; Refueling	ADMINISTRATIVE:	LCO added to instrumentation section of RTS.
3.8.1.e	3.9.2	LCO:	2 source range chnls operable; Core alt	ADMINISTRATIVE:	Requirement unchanged.
3.8.1.e	3.9.2 A	LCO:	1 source range chnl operable; Refueling condition	ADMINISTRATIVE:	Requirement unchanged.
3.8.1.f	3.9.4 & .5	LCO:	1 SDC pmp & HX in operation; Refueling	MORE RESTRICTIVE:	RTS requires 2 SDC trains in MODE 6 if water level is <647'; 1 SDC train when level is ≥647'.
3.8.1.g	3.9.1	LCO:	Maintain refueling boron; During head removal	ADMINISTRATIVE:	Requirement unchanged. TS definition of "Refueling Boron Conc" is ≥5% subcritical.
3.8.1.g	3.9.1	LCO:	Maintain refueling boron; During refueling ops	ADMINISTRATIVE:	Requirement unchanged. TS definition of "Refueling Boron Conc" is ≥5% subcritical.
3.8.1.g	3.9.1.1	SR:	PCS boron; sample; Each shift during head removal	LESS RESTRICTIVE:	SR Frequency extended to 72 hrs iaw STS.
3.8.1.g	3.9.1.1	SR:	PCS boron; sample; Each shift during refuel ops	LESS RESTRICTIVE:	SR Frequency extended to 72 hrs iaw STS.

TS Number	RTS Number	TS requirement description	Classification and Description of Changes	
3.8.1.h	3.9 Relocated	LCO: Maintain comm CR to fuel mach; During core alts	RELOCATED:	This requirement does not meet criterion of 10 CFR 50.36.
3.8.2	3.9.1,.2,.3,&.4	ACTN: 3.8.1 not met; Stop refuel ops	ADMINISTRATIVE:	Requirement unchanged.
3.8.2	3.9.1,.2,.3,.4,&.5	ACTN: 3.8.1 not met; Stop reactivity changes	ADMINISTRATIVE:	Requirement unchanged.
3.8.2	3.9.1,.2,.4,&.5	ACTN: 3.8.1 not met; Initiate repairs to meet 3.8.1	ADMINISTRATIVE:	Requirement Unchanged.
3.8.3	3.9 Relocated	LCO: Decay time for refueling >48 hrs	RELOCATED:	The corresponding LCO was omitted from STS. It is not possible to make required preparations for refueling operation in such a short time. TS definition of Refueling Operation is equivalent to STS definition of Core Alterations.
3.8.4.a	3.9.3.a	LCO: Pool vent & fltr on; Moving hot fuel, hatch open	ADMINISTRATIVE:	Requirement unchanged.
3.8.4.b	3.7.12	LCO: Pool vent & fltr on; Moving hot fuel in SFP	ADMINISTRATIVE:	Requirement unchanged.
3.8.4	3.7.12 C/3.9.3 C	ACTN: Both fans out; Stop fuel handling	ADMINISTRATIVE:	Requirement unchanged.
3.8.5	3.9 Relocated	LCO: Tilt pit temp <150°F; <1 year fuel	RELOCATED:	This requirement does not meet the criterion of 10 CFR 50.36.
3.8.5	3.9 Relocated	SR: Tilt pit temp; Monitor continuously; <1 yr fuel	RELOCATED:	This requirement does not meet the criterion of 10 CFR 50.36.
3.8.5	3.9 Relocated	SR: Tilt pit temp; Monitor after fuel addn 24 hrs	RELOCATED:	This requirement does not meet the criterion of 10 CFR 50.36.
3.8.5	3.9 Relocated	SR: Tilt pit temp monitoring, when pool clg failed	RELOCATED:	This requirement does not meet the criterion of 10 CFR 50.36.
3.9		Deleted		

TS Number	RTS Number	TS requirement description	Classification and Description of Changes	
3.10.1	3.1.1 & .2	Shutdown Margin Requirements		
3.10.1.a	3.1.1	LCO: SDM = 2% >525°F; W/4 PCPs	ADMINISTRATIVE:	The SDM value is unchanged with the exception of the reference to 4 pump operation is not mentioned since the applicability range bounds the SDM value for 4 pump operation.
3.10.1.b	3.1.1	LCO: SDM >3.75%; W/<4 PCPs >525°F	ADMINISTRATIVE:	The SDM value is unchanged <4 pump operation is bounded by applicability range specified. This is contained within LCO 3.1.2 SDM Tave <525 F.
3.10.1.b	3.1.1	ACTN: <4 PCPs & >525°F; Borate to req SDM	ADMINISTRATIVE:	Reworded to conform with standard with technical content remaining the same.
3.10.1.c	3.1.2	LCO: Boron >CSD boron; <525°F w/≥2810 gpm	ADMINISTRATIVE:	The condition of MODE 3 <525°F applies to LCO 3.1.2 RTS. This applicability range bounds the SDM value required. For this condition the SDM value is 3750 pcm SDM. The requirement of being >CSD boron when Tave <525°F is incorporated in the additional SDM required in this applicability range. Therefore, the boron and flow requirements stated are not applicable.
3.10.1.c.1.a	3.4.6 D/3.4.7 C 3.4.8 c	ACTN: <525°F, 2810 >flow ≥610; SDM >3.5% & c.1.b	ADMINISTRATIVE:	Requirements unchanged except for higher required minimum flow rate of 1000 gpm. SDM requirement moved to LCO 3.1.2.
3.10.1.c.1.b	3.9.4 A/3.9.5 A	ACTN: <525°F, 2810 >flow ≥610; 2 Chg pumps off, or c.2	ADMINISTRATIVE:	Requirements unchanged except for higher required minimum flow rate of 100 gpm.
3.10.1.c.2	3.4.6 D/3.4.7 C 3.4.8 C	ACTN: <525°F, 2810 >flow ≥610; verify chg off; 15 min	MORE RESTRICTIVE:	Requires continuous monitoring for dilution flow and requires higher minimum flow rate of 1000 gpm.
3.10.1.c.2	3.9.4 A/3.9.5 A	ACTN: <525°F, 2810 >flow ≥610, Chg on; Stop Chg, chk SDM	ADMINISTRATIVE:	Requirements unchanged except for higher required minimum flow rate of 100 gpm.
3.10.1.c.2(a)	3.4.6 D/3.4.7 C 3.4.8 C	ACTN: <525°F, 2810 >flow ≥610, Chg on; Stop Chg, chk SDM	ADMINISTRATIVE:	Requirements unchanged except for higher required minimum flow rate of 100 gpm.
3.10.1.c.2(a)	3.9.4 A/3.9.5 A	ACTN: <525°F, 2810 >flow ≥610, Chg on; Stop Chg, chk SDM	ADMINISTRATIVE:	Requirements unchanged except for higher required minimum flow rate of 100 gpm.
3.10.1.d	3.1 Deleted	ACTN: Untrippable rod; Verify SDM	ADMINISTRATIVE:	Reactivity consideration pertaining to an inoperable rod is accounted for the in RTS definition of SHUTDOWN MARGIN Section 1.1. Therefore this statement has been deleted since it is no longer applicable.

TS Number	RTS Number	TS requirement description	Classification and Description of Changes	
3.10.1.e	3.1.5.6	LCO: Each rod drop time ≤2.5 sec	ADMINISTRATIVE:	This statement remains completely intact from the current license in SR 3.1.5.5.
3.10.2		Deleted		
3.10.3	3.1.6	LCO: PL rods withdrawn	ADMINISTRATIVE:	This LCO is unchanged, it has been incorporated in RTS 3.1.6 "Shutdown and Part Length Rod Insertion Limits."
3.10.3	3.1.6	XCPT: 3.10.3 (PL rods out LCO) N/A; Rod exercising	ADMINISTRATIVE:	Changed wording to reflect standard.
3.10.4	3.1.5	Misaligned or Inop Control Rods		
3.10.4.a	3.1 Deleted	DEF: Misaligned rod (>8in out)	ADMINISTRATIVE:	Not a defined term in STS
3.10.4.b	3.1 Deleted	DEF: Inop control rod	ADMINISTRATIVE:	Not a defined term in STS
3.10.4.b	3.1 Deleted	DEF: Inop PL rod	ADMINISTRATIVE:	Not a defined term in STS
3.10.4.b	3.1.5	LCO: <2 misaligned or inop rods; When >HSD	ADMINISTRATIVE:	Technical content unchanged, slight change in wording for this action.
3.10.4.b	3.1.5 E.1	ACTN: >1 misaligned or inop rod; HSD in 12 hrs	ADMINISTRATIVE:	Technical content unchanged, slight change in wording for this action.
3.10.4.c	3.1.5 B.2.1/.2	ACTN: Misaligned rod; Hot chnl OK or be <75%; 2 hrs	ADMINISTRATIVE:	Changed wording align with RTS.
3.10.4.c	3.1.5 A.1	ACTN: Misaligned rod; Verify SDM	ADMINISTRATIVE:	Changed wording to align with RTS.
3.10.4.c	3.1 Deleted	ACTN: Misaligned rod; Verify ejected rod worths	ADMINISTRATIVE:	This requirement has been deleted this worth of the misaligned rod is incorporated in the SDM verification of 3.1.5 A.1.
3.10.5	3.1.9	Regulating Group Insertion Limits		
3.10.5.a	3.1.7	LCO: Reg rod sequence, overlap, & insertion w/in COLR	ADMINISTRATIVE:	Changed wording to reflect the RTS. Overlap is not discussed explicitly, but it is an inherent part of the rod sequencing.
3.10.5.b	3.1.7 B.2	ACTN: Reg rod not w/in limit; Restore; 2 hrs	ADMINISTRATIVE:	Changed wording to reflect standard.
3.10.6	3.1.8	Shutdown Rod Limits		
3.10.6.a	3.1.6	LCO: All SD Rods out before any regulating rods	ADMINISTRATIVE:	Requirement unchanged.

TS Number	RTS Number	TS requirement description	Classification and Description of Changes	
3.10.6.b	3.1 Relocated	LCO: SD rods not withdrawn w/o bubble	RELOCATED:	No similar requirement appears in STS. The intent of this requirement was to assure that the reactor was not taken critical without a bubble in the pressurizer. The initial criticality and initial low power physics testing were performed at 260°F T_{ave}. At that temperature it would be possible to be in a solid water condition. Proposed RTS do not allow criticality below 500°F for physics testing or below 525°F for normal operation. These newer restrictions eliminate the need for this Tech Spec requirement.
3.10.6.c	3.1.6	LCO: SD rods not below exercise limit until reg rods in	ADMINISTRATIVE:	Requirement unchanged.
3.10.7	3.1.8	XCPT: 3.10.1.a (4 PCP SDM) N/A; Phy Test	ADMINISTRATIVE:	Changed wording to reflect standard.
3.10.7	3.1.7	XCPT: 3.10.1.a (4 PCP SDM) N/A; Rod exercise	ADMINISTRATIVE:	The exception for rod exercises is stated in a note in RTS for each applicable LCO that would require such a SR.
3.10.7	3.1.8	XCPT: 3.10.1.b (<4 PCP SDM) N/A; Phy Test	ADMINISTRATIVE:	Changed wording to reflect standard.
3.10.7	3.1 Deleted	XCPT: 3.10.1.b (<4 PCP SDM) N/A; Rod exercise	MORE RESTRICTIVE:	Exception was not included in RTS; it is not needed.
3.10.7	3.1.8	XCPT: 3.10.3 (PL rods out) N/A; Phy Test	ADMINISTRATIVE:	Changed wording to reflect standard.
3.10.7	3.1.6	XCPT: 3.10.3 (PL rods out) N/A; Rod exercise	ADMINISTRATIVE:	The exception for rod exercises is stated in a note in RTS for each applicable LCO that would require such a SR.
3.10.7	3.1.8	XCPT: 3.10.4.b (Misaligned or inop rod) N/A; Phy Test	ADMINISTRATIVE:	Changed wording to reflect standard.
3.10.7	3.1.5/3.1.6	XCPT: 3.10.4.b (Misaligned or inop rod) N/A; Rod exercise	ADMINISTRATIVE:	The exception for rod exercises is stated in a note in RTS for each applicable LCO that would require such a SR.
3.10.7	3.1.8	XCPT: 3.10.5 (rod insrtn, seq, overlap) N/A; Phy Test	ADMINISTRATIVE:	Changed wording to reflect standard.
3.10.7	3.1.5/3.1.6	XCPT: 3.10.5 (rod insrtn, seq, overlap) N/A; Rod ex	ADMINISTRATIVE:	The exception for rod exercises is stated in a note in RTS for each applicable LCO that would require such a SR.
3.10.7	3.1.8	XCPT: 3.10.6 (SD rod limits) N/A; Phy Test	ADMINISTRATIVE:	Changed wording to reflect standard.
3.10.7	3.1.6	XCPT: 3.10.6 (SD rod limits) N/A; Rod exercise	ADMINISTRATIVE:	The exception for rod exercises is stated in a note in RTS for each applicable LCO that would require such a SR.

TS Number	RTS Number	TS requirement description	Classification and Description of Changes	
3.11	3.2.1	Power Distribution Instrumentation		
3.11.1	3.2 Relocated	Incore Detectors	RELOCATED:	The incore detectors do not meet the criterion of 10 CFR 50.36, and the associated requirements have been relocated to plant procedures. The Incore detectors are used for monitoring linear heat rate, so certain incore related requirements are retained.
3.11.1.a	3.2 Relocated	LCO: Min incores; Meas Quad pwr tilt (Tq)	RELOCATED:	
3.11.1.a	3.2 Relocated	LCO: Min incores; Meas Radial peaking (Fr)	RELOCATED:	
3.11.1.a	3.2 Relocated	LCO: Min incores; Meas LHR	RELOCATED:	
3.11.1.a	3.2 Relocated	LCO: Min incores; Determining AO	RELOCATED:	
3.11.1.a	3.2 Relocated	LCO: Min incores; Determining APL	RELOCATED:	
3.11.1.b	3.2 Relocated	LCO: Min incores; Monitoring LHR	RELOCATED:	
3.11.1.b	3.2.1	LCO: Incore alarm operable; Monitoring LHR w/alarms	ADMINISTRATIVE:	Requirement unchanged.
3.11.1 A1	3.2 Relocated	ACTN: <min incores; No incore Tq, Fr, LHR, AO, APL	RELOCATED	
3.11.1 A2	3.2.1 B.1.1	ACTN: W/O incore alm; Don't use for monitoring LHR	ADMINISTRATIVE:	Requirement unchanged.
3.11.1 A2	3.2.1 B	ACTN: W/O incore alm; Comply w/3.11.2 or 3.23.1	ADMINISTRATIVE:	Requirement unchanged.
3.11.2	3.2	Excore Power Distribution Monitoring System		
3.11.2.a	3.2.1.3	SR: Incore AO Target & APL determined w/in 31 days; (for monitoring LHR w/excores)	ADMINISTRATIVE:	Requirement unchanged.
3.11.2.a	3.2.4.1 3.2.1 B.1.3	LCO: Measure AO w/in .05 of target for last 24 hrs; (for monitoring LHR w/excores)	ADMINISTRATIVE:	This measurement is inherent in the determination of ASI as required by SR 3.2.4.1 (Verify ASI within limits - Continuously) and in the action when shifting LHR measurement instruments from the incores to the excores as required by 3.2.1 B.1.3.
3.11.2.b	3.2.5.2	LCO: Excore AO cal w/incore; Monitoring LHR w/excores	ADMINISTRATIVE:	Requirement unchanged.
3.11.2.b	3.2.5.2	LCO: Excore AO cal w/incore; Each TM/LP trip chnl	ADMINISTRATIVE:	Requirement unchanged.
3.11.2.b	3.2.5.2	LCO: Excore AO cal w/incore; ASI alm	ADMINISTRATIVE:	Requirement unchanged.

Comparison of existing Palisades Tech Specs and Proposed Palisades Tech Specs. (03/28/96)

TS Number	RTS Number	TS requirement description	Classification and Description of Changes	
3.11.2.c	3.2.5.2	LCO: Excore Tq cal w/incore; Monitoring LHR w/excores	ADMINISTRATIVE:	Requirement unchanged.
3.11.2.c	3.2.5.2	LCO: Excore Tq cal w/incore; Monitoring Tq w/excores	ADMINISTRATIVE:	Requirement unchanged.
3.11.2 A1	3.2.1 B.1.1	ACTN: Excore monit sys inop; Don't use for LHR	ADMINISTRATIVE:	Requirement unchanged.
3.11.2 A2	3.2.5 B.1	ACTN: Meas Tq not cal w/incores; Do not use for Tq	ADMINISTRATIVE:	Requirement unchanged.
3.11.2 A3	3.2.5 C.2.1	ACTN: Incore/excore AO diff >0.02; Adjust ASI alm; 12 hrs	ADMINISTRATIVE:	Requirement unchanged.
3.11.2 A4	3.2.5 B.1	ACTN: Incore/excore T_q diff >0.02; calc T_q each 12 hrs	ADMINISTRATIVE:	Requirement unchanged.

TS Number	RTS Number	TS requirement description	Classification and Description of Changes	
3.12	3.1.4	Moderator Temperature Coefficient		
3.12	3.1.4	LCO: MTC <+0.5E-4; <2% RTP	ADMINISTRATIVE:	Requirement unchanged.
3.13		Deleted		
3.14	3.7.11, 3.7.12	Control Room Ventilation	MORE RESTRICTIVE:	Section 3.14 has been replaced by two LCOs, 3.7.11 and 3.7.12. The existing specification 3.14 was not updated when new control room ventilation system equipment was added to the plant. A TS change request was submitted on 02/28/86, and never approved. It was withdrawn on 01/25/89 with a commitment to make the appropriate revisions during the conversion to restructured Tech Specs.
3.14.a	3.3.1 G	ACTN: W CR >120°F; Immediate action to fix or to SD	MORE RESTRICTIVE:	Required temperature reduced from 120°F to 90°F. This reduced temperature supports operability of the Reactor Protective System Thermal Margin Monitors. Its inclusion in RTS completes an action requested in Amendment 118.
3.14.b	3.7.10	LCO: CR Filter operable	MORE RESTRICTIVE:	Proposed LCO requires two filtration trains to be operable during MODES 1, 2, 3, and 4, and during fuel moves and Core Alterations.
3.14.b	3.7.11	LCO: 2 CR Fans operable	MORE RESTRICTIVE:	Proposed LCO requires two complete control room temperature control systems to be operable during MODES 1, 2, 3, and 4, and during fuel moves and Core Alterations.
3.14.b	3.7.10 A.1	ACTN: W/filter sys inop; fix; 31 days (or SD)	MORE RESTRICTIVE:	Proposed condition and actions require one inoperable filtration train, in MODES 1, 2, 3, or 4, to be restored within 7 days, and require 3.0.3 entry if two trains become inoperable in MODES 1, 2, 3, or 4. Additional actions are stipulated for MODES 5 or 6 where none are stipulated in existing TS.
3.14.b	3.7.10 A.1	ACTN: W/both fans inop; fix; 31 days (or SD)	MORE RESTRICTIVE:	Proposed condition and actions require one inoperable cooling train, in MODES 1, 2, 3, or 4, to be restored within 30 days, and require 3.0.3 entry if two trains become inoperable in MODES 1, 2, 3, or 4. Additional actions are stipulated for MODES 5 or 6 where none are stipulated in existing TS.

TS Number	RTS Number	TS requirement description	Classification and Description of Changes
3.15		Reactor Primary Shield Cooling System	The requirements of this entire section have been deleted by Amendment 171 to the Palisades TS.

Comparison of existing Palisades Tech Specs and Proposed Palisades Tech Specs. (03/28/96)

TS Number	RTS Number	TS requirement description	Classification and Description of Changes	
3.16	3.3.3	ESF Sys Initiation Settings	ADMINISTRATIVE:	The Specification, Applicability, and Action statements are implicit in LCO 3.3.3, as supported by LCOs 3.0.1 and 3.0.2
3.16	3.3.3	LCO: ESF settings iaw Tbl 3.16.1	ADMINISTRATIVE:	Unchanged, now Table 3.3.3-1.
3.16 T	3.3.3-1	TBL: ESF Instrument Setting Limits	ADMINISTRATIVE:	Requirement Unchanged.
3.16 T.1	3.3.3-1 t1a	LCO: Pzr Low Press >1593#	ADMINISTRATIVE:	Requirement Unchanged.
3.16 T.2	3.3.3-1 t2a	LCO: Cont Hi Press 3.70-4.40#	ADMINISTRATIVE:	Requirement Unchanged.
3.16 T.3	3.3.3-1 t3a	LCO: Cont High Rad <20 R/H	ADMINISTRATIVE:	Requirement Unchanged.
3.16 T.4	3.3.3-1 t4a,b	LCO: SG Lo Press ≥500#	ADMINISTRATIVE:	Requirement Unchanged.
3.16 T.5	3.3.3-1 t5a,b	LCO: SG Lo Level ≥25.9%	ADMINISTRATIVE:	Requirement Unchanged.
3.16 T.6	3.3.3-1 t6a	LCO: SIRWT Low Level 21 to 27 inch	ADMINISTRATIVE:	Requirement Unchanged.
3.16.T.6	3.3 Relocated	LCO: ESF Pump Room Rad Monitors <2.2E5 CPM	RELOCATED:	The ESF pump room monitors are not assumed to function by the safety analyses. This requirement does not meet the criterion of 10 CFR 50.36.

TS Number	RTS Number	TS requirement description	Classification and Description of Changes	
3.17	3.3.1-3.3.10	Instrumentation Systems	ADMINISTRATIVE:	Requirement unchanged. Worded per STS.
3.17.1	3.3.1/3.3.2	LCO: 4 RPS channels in Tbl 3.17.1; Fuel, >1 rod, etc	ADMINISTRATIVE:	Specification: Requirement unchanged in intent. Reworded and divided into two LCOs per STS; instrumentation in LCO 3.3.1, logic and manual initiation in LCO 3.3.2.
3.17.1.1	3.3.2 C.	ACTN: 1 manual trip inoperable; Restore; Before startup	ADMINISTRATIVE:	Unchanged in intent- RTS 3.3.2 Condition C, changed "before Startup" to read "Prior to entering MODE 2 following next MODE 3 entry" to be similar to Indefinite bypass wording of digital plant LCOs for STS consistency.
3.17.1.2	3.3.1 A	ACTN: 1 trip unit or inst inop; put in trip; 7 days	ADMINISTRATIVE:	Requirement unchanged.
3.17.1.2 a	3.3.1 C	ACTN: Hi SUR/LOL, 1 trip unit inop; No restore required	MORE RESTRICTIVE:	RTS requires restoring to OPERABLE prior to entering MODE 2 following MODE 5 entry. In effect, this is prior to the next reactor startup. TS does not require any restoration.
3.17.1.3.a	3.3.1 B.1.	ACTN: 2 trip units or inst inop; trip 1; 1 hr	ADMINISTRATIVE:	Requirement unchanged.
3.17.1.3.b	3.2.5 D.1/E.1	ACTN: 2 Pwr range instruments inoperable; be 70%; 2 hrs	ADMINISTRATIVE:	This action is replaced by actions which assure the desired protection is retained, or require a power reduction to below 25% RTP. The existing Bases (2nd paragraph, page B 3.17-8) state that the reason for the required power reduction is the loss of the ability to detect flux tilts when only two power range NI channels are available. With the proposed RTS, if 1 (of 3) required ASI monitoring channels (which are fed by the power range NI channels) are inoperable, Action 3.2.5 D.1 directs using the Incore detectors for measurement of LHR. The incores provide the ability to detect flux tilts, and thereby provide the information which the inoperable NIs are unable to provide. If this action cannot be completed, (ie the desired flux tilt detection function is lost) Action 3.2.5 E.1 requires a power reduction to below 25%.
3.17.1.3.c	3.3.1.b.2	ACTN: 2 trip units or inst inop; restore 1; 7 days	ADMINISTRATIVE:	Requirement unchanged.
3.17.1.3 c	3.3.1 D	ACTN: Hi SUR/LOL, 2 Trip Units inop; no restore required	MORE RESTRICTIVE:	RTS requires restoring one Trip units to OPERABLE prior to entering MODE 2 following MODE 5 entry. In effect, this is prior to the next reactor startup. TS does not require any restoration.
3.17.1.4	3.3.2 A	ACTN: 1 matrix logic Channel inop; restore; 48 hrs	ADMINISTRATIVE:	Requirement unchanged.

TS Number	RTS Number	TS requirement description	Classification and Description of Changes	
3.17.1.5	3.3.2 B	ACTN: 1 init. chnl inop; de-energize pwr supplies; 1 hr	ADMINISTRATIVE:	Requirement unchanged.
3.17.1.6a	3.3.1 G/3.3.2 F	ACTN: Action not met or <min chnls; HSD 12 hrs	MORE RESTRICTIVE:	The shutdown actions for both the instrumentation (RTS 3.3.1 F) And logic (3.3.2 D) Use the STS shutdown track requiring mode 3 entry in 6 hrs, and placing the plant in a condition where the LCO does not apply in 6 hrs. This contrasts with the 12 hrs Hot Shutdown Completion Time of the TS.
3.17.1.6b	3.3.1 G/3.3.2 F	ACTN: Action not met or <min chnls; leave applic; 48 hrs	MORE RESTRICTIVE:	The RTS Action B.2 uses the STS Completion Time of 6 hrs to ensure no more than one CR is capable of withdrawal. This requirement is not explicitly stated in the TS, but meets the TS requirement to place the plant in a Condition where the LCO does not apply. Action B.2 requirement in the RTS requires ensuring no more than one CR is capable of withdrawal. This differs from the STS, where all RTCBs must be opened, due to the LCO APPLICABILITY difference between the RTS and STS, It is consistent with the TS.
3.17.1T	3.3.1-1T	TBL: RPS instrument requirements		
3.17.1T#1	3.3.2	LCO: 2 manual trip Chnls	ADMINISTRATIVE:	Unchanged in intent. No longer addressed in Table, in accordance with STS format. Addressed in LCO 3.3.2 Statement.
3.17.1T#2	3.3.1-1 T1	LCO: 4 VHPT Chnls	ADMINISTRATIVE:	Unchanged in intent. IAW STS, No. of channels is addressed in LCO 3.3.1 statement.
3.17.1T#3	3.3.1-1 T2	LCO: 4 Hi Rate Chnls	ADMINISTRATIVE:	Unchanged in intent. IAW STS, No. of channels is addressed in LCO 3.3.1 statement.
3.17.1T#4	3.3.1-1 T9	LCO: 4 TM/lpt Chnls	ADMINISTRATIVE:	Unchanged in intent. IAW STS, No. of channels is addressed in LCO 3.3.1 statement.
3.17.1T#5	3.3.1-1 T5	LCO: 4 Hi Pressurizer pressure Chnls	ADMINISTRATIVE:	Unchanged in intent. IAW STS, No. of channels is addressed in LCO 3.3.1 statement.
3.17.1T#6	3.3.1-1 T6	LCO: 4 Low Flow Chnls	ADMINISTRATIVE:	Unchanged in intent. IAW STS, No. of channels is addressed in LCO 3.3.1 statement.
3.17.1T#7	3.3.1-1 T10	LCO: 4 Loss of Load Chnls	ADMINISTRATIVE:	Unchanged in intent. IAW STS, No. of channels is addressed in LCO 3.3.1 statement.
3.17.1T#8	3.3.1-1 T4	LCO: 4 Low "A" SG Level Chnls	ADMINISTRATIVE:	Unchanged in intent. IAW STS, No. of channels is addressed in LCO 3.3.1 statement.

TS Number	RTS Number	TS requirement description	Classification	Description of Changes
3.17.1T#9	3.3.1-1 T5	LCO: 4 Low "B" SG Level Chnls	ADMINISTRATIVE:	Unchanged in intent. IAW STS, No. of channels is addressed in LCO 3.3.1 statement.
3.17.1T#10	3.3.1-1 T6	LCO: 4 Low "A" SG Pressure Chnls	ADMINISTRATIVE:	Unchanged in intent. IAW STS, No. of channels is addressed in LCO 3.3.1 statement.
3.17.1T#11	3.3.1-1 T7	LCO: 4 Low "B" SG Pressure Chnls	ADMINISTRATIVE:	Unchanged in intent. IAW STS, No. of channels is addressed in LCO 3.3.1 statement.
3.17.1T#12	3.3.1-1 T12	LCO: 4 Hi Cont Pressure Chnls	ADMINISTRATIVE:	Unchanged in intent. IAW STS, No. of channels is addressed in LCO 3.3.1 statement.
3.17.1T#13	3.3.2	LCO: 6 RPS Matrix Logic Chnls	ADMINISTRATIVE:	Requirement Unchanged. Addressed in LCO statement.
3.17.1T#14	3.3.2	LCO: 4 Initiation Logic Chnls	ADMINISTRATIVE:	Requirement unchanged. Addressed in LCO statement.
3.17.1T(a)	3.3.1 E	LCO: 2 WR NI Chnls; Zero Pwr Mode Bypass	MORE RESTRICTIVE:	The option to use the Zero Power Mode Bypass has been removed. This bypass may only be used under conditions when the RPS is not required to be operable.
3.17.1T(b)	T3.3.1-1 Note b	NOTE: Bypass conditions	MORE RESTRICTIVE:	The option to use the Zero Power Mode Bypass has been removed. This bypass may only be used under conditions when the RPS is not required to be operable.
3.17.1T(c)	3.3 Deleted	NOTE: bypass conditions, physics testing	MORE RESTRICTIVE:	Note deleted. This deletion of the note permitting raising the bypass setpoint is done because this provision of raising the bypass enable setpoint is not actually used at Palisades during Physics Testing. Therefore it is Not Required.
3.17.1T(d)	T3.3.1-1 Note c	NOTE: Special Loss of Load applicability	ADMINISTRATIVE:	Requirement unchanged.
3.17.2	3.3.3/3.3.4	LCO: ESF chnls in Table 3.17.2; ≥300°F	ADMINISTRATIVE:	Unchanged in Intent. Worded per STS. Instrumentation in LCO 3.3.2. Logic and Manual in LCO 3.3.4. Note that TS LCOs 3.17.2 (ESF) and 3.17.3 (Isolation Functions) are combined into LCO 3.3.3 and 3.3.4.
3.17.2.1	3.3.4 A.	ACTN: 1 Manual Chnl inop; Restore 48 hrs	ADMINISTRATIVE:	Requirement unchanged.
3.17.2.2	3.3.3 B.1	ACTN: 1 inst Chnl inop; put in trip; 7 days	ADMINISTRATIVE:	Requirement unchanged.
3.17.2.3(a)	3.3.3 C.1	ACTN: 2 inst Chnls inop; trip 1; 8 hrs	ADMINISTRATIVE:	Requirement unchanged.
3.17.2.3(b)	3.3.3 C.2	ACTN: 2 inst Chnls inop; restore 1; 7 days	ADMINISTRATIVE:	Requirement unchanged.

TS Number	RTS Number	TS requirement description	Classification and Description of Changes	
3.17.2.4(a)	3.3.3 A.1	ACTN: 1 SIRWT Lvl Chnl inop; bypass; 8 hrs	ADMINISTRATIVE:	Requirement unchanged.
3.17.2.4(b)	3.3.3 A.2	ACTN: 1 SIRWT Lvl Chnl inop; restore; 7 days	ADMINISTRATIVE:	Requirement unchanged.
3.17.2.5	3.8.1 F.1	ACTN: sequencer inop; declare DG inop; Immediately	ADMINISTRATIVE:	Requirement Unchanged. The sequencers are addressed as a required part of the Diesel Generators.
3.17.2.6a	3.3.3 E/3.3.4 B	ACTN: Action not met or <min chnls; Hot SD 12 hrs	MORE RESTRICTIVE:	The RTS requires MODE 3 entry in 6 hrs, as in the STS. MODE 4 entry is in 30 hrs, vice 48 for the TS.
3.17.2.6b	3.3.3 E/3.3.4 B	ACTN: Action not met or <min chnls; leave applic; 48 hrs	MORE RESTRICTIVE:	The RTS requires MODE 3 entry in 6 hrs, as in the STS. MODE 4 entry is in 30 hrs, vice 48 for the TS.
3.17.2T#1a	3.3.4-1 t1a	LCO: 2 manual SIS Chnls	ADMINISTRATIVE:	Requirement unchanged.
3.17.2T#1b	3.3.4-1 t1b	LCO: 2 SIS Logic Chnls	ADMINISTRATIVE:	Requirement unchanged.
3.17.2T#1c	3.3.4-1 t1c	LCO: 2 CHP SIS initiation Chnls	ADMINISTRATIVE:	Requirement unchanged.
3.17.2T#1d	3.3.3-1 t1a	LCO: 4 Pressurizer Pressure Chnls	ADMINISTRATIVE:	Requirement unchanged.
3.17.2T#2a	3.3.4-1 6a	LCO: 2 manual RAS Chnls	ADMINISTRATIVE:	Requirement unchanged.
3.17.2T#2b	3.3.4-1 6b	LCO: 2 RAS logic Chnls	ADMINISTRATIVE:	Requirement unchanged.
3.17.2T#2c	3.3.3-1 6a	LCO: 4 SIRWT Level Chnls	ADMINISTRATIVE:	Requirement unchanged.
3.17.2T#3a	3.3.4-1 5a	LCO: 2 manual AFAS Chnls	ADMINISTRATIVE:	Requirement unchanged.
3.17.2T#3b	3.3.4-1 5b	LCO: 2 AFAS Logic Chnls	ADMINISTRATIVE:	Requirement unchanged.
3.17.2T#3c	3.3.3-1 5a	LCO: 4 SG "A" level Chnls	ADMINISTRATIVE:	Requirement unchanged.
3.17.2T#3d	3.3.3-1 5b	LCO: 4 SG "B" level Chnls	ADMINISTRATIVE:	Requirement unchanged.
3.17.2T#4a	3.8.1	LCO: 2 DBA Sequencers	ADMINISTRATIVE:	The sequencers are addressed in the RTS electrical chapter as a functional part of the Diesel Generator. LCO 3.8.1 provides both Actions and SRs for the sequencers.
3.17.2T#4b	3.8.1	LCO: 2 Shutdown Sequencers	ADMINISTRATIVE:	The sequencers are addressed in the RTS electrical chapter as a functional part of the Diesel Generator. LCO 3.8.1 provides both Actions and SRs for the sequencers.

TS Number	RTS Number	TS requirement description	Classification and Description of Changes	
3.17.3	3.3.3/3.3.4	LCO: Isolation chnls in Table 3.17.3; >Cold SD	LESS RESTRICTIVE:	APPLICABILITY Current TS APPLICABILITY for the containment isolation functions of Table 3.17.3 is >COLD SHUTDOWN. RTS APPLICABILITY is MODES 1, 2, and 3. This is justifiable in the case of SGLP since the SGLP function may be bypassed below 550 psia, which corresponds to a temperature above 300°F. In the case of CHP and CHR, manual initiation capability is still possible in MODE 4 due to the MODE 4 applicability requirements of LCO 3.6.3, Containment Isolation Valves. In addition, the Refueling CHR specification (LCO 3.3.6) addresses CHR isolation in MODE 6, during fuel handling.
3.17.3.1	3.3.4 A	ACTN: 1 Isolation manual chnl inop; restore; 48 hrs	ADMINISTRATIVE:	Requirement unchanged.
3.17.3.2	3.3.3 B.1	ACTN: 1 isolation inst chnl inop; trip; 7 days	ADMINISTRATIVE:	Requirement unchanged.
3.17.3.3a	3.3.4 C.1	ACTN: 2 isolation inst Chnls inop; trip 1; 8 hrs	ADMINISTRATIVE:	Requirement unchanged.
3.17.3.3b	3.3.4 C.2	ACTN: 2 isolation inst Chnls inop; restore 1; 7 days	ADMINISTRATIVE:	Requirement unchanged.
3.17.3.4	3.3 Relocated	ACTN: Safeguards rm monitors inop; isolate vent; Immed	RELOCATED:	The ESF pump room monitors are not assumed to function by the safety analyses. This requirement does not meet the criterion of 10 CFR 50.36.
3.17.3.5a	3.3.3 E/3.3.4 B	ACTN: Action not met or <min chnls; Hot SD 12 hrs	MORE RESTRICTIVE:	The RTS requires MODE 3 entry in 6 hrs, as in the STS. MODE 4 entry is in 30 hrs, vice 48 for the TS.
3.17.3.5b	3.3.3 E/3.3.4 B	ACTN: Action not met or <min chnls; leave applic; 48 hrs	MORE RESTRICTIVE:	See above description
3.17.3T#1a	3.3.4-1 t1a.	LCO: 2 CHP Logic Chnls	ADMINISTRATIVE:	Requirement unchanged.
3.17.3T#1b	3.3.3-1 t2a	LCO: 4 "left" containment Pressure switches	ADMINISTRATIVE:	Requirement unchanged.
3.17.3T#1c	3.3.3-1 t2b	LCO: 4 "right" containment Pressure switches	ADMINISTRATIVE:	Requirement unchanged.
3.17.3T#2a	3.3.4-1 t3a	LCO: 2 manual CHR Chnls	ADMINISTRATIVE:	Requirement unchanged.
3.17.3T#2b	3.3.3-1 t3b	LCO: 2 CHR logic Chnls	ADMINISTRATIVE:	Requirement unchanged.
3.17.3T#2c	3.3.3-1 t3a	LCO: 4 Containment Monitors	ADMINISTRATIVE:	Requirement unchanged.
3.17.3T#3a	3.3.4-1 t4a	LCO: 2 manual SGLP Chnls	ADMINISTRATIVE:	Requirement unchanged.
3.17.3T#3b	3.3.4-1 t4b	LCO: 2 SGLP Logic Chnls	ADMINISTRATIVE:	Requirement unchanged.
3.17.3T#3c	3.3.3-1 4a	LCO: 4 SG "A" pressure Chnls	ADMINISTRATIVE:	Requirement unchanged.

TS Number	RTS Number	TS requirement description	Classification and Description of Changes	
3.17.3T#3d	3.3.3-1 4b	LCO: 4 SG "B" pressure Chnls	ADMINISTRATIVE:	Requirement unchanged.
3.17.3T#4a	3.3 Relocated	LCO: 1 East room monitor	RELOCATED:	The ESF pump room monitors are not assumed to function by the safety analyses. This requirement does not meet the criterion of 10 CFR 50.36.
3.17.3T#4b	3.3 Relocated	LCO: 1 West room monitor	RELOCATED:	The ESF pump room monitors are not assumed to function by the safety analyses. This requirement does not meet the criterion of 10 CFR 50.36.
3.17.4	3.3.7	LCO: AMI chnls in Table 3.17.4; >300°F	ADMINISTRATIVE:	Requirement unchanged.
3.17.4.1	3.3.7 A	ACTN: 1 chnl 1-14 inop; restore; 7 days	ADMINISTRATIVE:	Requirement unchanged.
3.17.4.2	3.3.7 B	ACTN: 2 chnls 1-14 inop; restore 1; 48 hrs	ADMINISTRATIVE:	Requirement unchanged.
3.17.4.3	3.3.7-1 T Note C.	ACTN: Valve Pos inop; restore or lock vlv shut; 7 days	ADMINISTRATIVE:	Requirement unchanged.
3.17.4.4a	3.3.7 C	ACTN: Action 1-3 not met or <min chnl; Hot SD 12 hrs	MORE RESTRICTIVE:	LCO 3.0.3 shutdown action of 6 hrs to MODE 3 and 30 hrs to MODE 4 used to be consistent with shutdown action in other LCOs.
3.17.4.4b	3.3.7 C	ACTN: Action 1-3 not met or <min chnl; leave applic; 48 hrs	MORE RESTRICTIVE:	RTS MODE 4 Completion Time is 30 hrs.
3.17.4.5	3.3.7 A	ACTN: 1 chnl 16-21 inop; restore; 7 days	ADMINISTRATIVE:	Requirement unchanged.
3.17.4.6	3.3.7 B	ACTN: 2 chnls 16-21 inop; restore 1; 48 hrs	ADMINISTRATIVE:	Requirement unchanged.
3.17.4.7(a)	3.3.7 C	ACTN: 2 CETs inop & Action not met; Do 3.17.4.4	ADMINISTRATIVE:	Requirement unchanged.
3.17.4.7(b)	3.3.7	ACTN: 2 RVWL inop & Action not met; alt monitor; 48 hrs	ADMINISTRATIVE:	The deletion of this specific requirement does not impact the requirements for equipment operability in any way. The bases do address the need for alternative monitoring using SMM, CETs, and Pressurizer Level. All of these parameters are in table 3.3.7-1, and are required to be OPERABLE. In addition, should both channels of any of these become inoperable, shutdown is required. Therefore it is impossible not to meet the alternative monitoring requirement.
3.17.4.7(c)	3.3.7 D	ACTN: Action 5 or 6 not met; submit report; 30 days	ADMINISTRATIVE:	Unchanged in intent. Referencing Spec. 5.6.7 is in accordance with STS format. The result is the same.
3.17.4.7(d)	3.3.7 D	ACTN: Action 5 or 6 not met; Fix inst prior to SU	ADMINISTRATIVE:	Requirement unchanged.
3.17.4T#1	3.3.7-1 T1	LCO: 2 WR Th chnls	ADMINISTRATIVE:	Requirement unchanged.

Comparison of existing Palisades Tech Specs and Proposed Palisades Tech Specs. (03/28/96)

TS Number	RTS Number	TS requirement description	Classification and Description of Changes	
3.17.4T#2	3.3.7-1 T2	LCO: 2 WR Tc chnls	ADMINISTRATIVE:	Requirement unchanged.
3.17.4T#3	3.3.7-1 T3	LCO: 2 WR NI chnls	ADMINISTRATIVE:	Requirement unchanged.
3.17.4T#4	3.3.7-1 T4	LCO: 2 Cont water lvl chnls	ADMINISTRATIVE:	Requirement unchanged.
3.17.4T#5	3.3.7-1 T5	LCO: 2 Subcooled margin chnls	ADMINISTRATIVE:	Requirement unchanged.
3.17.4T#6	3.3.7-1 T6	LCO: 2 WR Pzr Level chnls	ADMINISTRATIVE:	Requirement unchanged.
3.17.4T#7	3.3.7-1 T7	LCO: 2 Cont H_2 chnls	ADMINISTRATIVE:	Requirement unchanged.
3.17.4T#8	3.3.7-1 T8	LCO: 2 CST Level chnls	ADMINISTRATIVE:	Requirement unchanged.
3.17.4T#9	3.3.7-1 T9	LCO: 2 WR Pressurizer Pressure chnls	ADMINISTRATIVE:	Requirement unchanged.
3.17.4T#10	3.3.7-1 T10	LCO: 2 WR Cont Pressure chnls	ADMINISTRATIVE:	Requirement unchanged.
3.17.4T#11	3.3.7-1 T11	LCO: 2 WR SG "A" Level Th chnls	ADMINISTRATIVE:	Requirement unchanged.
3.17.4T#12	3.3.7-1 T12	LCO: 2 WR SG "B" Level chnls	ADMINISTRATIVE:	Requirement unchanged.
3.17.4T#13	3.3.7-1 T13	LCO: 2 NR SG "A" Pressure chnls	ADMINISTRATIVE:	Requirement unchanged.
3.17.4T#14	3.3.7-1 T14	LCO: 2 NR SG "B" Pressure chnls	ADMINISTRATIVE:	Requirement unchanged.
3.17.4T#15	3.3.7-1 T15	LCO: 1 pos indicator for each cont iso valve	ADMINISTRATIVE:	Note a added in accordance with STS. This allows deletion of the TS Action 3.17.4.3,(valve closure in 7 days) since locking the valve shut per Note c accomplishes the same thing.
3.17.4T#16	3.3.7-1 T16	LCO: 4 CETs quad 1	ADMINISTRATIVE:	Requirement unchanged.
3.17.4T#17	3.3.7-1 T17	LCO: 4 CETs quad 2	ADMINISTRATIVE:	Requirement unchanged.
3.17.4T#18	3.3.7-1 T18	LCO: 4 CETs quad 3	ADMINISTRATIVE:	Requirement unchanged.
3.17.4T#19	3.3.7-1 T19	LCO: 4 CETs quad 4	ADMINISTRATIVE:	Requirement unchanged.
3.17.4T#20	3.3.7-1 T20	LCO: 2 RVWL chnls	ADMINISTRATIVE:	Requirement unchanged.
3.17.4T#21	3.3.7-1 T21	LCO: 2 HR Cont Rad chnls	ADMINISTRATIVE:	Requirement unchanged.
3.17.5	3.3.8	LCO: Alt SD chnls in Table 3.17.5; >300°F	ADMINISTRATIVE:	Requirement unchanged.
3.17.5.1a	3.3.8 A.1	ACTN: Alt SD Chnls inop; provide equiv; 7 days	ADMINISTRATIVE:	Requirement unchanged.

TS Number	RTS Number	TS requirement description	Classification and Description of Changes	
3.17.5.1b	3.3.8 A.2	ACTN: Alt SD Chnls inop; restore; 60 days	ADMINISTRATIVE:	Requirement unchanged.
3.17.5.2a	3.3.8 B.1	ACTN: Action not met or <min chnls; Hot SD 12 hrs	MORE RESTRICTIVE:	Used STS shutdown time of 6 hrs to MODE 3.
3.17.5.2b	3.3.8 B.2	ACTN: Action not met or <min chnls; leave applic; 48 hrs	MORE RESTRICTIVE:	Used STS shutdown time of 6 hrs to MODE 3.
3.17.5T#1	3.3.8-1 T1	LCO: 1 SU Nuclear Inst chnl	ADMINISTRATIVE:	Requirement unchanged.
3.17.5T#2	3.3.8-1 T2	LCO: 1 Pressurizer Pressure chnl	ADMINISTRATIVE:	Requirement unchanged.
3.17.5T#3	3.3.8-1 T3	LCO: 1 Pressurizer Level chnl	ADMINISTRATIVE:	Requirement unchanged.
3.17.5T#4	3.3.8-1 T4	LCO: 1 Loop 1 Th chnl	ADMINISTRATIVE:	Requirement unchanged.
3.17.5T#5	3.3.8-1 T5	LCO: 1 loop 2 Th chnl	ADMINISTRATIVE:	Requirement unchanged.
3.17.5T#6	3.3.8-1 T6	LCO: 1 Loop 1 Tc chnl	ADMINISTRATIVE:	Requirement unchanged.
3.17.5T#7	3.3.8-1 T7	LCO: 1 Loop 2 Tc chnl	ADMINISTRATIVE:	Requirement unchanged.
3.17.5T#8	3.3.8-1 T8	LCO: 1 SG "A" Pressure chnl	ADMINISTRATIVE:	Requirement unchanged.
3.17.5T#9	3.3.8-1 T9	LCO: 1 SG "B" Pressure chnl	ADMINISTRATIVE:	Requirement unchanged.
3.17.5T#10	3.3.8-1 T10	LCO: 1 SG "A" Level chnl	ADMINISTRATIVE:	Requirement unchanged.
3.17.5T#11	3.3.8-1 T11	LCO: 1 SG "B" Level chnl	ADMINISTRATIVE:	Requirement unchanged.
3.17.5T#12	3.3.8-1 T12	LCO: 1 SIRWT Level chnl	ADMINISTRATIVE:	Requirement unchanged.
3.17.5T#13	3.3.8-1 T13	LCO: 1 AFW Flow to SG "A" chnl	ADMINISTRATIVE:	Requirement unchanged.
3.17.5T#14	3.3.8-1 T14	LCO: 1 AFW Flow to SG "B" chnl	ADMINISTRATIVE:	Requirement unchanged.
3.17.5T#15	3.3.8-1 T15	LCO: 1 Pump P-8B Suction Pressure chnl	ADMINISTRATIVE:	Requirement unchanged.
3.17.5T#16	3.3.8-1 T16	LCO: 1 Pump P-8B steam Valve Control chnl	ADMINISTRATIVE:	Requirement unchanged.
3.17.5T#17	3.3.8-1 T17	LCO: 1 AFW Flow Control to SG "A" chnl	ADMINISTRATIVE:	Requirement unchanged.
3.17.5T#18	3.3.8-1 T18	LCO: 1 AFW Flow Control to SG "B" chnl	ADMINISTRATIVE:	Requirement unchanged.

TS Number	RTS Number	TS requirement description	Classification and Description of Changes	
3.17.5T#19	3.3 Deleted	LCO: C-150 Transfer Switches	ADMINISTRATIVE:	Unchanged in intent. This transfer switch is not specifically called out because Transfer Switches must function for the other instrumentation to function. Performing SRs on the above instrumentation validated the transfer switch automatically. This is stated in the bases.
3.17.5T#20	3.3 Deleted	LCO: C-150A Transfer Switches	ADMINISTRATIVE:	Unchanged in intent. This transfer switch is not specifically called out because Transfer Switches must function for the other instrumentation to function. Performing SRs on the above instrumentation validated the transfer switch automatically. This is stated in the bases.
3.17.6	3.3 LCOs	LCO: Safety function chnls in Table 3.17.6; in Table	ADMINISTRATIVE:	Unchanged in intent. APPLICABILITY wording changed to be consistent with new MODE definitions. Item 1 in Table 3.17.6 is now LCO 3.3.9. It is the counterpart of RTS LCO 3.3.1 for use in monitoring when the RPS is not required. It is the same in intent as in the TS and STS. Item 20 in Table 3.17.6 is now LCO 3.3.6. Item 19 is now LCO 3.3.10.
3.17.6.1a	3.3.9 A.1	ACTN: Flux Monitoring inop; stop adding rx; Immediately	ADMINISTRATIVE:	Requirement unchanged.
3.17.6.1b	3.3 Deleted	ACTN: Flux Monitoring inop; Hot SD; 15 minutes	ADMINISTRATIVE:	This requirement to be in HSD is not applicable with the arrangement of requirements in RTS. LCOs 3.3.1 and 3.3.9 have complementary applicabilities. LCO 3.3.9, therefore cannot be applicable with the reactor "above" hot shutdown (ie, MODES 1 or 2) and LCO 3.3.1 carries its own flux monitoring requirements and associated actions. Therefore, this TS requirement addresses conditions which cannot arise under the structure of the RTS instrument LCOs.
3.17.6.1c	3.3.9 A.3	ACTN: Flux Monitoring inop; Verify SDM 4 hrs & each 12 hrs	ADMINISTRATIVE:	Requirement unchanged.
3.17.6.2	3.1.5 D.1	ACTN: 1 Rod Pos chnl inop; check rods 15; Min after motion	ADMINISTRATIVE:	Requirement unchanged.
3.17.6.3	3.3 Relocated	ACTN: SIRWT Temp chnl inop; provide alternate; 7 days	RELOCATED:	This requirement does not meet the criterion of 10 CFR 50.36.
3.17.6.4	3.3 Relocated	ACTN: 1 MFW Flow chnl inop; provide alternate; 24 hrs	RELOCATED:	This requirement does not meet the criterion of 10 CFR 50.36.
3.17.6.5	3.3 Relocated	ACTN: 1 MFW Temp chnl inop; provide alternate; 24 hrs	RELOCATED:	This requirement does not meet the criterion of 10 CFR 50.36.

TS Number	RTS Number	TS requirement description	Classification and Description of Changes	
3.17.6.6.1	3.7.5	ACTN: 1 AFW Flow chnl inop; verify valve operable; 2 hrs	ADMINISTRATIVE:	The AFW LCO, 3.7.5, includes the operability of the flow control valves as an integral part of the operability of an AFW train. Therefore, if a flow channel becomes inoperable, the operability of the associated valve, and therefore the train, must be determined immediately. While RTS provided no time limit or making this determination, the intent of the two requirements is the same.
3.17.6.6.2	3.7.5	ACTN: 2 AFW Flow chnls inop; declare valve inop; Immed	ADMINISTRATIVE:	The AFW LCO, 3.7.5, includes the operability of the flow control valves as an integral part of the operability of an AFW train. Therefore, if a flow channel cause a valve to be inoperable, the valve and the associated AFW train are also inoperable.
3.17.6.7.1	3.4.15 A.1	ACTN: 1 leak detector inop; restore; Prior to startup	ADMINISTRATIVE:	Requirements unchanged.
3.17.6.7.2	3.4.15 B.1	ACTN: 2 of 3 leak detectors inop; restore; 30 days	ADMINISTRATIVE:	Requirements unchanged.
3.17.6.8	3.4 Relocated	ACTN: 1 Safety Vlv Pos Ind inop; restore; Prior to startup	RELOCATED:	This requirement does not meet the criterion of 10 CFR 50.36.
3.17.6.9	3.4 Relocated	ACTN: 1 PORV Pos Ind inop; restore; Prior to startup	RELOCATED:	This requirement does not meet the criterion of 10 CFR 50.36.
3.17.6.10a	3.4 Relocated	ACTN: 1 Block vlv Pos Ind inop; restore; B4 SU	RELOCATED:	This requirement does not meet the criterion of 10 CFR 50.36.
3.17.6.10b	3.4 Relocated	ACTN: 1 LTOP Block Pos Ind inop; verify open; Each 12 hrs	RELOCATED:	This requirement does not meet the criterion of 10 CFR 50.36.
3.17.6.11	3.3 Relocated	ACTN: SWS Break Detector inop; restore prior to startup	RELOCATED:	This requirement does not meet the criterion of 10 CFR 50.36.
3.17.6.12.1	3.3 Relocated	ACTN: 1 Comparitor inop; restore; Prior to Startup	RELOCATED:	The Flux - ΔT comparitors are used only for indication. They do not provide any protective function, nor do they meet any of the criterion of 10 CFR 50.36.
3.17.6.12.2	3.3 Relocated	ACTN: 2 Comparitors inop; be ≤70% pwr; 2 hrs	RELOCATED:	The Flux - ΔT comparitors are used only for indication. They do not provide any protective function, nor do they meet any of the criterion of 10 CFR 50.36.
3.17.6.13	3.3 Relocated	ACTN: 1 seq chnl inop; check rods; 15 min after motion	RELOCATED:	This requirement does not meet the criterion of 10 CFR 50.36.

TS Number	RTS Number	TS requirement description	Classification and Description of Changes	
3.17.6.14	3.5 Relocated	ACTN: CBA lo Lvl alm inop; Verify level each 12 hrs	RELOCATED:	This requirement does not meet the criterion of 10 CFR 50.36.
3.17.6.15	3.2.5 A.1	ACTN: Deviation Alm inop; Calculate T_q each 12 hrs	ADMINISTRATIVE:	Requirement unchanged.
3.17.6.16	3.2 Relocated	ACTN: ASI Alm inop; Restore prior to startup	RELOCATED:	This requirement does not meet the criterion of 10 CFR 50.36.
3.17.6.17	3.4.6 E.1	ACTN: SDC interlock inop; Breaker "Racked Out" position; 8 hrs	MORE RESTRICTIVE:	RTS required circuit breaker be in "OPEN" position in 1 hr.
3.17.6.18	3.1.7 C.1	ACTN: PDIL Alm inop; check rods; 15; Min after motion	ADMINISTRATIVE:	Requirement unchanged.
3.17.6.19a	3.3.10 A.1	ACTN: Fuel Pool monitor inop; stop moving fuel; Immediate	ADMINISTRATIVE:	Requirement unchanged.
3.17.6.19b	3.3.10 A.2	ACTN: Fuel Pool monitor inop; restore capability; 72 hrs	ADMINISTRATIVE:	Requirement unchanged.
3.17.6.20	3.3.6	ACTN: Cont Refueling Monitor inop; Stop refueling	MORE RESTRICTIVE:	Unchanged in Intent, but Action A.1 in LCO 3.3.6 now requires suspending CORE ALTERATIONS (the equivalent of suspending TS Refueling operations), and in addition, Action A.2 requires suspending movement of Irradiated Fuel.
3.17.6.21a	3.3	ACTN: Action not met or <min chnls; Hot SD 12 hrs	MORE RESTRICTIVE:	The general shutdown action is moved to the associated LCOs. In each case it requires being in MODE 3 (similar to TS HSD) within 6 hrs.
3.17.6.21b	3.3	ACTN: Action not met or <min chnls; leave applic; 48 hrs	MORE RESTRICTIVE:	The general shutdown action is moved to the associated LCOs. In each case it requires being in Mode in 30 hrs or in MODE 5 in 36 hrs, either of which is more restrictive than the TS action.
3.17.6T#1	3.3.9	LCO: 2 chnls Flux Monitoring; $<10^{-4}$% w/fuel	ADMINISTRATIVE:	Applicability has been made complementary with that of LCO 3.3.1 so that when the RPS and four channels of NIs are not required, this LCO will require flux monitoring capability.
3.17.6T#2	3.1.5	LCO: 2 chnls Rod Pos; >1 rod capable of withdrawal	ADMINISTRATIVE:	Rod position indication is addressed as a functional part of Rod Operability in LCO 3.1.5.
3.17.6T#3	3.3 Relocated	LCO: 2 chnls SIRWT Temp; 300°F	RELOCATED:	This requirement does not meet the criterion of 10 CFR 50.36.
3.17.6T#4	3.3 Relocated	LCO: 2 chnls MFW Flow; >15% power	RELOCATED:	This requirement does not meet the criterion of 10 CFR 50.36.

TS Number	RTS Number	TS requirement description	Classification and Description of Changes	
3.17.6T#5	3.3 Relocated	LCO: 2 chnls MFW Temp; >15% power	RELOCATED:	This requirement does not meet the criterion of 10 CFR 50.36.
3.17.6T#6	3.3 Relocated	LCO: 2 chnl / line AFW Flow; >300°F	RELOCATED:	This requirement does not meet the criterion of 10 CFR 50.36. At least one channel of AFW flow per feed line is required by LCO 3.7.5 as part of AFW train operability, but redundancy is not required.
3.17.6T#7	3.4.15	LCO: 4 chnls diverse PCS leak detection; >300°F	ADMINISTRATIVE:	Requirement unchanged.
3.17.6T#8	3.4 Relocated	LCO: 2 chnls pos ind per safety vlv; >300°F	RELOCATED:	This requirement does not meet the criterion of 10 CFR 50.36.
3.17.6T#9	3.4 Relocated	LCO: 3 chnls pos ind per PORV; >210°F	RELOCATED:	This requirement does not meet the criterion of 10 CFR 50.36.
3.17.6T#10	3.4 Relocated	LCO: 2 chnls pos ind per Block Vlv; At all times	RELOCATED:	This requirement does not meet the criterion of 10 CFR 50.36.
3.17.6T#11	3.7 Relocated	LCO: 1 SWS break detector; ≥Hot Standby	RELOCATED:	This requirement does not meet the criterion of 10 CFR 50.36.
3.17.6T#12	3.3 Relocated	LCO: 4 Flux ΔT comparitors; Power Operation	RELOCATED:	The Flux - ΔT comparitors are used only for indication. They do not provide any protective function, nor do they meet any of the criterion of 10 CFR 50.36.
3.17.6T#13	3.3 Relocated	LCO: 2 chnls Rod sequence control/Alarm; >1 rod	RELOCATED:	This requirement does not meet the criterion of 10 CFR 50.36.
3.17.6T#14	3.5 Relocated	LCO: 2 Boric Acid Tank Lvl Alm; ≥Hot Standby	RELOCATED:	This requirement does not meet the criterion of 10 CFR 50.36.
3.17.6T#15	3.2.5	LCO: 1 Excore Deviation Alm; >25% power	ADMINISTRATIVE:	Requirements unchanged.
3.17.6T#16	3.2 Relocated	LCO: 4 chnls ASI Alarm; >25% power	RELOCATED:	This requirement does not meet the criterion of 10 CFR 50.36.
3.17.6T#17	3.4.6 E	LCO: 2 SDC interlocks; >200 psia	ADMINISTRATIVE:	Requirements unchanged, interlock not required when SDC in operation.
3.17.6T#18	3.1.7	LCO: 2 chnls PDIL Alm; ≥Hot Standby	ADMINISTRATIVE:	Requirements unchanged.
3.17.6T#19	3.3.10	LCO: 2 chnls Fuel Pool Monitor; W/fuel in pool	ADMINISTRATIVE:	Requirements unchanged.
3.17.6T#20	3.3.6	LCO: 2 chnls Cont Refuel Monitor; Refueling Ops	MORE RESTRICTIVE:	See APPLICABILITY discussion for LCO 3.17.6.20.

TS Number	RTS Number	TS requirement description	Classification and Description of Changes	
3.18	N/A	Deleted		
3.19	3.5.5	Iodine Removal System	ADMINISTRATIVE:	Requirement unchanged. RTS 3.5.5 provides requirements iaw STS.
3.19.1	3.5.5	LCO: 11,500# >TSP >8,300#; ≥300°F	ADMINISTRATIVE:	Requirement unchanged. RTS MODES 1, 2, and 3 applicability is equivalent to TS ≤300°F.
3.19.1	3.5.5 A.1	ACTN: TSP not w/in limits; restore; 72 hrs	ADMINISTRATIVE:	Requirement unchanged.
3.19.2a	3.5.5 B.1	ACTN: Action not met or <min chnls; Hot SD 12 hrs	MORE RESTRICTIVE:	RTS requires MODE 3 in 6 hrs iaw STS. RTS MODE 3 equivalent to TS Hot SD.
3.19.2b	3.5.5 B.2	ACTN: Action not met or <min chnls; leave applic; 48 hrs	MORE RESTRICTIVE:	RTS requires MODE 4 in 30 hrs.
3.20	5.0 Relocated	Shock Suppressors (Snubbers)		
3.20.1	5.0 Relocated	LCO: Safety Related snubbers operable; iaw system req	RELOCATED:	This requirement does not meet the criterion of 10 CFR 50.36.
3.20.1.a	5.0 Relocated	ACTN: Safety related snubber inop; Fix in 72 hrs	RELOCATED:	This requirement does not meet the criterion of 10 CFR 50.36.
3.20.1.a	5.0 Relocated	ACTN: Safety related snubber inop; Analyze or sys inop	RELOCATED:	This requirement does not meet the criterion of 10 CFR 50.36.

Comparison of existing Palisades Tech Specs and Proposed Palisades Tech Specs. (03/28/96)

TS Number	RTS Number	TS requirement description	Classification and Description of Changes	
.21	5.0 Relocated	Crane Ops & Movement of Heavy Loads	RELOCATED:	Relocation of this LCO has also been proposed by a Technical Specifications change request which was submitted on December 6, 1995, but has not (as of this writing) been reviewed or approved.
3.21	5.0 Relocated	DEF: Heavy Loads; >1300# but not fuel bundle	RELOCATED:	This requirement does not meet the criterion of 10 CFR 50.36.
3.21.1.a	5.0 Relocated	LCO: No hvy loads over PCS; Tc >225°F	RELOCATED:	This requirement does not meet the criterion of 10 CFR 50.36.
3.21.1.a	5.0 Relocated	LCO: No hvy loads over PCS; Tpress >225°F	RELOCATED:	This requirement does not meet the criterion of 10 CFR 50.36.
3.21.1.b	5.0 Relocated	LCO: No hvy loads in CB w/o req re-analysis	RELOCATED:	This requirement does not meet the criterion of 10 CFR 50.36.
3.21.2.a	5.0 Relocated	LCO: No hvy loads over fuel in main pool	RELOCATED:	This requirement does not meet the criterion of 10 CFR 50.36.
3.21.2.b	5.0 Relocated	LCO: No hvy loads over SFP; <1 Mo fuel	RELOCATED:	This requirement does not meet the criterion of 10 CFR 50.36.
3.21.2.b	5.0 Relocated	LCO: No hvy loads over SFP; <3 Mo fuel, w/o fltr	RELOCATED:	This requirement does not meet the criterion of 10 CFR 50.36.
3.21.2.b	5.0 Relocated	LCO: No hvy loads over tilt pit; <22 day fuel	RELOCATED:	This requirement does not meet the criterion of 10 CFR 50.36.
3.21.2.b	5.0 Relocated	LCO: No hvy loads over pit; <77 day fuel, w/o fltr	RELOCATED:	This requirement does not meet the criterion of 10 CFR 50.36.
3.21.2.d (1)	5.0 Relocated	LCO: No hvy loads over 649'lvl; w/o i'lk or s'visor	RELOCATED:	This requirement does not meet the criterion of 10 CFR 50.36.
3.21.2.d (2)	5.0 Relocated	LCO: No hvy loads over 649' during fuel handling	RELOCATED:	This requirement does not meet the criterion of 10 CFR 50.36.
3.21.2.e	5.0 Relocated	LCO: No >25 T loads over fuel pool w/o evaluation	RELOCATED:	This requirement does not meet the criterion of 10 CFR 50.36.
3.21.2.f	5.0 Relocated	LCO: No hvy loads over 649' w/o req re-analysis	RELOCATED:	This requirement does not meet the criterion of 10 CFR 50.36.
3.21.2.g	5.0 Relocated	LCO: Do Not move past fuel pool w/o interlocks; All times	RELOCATED:	This requirement does not meet the criterion of 10 CFR 50.36.

Comparison of existing Palisades Tech Specs and Proposed Palisades Tech Specs. (03/28/96)

TS Number	RTS Number	TS requirement description	Classification and Description of Changes	
3.22		Fire Protection System (Deleted)		
3.23	3.2	Power Distribution Limits		
3.23.1	3.2.1	LCO: LHR <COLR limit; >50% RTP	MORE RESTRICTIVE:	Added Incore Alarm System Operable to ensure it can be used for LHR monitoring.
3.23.1 A1	3.2.1 A.1	ACTN: >4 incore alms; Reduce LHR in 1 hr or be <50%	ADMINISTRATIVE:	Requirement unchanged.
3.23.1 A2	3.2.1 B.1.3	ACTN: AO >Target; stop using excore for LHR	ADMINISTRATIVE:	Requirement unchanged.
3.23.1 A2	3.2.1 B.2.1/.2	ACTN: Alm inop; be <85% w/in 2 hrs & follow A3	ADMINISTRATIVE:	Reworded for clarity.
3.23.1 A3	3.2.1 B.2.2	ACTN: Incore alm inop for LHR; Manual readings req	ADMINISTRATIVE:	Requirement unchanged.
3.23.1 A3	3.2.1 C.1	ACTN: Manual readings >alm; Follow Action A1	ADMINISTRATIVE:	Requirement unchanged.
3.23.1 A1	3.2.1 C	COND: Req action & ass Comp time not met	ADMINISTRATIVE:	Requirement unchanged.
3.23.1 A1	3.2.1 C.1	ACTN: Be <50% RTP; 2 hrs	ADMINISTRATIVE:	Requirement unchanged.
3.23.2	3.2.2	LCO: Radial Peaking w/in COLR; >25% RTP	ADMINISTRATIVE:	Requirement unchanged.
3.23.2 A1	3.2.2 A/B	ACTN: <50% & Fr>limit; HSD w/in 6 hrs	LESS CONSERVATIVE:	The action has been changed to reduce power to below applicability range of 25% RTP. This places the reactor in a conservative state with ample thermal margin.
3.23.2 A2	3.2.2 A.1	ACTN: >50% & Fr>limit; Reduce pwr; 6 hrs	ADMINISTRATIVE:	The action has been changed to reflect the standard. The power restriction stated by the equation in 3.23.2 A2 is relocated to the COLR. Reducing thermal power to bring the combination of thermal power and peaking to within limits is outlined in the COLR and calls upon the equations stated in the COLR or radial peaking and power level.
3.23.3	3.2.3	LCO: Tq <5%; W/>25% RTP	ADMINISTRATIVE:	
3.23.3 A1	3.2.3 A	ACTN: 10% >Tq >5%; do Action a, b, or c	ADMINISTRATIVE:	
3.23.3 A1.a	3.2 Deleted	ACTN: 10% >Tq >5%; fix w/in 2 hrs	ADMINISTRATIVE:	This is omitted from RTS, correction to within limits is always an option.
3.23.3 A1.b	3.2.3 A.1	ACTN: 10% >Tq >5%; check Fr w/in 2 hrs	ADMINISTRATIVE:	Requirement unchanged.
3.23.3 A1.b	3.2.3 A.1	ACTN: 10% >Tq >5%; check Fr in limit; Each 8 hrs	ADMINISTRATIVE:	Requirement unchanged.

TS Number	RTS Number	TS requirement description	Classification and Description of Changes	
3.23.3 A1.c	3.2.3 A.1	ACTN: 10% >Tq >5%; be <85% & check Fr	ADMINISTRATIVE:	Requirement unchanged.
3.23.3 A1.c	3.2.3 A.1	ACTN: 10% >Tq >5%; check Fr in limit; Each 8 hrs	ADMINISTRATIVE:	Requirement unchanged.
3.23.3 A2	3.2.3 B	ACTN: Tq >10%; Do Action a or b	ADMINISTRATIVE:	Requirement unchanged.
3.23.3 A2.a	3.2 Deleted	ACTN: Tq >10%; Fix w/in 2 hrs	ADMINISTRATIVE:	This is excluded from the standard, correction to within limits is always an option.
3.23.3 A2.b	3.2.3 B.1	ACTN: Tq >10%; Be <50% in 2 hrs	ADMINISTRATIVE:	Requirement unchanged.
3.23.3 A2.b	3.2.3 B.2	ACTN: Tq >10%; check Fr in limit; Each 8 hrs	ADMINISTRATIVE:	Requirement unchanged.
3.23.3 A3	3.2.3 C.1	ACTN: Tq >15%; SD w/in 12 hrs	LESS RESTRICTIVE:	Changed action to be <25% RTP within 12 hrs. This places the plant in a conservative condition and takes the plant out of the applicability range.

Comparison of existing Palisades Tech Specs and Proposed Palisades Tech Specs. (03/28/96)

TS Number	RTS Number	TS requirement description		Classification and Description of Changes	
4.0	3.0 - (SRs)		Surveillance Requirements		
4.0.1	3.0.1(SR)	SR:	Surv applicability same as LCO	ADMINISTRATIVE:	Very similar; used STS words.
4.0.2	3.0.2(SR)	SR:	Surv req frequency	ADMINISTRATIVE:	Very similar; used STS words.
4.0.2	3.0.2(SR)	SR:	Max freq extension, 1.25x	ADMINISTRATIVE:	Very similar; used STS words.
4.0.3	3.0.3(SR)	SR:	Failing SR implies noncompliance w/LCO	ADMINISTRATIVE:	Very similar; used STS words.
4.0.4	3.0.4(SR)	SR:	SRs must be current to enter condition in LCO	ADMINISTRATIVE:	Very similar; used STS words.
4.0.5	5.5.7	SR:	Surv Req for ASME testing	ADMINISTRATIVE:	Moved to program 5.5.7 iaw STS.

TS Number	RTS Number	TS requirement description		Classification and Description of Changes	
4.1	3.4.12		Overpressure Protection System Tests		
4.1.1	5.5.7	SR:	PORV; ASME sec XI testing	ADMINISTRATIVE:	Moved to Admin Cont Section.
4.1.2	3.4.12.5	SR:	PORV actuation chnl; calibration; 18 months	ADMINISTRATIVE:	Requirements unchanged.
4.1.3(a)	3.4.11.2	SR:	PORV; cycle when >CSD; 18 months	ADMINISTRATIVE:	Requirements unchanged.
4.1.3(b)	3.4.11.1	SR:	Block valve; Cycle in CSD if not done w/in 92 days	ADMINISTRATIVE:	Requirements unchanged.
4.1.4(a)	3.4.12.4	SR:	PORV actuation chnl; functional test; 31 days	ADMINISTRATIVE:	Requirements unchanged.
4.1.4(b)	3.4.12.3	SR:	Verify block open during PORV use; 72 hrs	ADMINISTRATIVE:	Requirements unchanged.
4.1.5	3.4.12.1	SR:	Verify HPSI blocked; Each 12 hrs when <300°F	ADMINISTRATIVE:	Requirements unchanged.

TS Number	RTS Number	TS requirement description		Classification and Description of Changes	
4.2			Equipment and Sampling Tests		
4.2.1		TBL:	Sampling Frequency		
4.2.1.1	3.4.16.1	SR:	PCS Gross activity; 3/wk, 72 hrs max (w/>500°F)	LESS RESTRICTIVE:	Frequency increased to 7 days iaw STS.
4.2.1.1	3.4 Relocated	SR:	PCS Gross Gamma; Continuously w/>500°F	RELOCATED:	This requirement does not meet the criterion of 10 CFR 50.36.
4.2.1.1	3.4 Relocated	ACTN:	Gross Gamma monitor inop; Sample PCS daily	RELOCATED:	This requirement does not meet the criterion of 10 CFR 50.36.
4.2.1.1	3.4.16.2	SR:	Dose equiv I-131; 14 days at power	ADMINISTRATIVE:	Requirements unchanged.
4.2.1.1	3.4.16.3	SR:	$\bar{E}$ 6 mo (>2 EFPD & 20 days since SD >2 day)	ADMINISTRATIVE:	Requirements unchanged.
4.2.1.1	3.4.16 A.1	ACTN:	Iodine Anal; 4 hrs w/DE I-131 >1 μCi/gm	ADMINISTRATIVE:	Requirements unchanged.
4.2.1.1	3.4.16.2	SR:	Iodine isotopic Anal; After a 15%/hr pwr inc	ADMINISTRATIVE:	Requirements unchanged.
4.2.1.1	3.4 Relocated	SR:	Cl & Ox; 3/wk, 72 hrs max, >210°F	RELOCATED:	This requirement does not meet the criterion of 10 CFR 50.36.
4.2.1.1	3.4 Relocated	SR:	Fl; 30 days & after welding on PCS	RELOCATED:	This requirement does not meet the criterion of 10 CFR 50.36.
4.2.1.2	3.1.1.1/3.1.2.1	SR:	PCS Boron; 2/wk	MORE RESTRICTIVE:	Frequency changed from twice per week to once per day.
4.2.1.3	3.5.4.3	SR:	SIRWT Boron; 1 Mo	ADMINISTRATIVE:	Requirement unchanged.
4.2.1.4	3.5 Relocated	SR:	CBAT Boron; 1 Mo	RELOCATED:	This requirement does not meet the criterion of 10 CFR 50.36. See discussion following LCO Section 3.2.
4.2.1.5	3.5.1.4	SR:	SIT Boron; 1 Mo	ADMINISTRATIVE:	Requirement unchanged.
4.2.1.6	3.7.14.1	SR:	SFP Boron; 1 Mo	MORE RESTRICTIVE:	Frequency changed from once per month to once per week.
4.2.1.6	3.7 Relocated	SR:	SFP Temp; cont;<1 yr fuel in tilt pit,see 3.8.5	RELOCATED:	This requirement does not meet the criterion of 10 CFR 50.36.
4.2.1.7	5.5.9	SR:	Secondary Gross Activity; 3/wk, 72 hrs max	ADMINISTRATIVE:	Secondary chemistry requirements moved to a program required by the Administrative Controls section.
4.2.1.7	3.7.13.1	SR:	Secondary DE I-131; 6 months	MORE RESTRICTIVE:	Frequency changed to once per month.
4.2.1.7	3.7.13.1	ACTN:	Sec DE I-131; 31 days w/sec gross I >10% limit	ADMINISTRATIVE:	Requirement unchanged.

TS Number	RTS Number	TS requirement description	Classification and Description of Changes	
4.2.2		TBL: Min Freq for Equipment Tests		
4.2.2.1	3.1.5.5	SR: FL Rod Drop; verify drop times; Refueling	ADMINISTRATIVE:	Requirement unchanged.
4.2.2.2	3.1.5.4	SR: All Rods; exercise; 92 days	ADMINISTRATIVE:	Requirement unchanged.
4.2.2.3	3.4.10.1	SR: Pzr Safety Valves; check set points; Refueling	ADMINISTRATIVE:	Requirement unchanged.
4.2.2.4	3.7.1.1	SR: Test Main Steam Safety Valves' setpoints	ADMINISTRATIVE:	Changes from 5/reout to 5/2yrs & 24/5years per ASME code. Requirements are essentially equivalent.
4.2.2.5	3.3 Relocated	SR: Ref Sys Interlocks; verify function; B4 refuel	RELOCATED:	This requirement does not meet the criterion of 10 CFR 50.36.
4.2.2.6	3.7.8.3	SR: SWS Valves; Verify SIS Actuation; Refueling	ADMINISTRATIVE:	Requirement unchanged.
4.2.2.6	3.7.8.4	SR: SWS Valves; Verify RAS Actuation; Refueling	ADMINISTRATIVE:	Requirement unchanged.
4.2.2T#7	3.4.13.1	SR: Primary Sys Leakage; evaluate; Daily	LESS RESTRICTIVE:	Frequency increased to 72 hrs iaw STS.
4.2.2.8	3.8.3.1	SR: DG Fuel Supply; inventory; Daily	ADMINISTRATIVE:	Requirement unchanged.
4.2.2.9	3.5 Relocated	SR: Verify BA Heat Trace Temp; Daily	RELOCATED:	This requirement does not meet the criterion of 10 CFR 50.36. See discussion following LCO Section 3.2.
4.2.2.10	3.5.1.2	SR: Verify SIT Lvl; Each shift	ADMINISTRATIVE:	Frequency specified as "12 hrs" rather than "Each Shift". Otherwise unchanged.
4.2.2.10	3.5.1.3	SR: Verify SIT Pressure; Each shift	ADMINISTRATIVE:	Frequency specified as "12 hrs" rather than "Each Shift". Otherwise unchanged.
4.2.2.11.a	3.6.8.1	SR: H2 Recomb; verify >700°F in 90 min; 6 months	LESS RESTRICTIVE:	RTS Frequency is 18 months iaw STS. SR now calls out Functional test; details are provided in plant procedure.
4.2.2.11.a	3.6.8.1	SR: H2 Recomb; verify @ 700°F, max pwr >60kW; 6 mo	LESS RESTRICTIVE:	RTS Frequency is 18 months iaw STS. SR now calls out Functional test; details are provided in plant procedure.
4.2.2.11.b.1	3.6 Relocated	SR: H2 Recomb; I&C chnl calibration; Refueling	RELOCATED:	RTS doesn't include this iaw STS. RTS 18 month Frequency is equivalent to refueling.
4.2.2.11.b.2	3.6.8.2	SR: H2 Recomb; visual inspection; Refueling	ADMINISTRATIVE:	RTS 18 month Frequency is equivalent to refueling cycle.
4.2.2.11.b.3	3.6.8.3	SR: H2 Recomb; heater cont & ground test; Refuel	ADMINISTRATIVE:	RTS 18 month Frequency is equivalent to refueling cycle.
4.2.2.12.a	3.5.5.1	SR: Verify TSP quantity; 18 months	ADMINISTRATIVE:	Requirement unchanged.

TS Number	RTS Number	TS requirement description	Classification and Description of Changes	
4.2.2.12.b	3.5.5.2	SR: Verify TSP Quality; 18 months	ADMINISTRATIVE:	Requirement unchanged.
4.2.2.13.a	3.6.3.1	SR: Purge & Vent Valve; check CR ind closed; 24 hrs	LESS RESTRICTIVE:	SR Freq changed to 31 days iaw STS. Valves which are energized to open and are electrically locked closed are equivalent to mechanically locked closed valves. RTS frequency is iaw STS.
4.2.2.13.b	3.6.3.5	SR: Purge & Vent Valve; leak rate test; 6 months	MORE RESTRICTIVE:	RTS adds a requirement to test w/in 92 days after opening, iaw STS. RTS 184 day Frequency is equivalent to TS 6 months frequency.
4.2.2.14.a	3.4.5.3 3.4.6.3 3.4.7.3 3.4.8.2	SR: Verify PCP alignments during SDC; 7 days	ADMINISTRATIVE:	Requirements unchanged.
4.2.2.14.b	3.4.5.2 3.4.6.2 3.4.7.2	SR: Verify SGs operable during SDC ops; 12 hrs	ADMINISTRATIVE:	Requirement unchanged.
4.2.2.14.c	3.4.5.1 3.4.6.1 3.4.7.1 3.4.8.1	SR: Verify pump operating for SDC; 12 hrs	ADMINISTRATIVE:	Requirement unchanged.
4.2.2.15.a	3.7.3.2	SR: Verify MFW Reg valves close on CHP; 18 months	ADMINISTRATIVE:	Requirement unchanged.
4.2.2.15.b	3.7.3.3	SR: Verify MFW Reg valves close on SGLP; 18 months	ADMINISTRATIVE:	Requirement unchanged.
4.2.3	3.7.10/.11	TBL: Hepa and Charcoal Absorber Systems		
4.2.3.a	3.7.10.1	SR: Flow through HEPA/charcoal filter; 31 days	MORE RESTRICTIVE:	Proposed SR requires operation of filter train for ≥10 hrs.
4.2.3.b.1	3.7.10.2/5.5.10	SR: CR Vent Sys; sample or replace absorber; Refuel	ADMINISTRATIVE:	Filter testing requirements moved to the Ventilation Filter Testing Program.
4.2.3.b.2	3.7.10.2/5.5.10	SR: CR Vent Sys; verify filtration; Refueling	ADMINISTRATIVE:	Filter testing requirements moved to the Ventilation Filter Testing Program.
4.2.3.b.3	3.7.10.2/5.5.10	SR: CR Vent Sys; verify absorption; Refueling	ADMINISTRATIVE:	Filter testing requirements moved to the Ventilation Filter Testing Program.
4.2.3.b	3.7.10.2/5.5.10	ACTN: After maintenance; SR 4.2.3.b.1, 2. & 3	ADMINISTRATIVE:	Filter testing requirements moved to the Ventilation Filter Testing Program.

TS Number	RTS Number	TS requirement description	Classification and Description of Changes	
4.2.3.b	3.7.10.2/5.5.10	ACTN: After paint, fire or chem; SR 4.2.3.b.1, 2. & 3	ADMINISTRATIVE:	Filter testing requirements moved to the Ventilation Filter Testing Program.
4.2.3.c.1	3.7.10.2/5.5.10.d	SR: CR Vent Sys; verify pressure drop; Refueling	ADMINISTRATIVE:	Filter testing requirements moved to the Ventilation Filter Testing Program.
4.2.3.c.2	3.7.10.3	SR: CR Vent Sys; verify recirc on CHP; Refueling	ADMINISTRATIVE:	Requirement unchanged.
4.2.3.c.2	3.7.10.4	SR: CR Vent Sys; verify recirc on CHR; Refueling	ADMINISTRATIVE:	Requirement unchanged.
4.2.3.c.3	3.7.10.5	SR: CR Vent Sys; verify CR + press; Refueling	LESS RESTRICTIVE:	The surveillance interval has been extended. Proposed frequency is 18 months "staggered". Thereby only one of the two trains will be tested each refueling.
4.2.3.c.4	3.7.12.4	SR: Bypass flow on Damper 1893; Refueling	ADMINISTRATIVE:	Requirement unchanged.
4.2.3.d	3.7.10.2/5.5.10	SR: CR Vent Sys; smpl or replace absorber; 720 hrs*	ADMINISTRATIVE:	Filter testing requirements moved to the Ventilation Filter Testing Program.
4.2.3.e	3.7.10.2/5.5.10	SR: CR Vent Sys; verify filtration; New fltrs	ADMINISTRATIVE:	Filter testing requirements moved to the Ventilation Filter Testing Program.
4.2.3.f	3.7.10.2/5.5.10	SR: CR Vent Sys; verify absorption; New absorber	ADMINISTRATIVE:	Filter testing requirements moved to the Ventilation Filter Testing Program.
4.2.3.g	3.3.1.8	SR: CR Vent Sys; check CR temp <120°F w/>105°F; 12 hrs	MORE RESTRICTIVE:	Required temperature reduced from 120°F to 90°F. This reduced temperature supports operability of the Reactor Protective System Thermal Margin Monitors. Its inclusion in RTS completes an action requested in Amendment 118.
4.2.3(g)	5.5.10 Note	NOTE: Allows 720 hrs to be extended to 1500 hrs	ADMINISTRATIVE:	Requirement unchanged.

TS Number	RTS Number	TS requirement description	Classification and Description of Changes	
4.3	3.4.11	Systems Surveillance		
4.3.a		Deleted		
4.3.b		Deleted		
4.3.c		Deleted		
4.3.d		Deleted		
4.3.e	5.0 Deleted	ADMN: Reevaluate ISI program IAW 10 CFR 50.55a(g)(5)	ADMINISTRATIVE:	Requirement is redundant to 10 CFR 50 requirement.
4.3.f	5.5.6	SR: RHX & PCP Flywhls to be inspected iaw Tbl 4.3.2	ADMINISTRATIVE:	Requirement moved to the Administrative Controls section.
4.3.g	5.0 Relocated	SR: Rx Vessel surv IAW FSAR Section 4.5.3	RELOCATED:	This requirement does not meet the criterion of 10 CFR 50.36.
4.3.h	3.4.14.1	SR: Vlvs in Tbl 4.3.1; lk test after CSD, or Maint	ADMINISTRATIVE:	Requirements unchanged.
4.3.i	3.4.14.3	ACTN: SI chk vlv leaking; verify back ups; Daily	ADMINISTRATIVE:	Requirements unchanged.
4.3.j	3.4.14.2	SR: LPSI Chk vlvs; closure check; B4 crit after SDC	ADMINISTRATIVE:	Requirements unchanged.
4.3.1	3.4.14.1	TBL: LPSI & Train 1 HPSI check valves	MORE RESTRICTIVE:	Added HLI check valve in HPSI Train 1.
4.3.1(a)3	3.4.14.1	LCO: Listed chk vlv leakage; Limits rate of change	ADMINISTRATIVE:	Requirements unchanged.
4.3.1(a)4	3.4.14 A	LCO: Listed chk vlv leakage <5 gpm	ADMINISTRATIVE:	Requirements unchanged.
4.3.1(a)5	3.4.14 Bases	ADMN: Adjust meas leakage for test press	ADMINISTRATIVE:	Affect of reducted test pressure was moved to Basis for LCO 3.4.14 iaw STS.
4.3.2		TBL: Misc Surveillance Items		
4.3.2.1.a	5.5.7	SR: RHX; Pri Shell - Tube Sht insp; 5 yrs	ADMINISTRATIVE:	This ASME Code required testing is administered by an Administrative Controls Program.
4.3.2.1.a	5.0 Relocated	SR: RHX; Pri Head insp; 5 yrs	ADMINISTRATIVE:	This ASME Code required testing is administered by an Administrative Controls Program.
4.3.2.2	5.5.6	SR: PCP; Flywheel insp; Refueling	ADMINISTRATIVE:	Moved to Administrative Controls section.
4.4		Deleted		

TS Number	RTS Number	TS requirement description	Classification and Description of Changes	
4.5	3.6	Containment Tests	ADMINISTRATIVE:	RTS requirements moved iaw STS.
4.5.1	3.6.1.1	SR: Integrated Leak Tests (ILRT)	ADMINISTRATIVE:	RTS 3.6.1.1 refers to Containment Leak Rate Testing Program iaw STS.
4.5.2	3.6.1.1	Local Leak Detection Tests (LLRT)	ADMINISTRATIVE:	RTS 3.6.1.1 refers to Containment Leak Rate Testing Program described in 5.5.14 iaw STS.
4.5.2.a(1)	3.6 Relocated	ADMN: LLRT press >55#	RELOCATED:	This item contains specific detail 10 CFR 50, Appendix J requirements. STS doesn't repeat these programmatic details. The details are located in the FSAR. These requirements are implemented by RTS 3.6.1.1 and the Containment Leak Rate Program 5.5.14.
4.5.2.a(2)	3.6 Relocated	ADMN: Air Lock between Seal Tests >10#	RELOCATED:	This item contains specific detail 10 CFR 50, Appendix J requirements. STS doesn't repeat these programmatic details. The details are located in the FSAR. These requirements are implemented by RTS 3.6.1.1 and the Containment Leak Rate Program 5.5.14.
4.5.2.a(3)	3.6 Relocated	ADMN: Acceptable methods, halogen, soap bubble, etc	RELOCATED:	This item contains specific detail 10 CFR 50, Appendix J requirements. STS doesn't repeat these programmatic details. The details are located in the FSAR. These requirements are implemented by RTS 3.6.1.1 and the Containment Leak Rate Program 5.5.14.
4.5.2.a(4a)	3.6 Relocated	SR: Penetrations; LLRT	RELOCATED:	This item contains specific detail 10 CFR 50, Appendix J requirements. STS doesn't repeat these programmatic details. The details are located in the FSAR. These requirements are implemented by RTS 3.6.1.1 and the Containment Leak Rate Program 5.5.14.
4.5.2.a(4b)	3.6.2.1	SR: Air lock seals; LLRT	ADMINISTRATIVE:	Requirement unchanged in RTS.
4.5.2.a(4b)	3.6 Relocated	SR: Equip hatch seals; LLRT	RELOCATED:	This item contains specific detail 10 CFR 50, Appendix J requirements. STS doesn't repeat these programmatic details. The details are located in the FSAR. These requirements are implemented by RTS 3.6.1.1 and the Containment Leak Rate Program 5.5.14.
4.5.2.a(4c)	3.6 Relocated	SR: Fuel Xfer Tube; LLRT	RELOCATED:	This item contains specific detail 10 CFR 50, Appendix J requirements. STS doesn't repeat these programmatic details. The details are located in the FSAR. These requirements are implemented by RTS 3.6.1.1 and the Containment Leak Rate Program 5.5.14.

TS Number	RTS Number	TS requirement description	Classification and Description of Changes	
4.5.2.a(4d)	3.6 Relocated	SR: Testable Iso vlvs; LLRT	RELOCATED:	This item contains specific detail 10 CFR 50, Appendix J requirements. STS doesn't repeat these programmatic details. The details are located in the FSAR. These requirements are implemented by RTS 3.6.1.1 and the Containment Leak Rate Program 5.5.14.
4.5.2.a(4e)	3.6 Relocated	SR: Cont comp repaired for ILRT	RELOCATED:	This item contains specific detail 10 CFR 50, Appendix J requirements. STS doesn't repeat these programmatic details. The details are located in the FSAR. These requirements are implemented by RTS 3.6.1.1 and the Containment Leak Rate Program 5.5.14.
4.5.2.b(1)	5.5.14	LCO: Cont Leakage, as meas by LLRT, ≤0.60 La	ADMINISTRATIVE:	Requirement unchanged in RTS. RTS 3.6.1.1 implements Containment Leak Rate Testing Program 5.5.14, which provides this acceptance criteria iaw STS.
4.5.2.b(2)	5.5.14	LCO: Air Lock between seal test leakage ≤0.023La.	ADMINISTRATIVE:	Requirement unchanged in RTS. RTS 3.6.2.1 implements Containment Leak Rate Testing Program 5.5.14, which provides this acceptance criteria iaw STS.
4.5.2.c(1)	3.6.1 A.1	ACTN: LLRT Leak >limit; initiate fix; Immediately	ADMINISTRATIVE:	RTS and STS require restoration within 1 hr. This is the equivalent of present TS requirement to initiate repairs immediately.
4.5.2.c(1)	3.6.1.A1	ACTN: LLRT Leak fix not complete in 48 hrs;	MORE RESTRICTIVE:	RTS requires completion within 1 hr. Requirement HSD in 6 hrs then CSD within 3 hrs. Requirement Unchanged. PAL TS define hot shutdown to be similar to MODE 3. Total time to cold shutdown remains 36 hrs.
4.5.2.c(2)	3.6.1 A.1	ACTN: Total CB Lkg >La; HSD in 6 hrs & CSD in 30	MORE RESTRICTIVE:	RTS requires action at >.6La. PAL TS define hot shutdown to be similar to MODE 3. Total time to cold shutdown remains 36 hrs.
4.5.2.c(3)	3.6.2 A.1	ACTN: Air Lock Lkg >.023 La; init fix; Immediately	ADMINISTRATIVE:	RTS requires verifying an operable door is closed in 1 hr iaw STS. The words initiate repairs immediately don't appear in STS, but it is assumed this will take place whenever equipment is inoperable. The 1 hr RTS AOT indicates that urgent action is required.
4.5.2.c(3)	3.6.2 A 2/3	ACTN: Air Lock Lkg >.023 La >7 days; HSD in 6 hrs	LESS RESTRICTIVE:	RTS requires locking operable door closed in 24 hrs and verifying the operable door is locked every 31 days iaw STS. RTS allows limited access thru the operable door.

TS Number	RTS Number	TS requirement description	Classification and Description of Changes	
4.5.2.c(3)	3.6.2 A 1/2	ACTN: Door Lkg >.6 La; declare inop, lock other door	LESS RESTRICTIVE:	RTS requires locking operable door closed in 24 hrs, current TS requires locking door in 1 hr. All other actions are more restrictive. RTS allows limited access thru the operable door.
4.5.2.c(3)	3.6.2 A.3	ACTN: Door Lkg >.6 La >48 hrs; HSD/6 hrs, CSD/30	LESS RESTRICTIVE:	RTS required verifying operable door lock closed once per 31 days. RTS allows limited access thru the operable door.
4.5.2.c(3)	3.6.2 A	XCPT: 4.5.2.c(2) (SD if lkg >La) N/A; 1 door bad, 1 OK	ADMINISTRATIVE:	RTS allow continued plant operation with 1 operable door iaw STS.
4.5.2.d(1)	3.6 Relocated	SR: Penetrations and iso vlvs; do LLRT; Refuel/2 yrs	RELOCATED:	This item contains specific detail 10 CFR 50, Appendix J requirements. STS doesn't repeat these programmatic details. The details are located in the FSAR. These requirements are implemented by RTS 3.6.1.1 and the Containment Leak Rate Program 5.5.14.
4.5.2.d(1)a	3.6 Relocated	SR: Cont Equip Hatch; LLRT; After use	RELOCATED:	This item contains specific detail 10 CFR 50, Appendix J requirements. STS doesn't repeat these programmatic details. The details are located in the FSAR. These requirements are implemented by RTS 3.6.1.1 and the Containment Leak Rate Program 5.5.14.
4.5.2.d(1)a	3.6 Relocated	SR: Fuel Xfer Tube; LLRT; After use	RELOCATED:	This item contains specific detail 10 CFR 50, Appendix J requirements. STS doesn't repeat these programmatic details. The details are located in the FSAR. These requirements are implemented by RTS 3.6.1.1 and the Containment Leak Rate Program 5.5.14.
4.5.2.d(1)b	3.6 Relocated	SR: Air lock; full penetration test; 6 months	RELOCATED:	This item contains specific detail 10 CFR 50, Appendix J requirements. STS doesn't repeat these programmatic details. The details are located in the FSAR. These requirements are implemented by RTS 3.6.1.1 and the Containment Leak Rate Program 5.5.14.
4.5.2.d(1)b	3.6 Relocated	SR: Air lock; test; After use	RELOCATED:	This item contains specific detail 10 CFR 50, Appendix J requirements. STS doesn't repeat these programmatic details. The details are located in the FSAR. These requirements are implemented by RTS 3.6.1.1 and the Containment Leak Rate Program 5.5.14.
4.5.2.d(2)	3.6 Relocated	SR: Testable Iso vlvs; stroke test; 3 months	RELOCATED:	This item is an ASME Section XI requirement. STS doesn't repeat these details. The details are located in the FSAR. These requirements are implemented by RTS 3.6.3.4 and the Inservice Inspection and Testing Program 5.5.7.

TS Number	RTS Number	TS requirement description	Classification and Description of Changes	
4.5.2.d(2)	3.6 Relocated	SR: Untestable Iso vlvs; stroke test; Each cold SD	RELOCATED:	This item is an ASME Section XI requirement. STS doesn't repeat these details. The details are located in the FSAR. These requirements are implemented by RTS 3.6.3.4 and the Inservice Inspection and Testing Program 5.5.7.
4.5.3	5.5.2	Recirculation [sic] Heat Removal Sys	ADMINISTRATIVE:	Requirements remain unchanged. This item contains specific programmatic requirement details. STS Section 3 doesn't repeat these details. The detailed requirements are contained in and implemented by RTS 5.5.2, Primary Coolant Sources Outside Containment.
4.5.3.a(1)	5.5.2	SR: SD Clg sys; hydro piping outside CB; Refueling	ADMINISTRATIVE:	Requirements remain unchanged. This item contains specific programmatic requirement details. STS Section 3 doesn't repeat these details. The detailed requirements are contained in and implemented by RTS 5.5.2, Primary Coolant Sources Outside Containment.
4.5.3.a(2)	5.5.2	SR: SD Clg sys; hydro SD Clg suction; Refueling	ADMINISTRATIVE:	Requirements remain unchanged. This item contains specific programmatic requirement details. STS Section 3 doesn't repeat these details. The detailed requirements are contained in and implemented by RTS 5.5.2, Primary Coolant Sources Outside Containment.
4.5.3.a(3)	5.5.2	SR: SD Clg sys; visual inspection; iaw 6.15 (refuel)	ADMINISTRATIVE:	Requirements remain unchanged. This item contains specific programmatic requirement details. STS Section 3 doesn't repeat these details. The detailed requirements are contained in and implemented by RTS 5.5.2, Primary Coolant Sources Outside Containment.
4.5.3.a(3)	5.5.2	SR: SD Clg sys; Measure leakage; iaw 6.15 (refuel)	ADMINISTRATIVE:	Requirements remain unchanged. This item contains specific programmatic requirement details. STS Section 3 doesn't repeat these details. The detailed requirements are contained in and implemented by RTS 5.5.2, Primary Coolant Sources Outside Containment.
4.5.3.b	5.5.2	LCO: Leakage from SDC sys <0.2 gpm	ADMINISTRATIVE:	Requirements remain unchanged. This item contains specific programmatic requirement details. STS Section 3 doesn't repeat these details. The detailed requirements are contained in and implemented by RTS 5.5.2, Primary Coolant Sources Outside Containment.
4.5.3.c	3.6 Relocated	ACTN: SDC leakage exceeds limit; Repair as req	RELOCATED:	These requirements are located in plant procedures and are implemented by RTS 5.5.2, Primary Coolant Source Outside Containment.

TS Number	RTS Number	TS requirement description	Classification and Description of Changes	
4.5.4	3.6.1.2	Surveillance for Prestressing Sys	ADMINISTRATIVE:	RTS 3.6.1.2 refers to Containment Structural Integrity Surveillance Program described in 5.5.5 iaw STS.
4.5.4.a	3.6 Relocated	SR: CB Tendon; Inspect; 5 yr interval, 1 yr variance	RELOCATED:	This item contains specific detailed Reg. Guide 1.35, Rev. 3 requirements. STS doesn't repeat these programmatic details. The details are located in the plant procedures. These requirements are implemented by RTS 3.6.1.2 and the Containment Structural Integrity Surveillance Program 5.5.5.
4.5.4.b	3.6 Relocated	ADMN: Selection of tendons for inspection	RELOCATED:	This item contains specific detailed Reg. Guide 1.35, Rev. 3 requirements. STS doesn't repeat these programmatic details. The details are located in the plant procedures. These requirements are implemented by RTS 3.6.1.2 and the Containment Structural Integrity Surveillance Program 5.5.5.
4.5.4.b.1	3.6 Relocated	ADMN: >4 dome tendons w/1 from each group	RELOCATED:	This item contains specific detailed Reg. Guide 1.35, Rev. 3 requirements. STS doesn't repeat these programmatic details. The details are located in the plant procedures. These requirements are implemented by RTS 3.6.1.2 and the Containment Structural Integrity Surveillance Program 5.5.5.
4.5.4.b.2	3.6 Relocated	ADMN: >4 vertical tendons	RELOCATED:	This item contains specific detailed Reg. Guide 1.35, Rev. 3 requirements. STS doesn't repeat these programmatic details. The details are located in the plant procedures. These requirements are implemented by RTS 3.6.1.2 and the Containment Structural Integrity Surveillance Program 5.5.5.
4.5.4.b.3	3.6 Relocated	ADMN: >5 hoop tendons	RELOCATED:	This item contains specific detailed Reg. Guide 1.35, Rev. 3 requirements. STS doesn't repeat these programmatic details. The details are located in the plant procedures. These requirements are implemented by RTS 3.6.1.2 and the Containment Structural Integrity Surveillance Program 5.5.5.
4.5.4.c	3.6 Relocated	ADMN: Field testing requirements	RELOCATED:	This item contains specific detailed Reg. Guide 1.35, Rev. 3 requirements. STS doesn't repeat these programmatic details. The details are located in the plant procedures. These requirements are implemented by RTS 3.6.1.2 and the Containment Structural Integrity Surveillance Program 5.5.5.

TS Number	RTS Number	TS requirement description	Classification and Description of Changes	
4.5.4.d	3.6 Relocated	ADMN: Lab testing requirements	RELOCATED:	This item contains specific detailed Reg. Guide 1.35, Rev. 3 requirements. STS doesn't repeat these programmatic details. The details are located in the plant procedures. These requirements are implemented by RTS 3.6.1.2 and the Containment Structural Integrity Surveillance Program 5.5.5.
4.5.4.e	3.6 Relocated	ADMN: Acceptance criterion	RELOCATED:	This item contains specific detailed Reg. Guide 1.35, Rev. 3 requirements. STS doesn't repeat these programmatic details. The details are located in the plant procedures. These requirements are implemented by RTS 3.6.1.2 and the Containment Structural Integrity Surveillance Program 5.5.5.
4.5.4.f	3.6 Relocated	ADMN: Report failures iaw 6.9.2 (Reportable Events)	RELOCATED:	This item contains specific detailed Reg. Guide 1.35, Rev. 3 requirements. STS doesn't repeat these programmatic details. The details are located in the plant procedures. These requirements are implemented by RTS 3.6.1.2 and the Containment Structural Integrity Surveillance Program 5.5.5.
4.5.5	3.6.1.2	End Anchorage Concrete Surveillance	ADMINISTRATIVE:	RTS 3.6.1.2 refers to Containment Structural Integrity Surveillance Program described in 5.5.5 iaw STS.
4.5.5.a/b	3.6 Relocated	SR: Tendon end anchorage; visual insp; Refueling	RELOCATED:	This item contains specific programmatic requirement details. STS doesn't repeat these programmatic details. The details are located in the plant procedures. These requirements are implemented by RTS 3.6.1.2 and the Containment Structural Integrity Surveillance Program 5.5.5.
4.5.5.a	3.6 Relocated	ACTN: Cracks >0.01in; Evaluate & document	RELOCATED:	This item contains specific programmatic requirement details. STS doesn't repeat these programmatic details. The details are located in the plant procedures. These requirements are implemented by RTS 3.6.1.2 and the Containment Structural Integrity Surveillance Program 5.5.5.
4.5.5.c	3.6 Relocated	ADMN: Addnl acceptance criteria	RELOCATED:	This item contains specific programmatic requirement details. STS doesn't repeat these programmatic details. The details are located in the plant procedures. These requirements are implemented by RTS 3.6.1.2 and the Containment Structural Integrity Surveillance Program 5.5.5.

TS Number	RTS Number		TS requirement description	Classification	Description of Changes
4.5.6	3.6.3		Containment Isolation Valves	ADMINISTRATIVE:	RTS 3.6.3 provides requirements iaw STS.
4.5.6.a	3.6.3.4	SR:	Cont iso vlvs; cycle & time; After maintenance	ADMINISTRATIVE:	RTS doesn't list this detail but post maintenance testing is required to verify operability.
4.5.6.b	3.6.3.6/7	SR:	Cont iso vlvs; CHR/CHP closure test; Refueling	ADMINISTRATIVE:	RTS 3.6.3.6/7 provides requirements iaw STS.
4.5.6.c	3.6.3.4	SR:	Cont iso vlv close times iaw t 3.6.1	ADMINISTRATIVE:	RTS 3.6.3.4 requirements iaw STS.
4.5.7	N/A		Penetration surveillance - Deleted		
4.5.8	3.6.1.2		Dome Delamination Surveillance	ADMINISTRATIVE:	RTS 3.6.1.2 refers to Containment Structural Integrity Surveillance Program described in 5.5.5 iaw STS. Requirements Placed in Containment Structural Integrity Testing Program, iaw STS.
4.5.8	3.6 Relocated	ACTN:	>5% dome tendons need retensioning; Inspect	RELOCATED:	This item contains specific programmatic requirement details. STS doesn't repeat these programmatic details. The details are located in the plant procedures. These requirements are implemented by RTS 3.6.1.2 and the Containment Structural Integrity Surveillance Program 5.5.5.
4.5.8	3.6 Relocated	ADMN:	Report delamination insp results to NRC	RELOCATED:	This item contains specific programmatic requirement details. STS doesn't repeat these programmatic details. The details are located in the plant procedures. These requirements are implemented by RTS 3.6.1.2 and the Containment Structural Integrity Surveillance Program 5.5.5.

TS Number	RTS Number		TS requirement description	Classification and Description of Changes	
4.6	3.5 & 3.6		SI and Spray tests	ADMINISTRATIVE:	RTS 3.5 and 3.6 provide requirements iaw STS.
4.6.1	3.5		Safety Injection System		
4.6.1.a	3.5.2.6	SR:	SI sys logic; test w test ckt; Refueling	ADMINISTRATIVE:	SR broken into several separate SRs supporting different RTS LCOs. SR 3.5.2.6 Verifies ECCS valve actuation.
4.6.1.a	3.5.2.8	SR:	SI sys logic; test w test ckt; Refueling	ADMINISTRATIVE:	SR broken into several separate SRs supporting different RTS LCOs. SR 3.5.2.8 Verifies ECCS Pump actuation.
4.6.2	3.6.7		Cont Spray System	ADMINISTRATIVE:	RTS 3.6.7 provides requirements iaw STS.
4.6.2.a	3.6.7.6/.7	SR:	Cont Spray; integrated sys test; Refueling	ADMINISTRATIVE:	RTS SR freq changed to 18 mo iaw STS. TS refueling frequency is equivalent to STS 18 months.
4.6.2.b	3.6.7.9	SR:	Spray Nozzles; verify open; 5 years	LESS RESTRICTIVE:	RTS interval is 10 years iaw STS.
4.6.2.b	3.6 Relocated	SR:	Visual Observation	ADMINISTRATIVE:	ASME Section XI provides requirements. STS doesn't repeat these details. The details are located in plant procedures. SR are implemented by RTS 3.6.7.9 and the Inservice Inspection and Testing Program 5.5.7.
4.6.3	3.5 & 3.6		Pumps		
4.6.3.a	3.5 Relocated	SR:	HPSI & LPSI pumps; start, alt controls; 3 mo	RELOCATED:	No similar requirement in STS or in ASME code, details of testing will be in Surv procedure.
4.6.3.a	3.5.2.4	SR:	HPSI & LPSI pumps; verify head; 3 months	ADMINISTRATIVE:	Requirement unchanged.
4.6.3.b	3.5 Deleted	SR:	HPSI & LPSI pumps run >15 min	ADMINISTRATIVE:	ASME requirement is >5 min; actual testing takes about 30 minutes, so there is actually no change in requirement. There is no similar requirement STS.
4.6.3.a	3.6 Relocated	SR:	Cont Spray pumps; Start, alt controls	RELOCATED:	This item contains specific programmatic details. The details are located in plant procedures. These requirements are implemented by RTS 3.6.7.5 and Inservice Inspection Testing Program 5.5.7.
4.6.3.a	3.6.7.5	SR:	Cont Spray pumps; verify head; 3 months	ADMINISTRATIVE:	RTS 3.6.7.5 contains requirements and refers to Inservice Inspection and Testing Program. RTS 5.5.7, Inservice Inspection and Testing Program implements the plant procedures which specify the 3 month or Quarterly Frequency.

TS Number	RTS Number	TS requirement description		Classification and Description of Changes	
4.6.3.b	3.6 Deleted	SR:	Cont Spray pumps; Run >15 min	ADMINISTRATIVE:	ASME requirement is >5 min; actual testing takes about 30 min so there is actually no change in requirement. There is no similar requirement in STS.
4.6.3.b	3.5.2.4	ADMN:	Acceptance criteria (HPSI & LPSI pumps)	ADMINISTRATIVE:	Requirement unchanged.
4.6.3.b	3.6.7.5	ADMN:	Acceptance criteria (Spray pumps)	ADMINISTRATIVE:	Requirement unchanged in RTS 3.6.7.5 iaw STS.
4.6.4			Valves		
4.6.4.a	3.5.1.1	SR:	Verify SIT isolation vlv oper; 7 days B4 startup	MORE RESTRICTIVE:	Frequency changed to 12 hrs, iaw STS.
4.6.4.b	3.5.2.1 & .3	SR:	Verify CV-3006 open w air isol; 7 days B4 startup	MORE RESTRICTIVE:	SR 3.5.2.1 verifies valve locked open each 12 hrs; SR 3.5.2.3 verifies air isolated each 31 days.
4.6.4.c	3.5.2.1	SR:	Verify CV-3027 & 3056 open; 7 days B4 startup	MORE RESTRICTIVE:	Frequency changed to 12 hrs.
4.6.4.d	3.6 Relocated	SR:	Verify Spray Vlv manual control; 18 months	RELOCATED:	ASME Section XI test detail. Required by 10 CFR 50 and not located in RTS iaw STS. Requirement located in plant procedures and implemented by RTS 5.5.5, Inservice Inspection and Testing Program.
4.6.5	3.6.7		Containment Air Cooling System		
4.6.5.a	3.6.7.8	SR:	Fans; op check; refueling	ADMINISTRATIVE:	RTS 3.6.7.8 provides requirements iaw STS. RTS defines Refueling Frequency as 18 months.
4.6.5.a	3.7.8.3	SR:	Vlvs; op check; refueling	ADMINISTRATIVE:	RTS 3.7.8.3 provides requirements iaw STS. RTS defines Refueling Frequency as 18 months.
4.6.5.b	3.6.7.2	SR:	Air Cooler Fans; exercised; 3 months	MORE RESTRICTIVE:	RTS freq changed to 31 days iaw STS.
4.6.5.b	3.6 Relocated	SR:	Air Cooler Vlvs; exercised; 3 months	RELOCATED:	ASME Section XI test detail. Required by 10 CFR 50 and not located in RTS iaw STS. Requirement located in plant procedures and implemented by RTS 5.5.5, Inservice Inspection and Testing Program.

TS Number	RTS Number	TS requirement description		Classification and Description of Changes	
4.7	3.8		Emergency Power System Periodic Tests		
4.7.1	3.8.1		Diesel Generators		
4.7.1.a	3.8.1.2	SR:	DGs; start manually; 1 Mo	ADMINISTRATIVE:	The timing requirement was reworded to more closely match STS, but to retain the existing requirement to be "ready for loading" within 10 seconds. No change is proposed for the testing frequency.
4.7.1.a	3.8 Relocated	SR:	DGs; alternate tested start ckt; 1 Mo	RELOCATED:	The requirement to test alternate circuits is not included in the proposed wording. Since the DG is not assumed to be single failure proof, the detail of verifying that both of the starting circuits function will be left to the testing procedure, as is done in STS.
4.7.1.a	3.8.1.2	SR:	DGs; verify start time <10 sec; 1 Mo	ADMINISTRATIVE:	Requirement unchanged.
4.7.1.a	3.8.1.3	SR:	DGs; Test load to 2400 Kw; 1 Mo	MORE RESTRICTIVE:	The loading requirement is changed to assure that the DG can supply peak accident loads.
4.7.1.b	3.8.1.14	SR:	DBA DG auto loading; integrated test; Refueling	MORE RESTRICTIVE:	Deleted allowance to test only selected motors. Frequency changed to 18 mo; added requirements on voltage, frequency, and run time iaw STS.
4.7.1.b	3.8.1.13 & 14	LCO:	DBA DG auto loading capability w/in 30 sec	ADMINISTRATIVE:	The 30 sec requirement is replaced by SR 3.8.1.13 verifying design sequencer timing and SR 3.8.1.14 verifying actual loading of equipment onto DG. Essentially unchanged.
4.7.1.c	3.8 Relocated	SR:	DGs; Inspect iaw Alco instructions; Refueling	RELOCATED:	This is a maintenance requirement rather than an operability verification; the equivalent requirement was deleted from STS. The requirement has been relocated to the FSAR.
4.7.1.d	3.8.1.18	SR:	Verify DG [auto connected] loads <750A at 2400V	ADMINISTRATIVE:	Reworded for clarity.
4.7.1.e	3.8.1.7	SR:	Fuel Xfer pumps; verify operable; 1 Mo	LESS RESTRICTIVE:	Frequency changed to 92 days iaw STS and ISI testing of other pumps.
4.7.2.a	3.8.6.1 & 3	SR:	Sta Batt's; Record each cell voltage; 1 Mo	LESS RESTRICTIVE:	Frequency for each cell changed to 92 days iaw STS. Pilot cells required monthly.
4.7.2.a	3.8.6.1	SR:	Sta Batt's; Record 1 pilot cell s.g.; 1 Mo	ADMINISTRATIVE:	Requirement unchanged.

TS Number	RTS Number	TS requirement description	Classification and Description of Changes	
4.7.2.a	3.8.6.2	SR: Sta Batt's; Record 1 pilot cell temp; 1 Mo	ADMINISTRATIVE:	Former 4.7.2.a (temperature of single pilot cell) and 4.7.2.b (temperature of every fifth cell) combined using STS words of "Representative cells". Shorter testing interval (1 month) retained.
4.7.2.b	3.8.6.3	SR: Sta Batt's; Record each cell gravity; 3 Mo	ADMINISTRATIVE:	Requirement unchanged.
4.7.2.b	3.8.6.2	SR: Sta Batt's; Record each 5th cell temp; 3 Mo	ADMINISTRATIVE:	Former 4.7.2.a (temperature of single pilot cell) and 4.7.2.b (temperature of every fifth cell) combined using STS words of "Representative cells". Shorter testing interval (1 month) retained.
4.7.2.b	3.8.6.3	SR: Sta Batt's; Record level & water added; 3 Mo	LESS RESTRICTIVE:	Deleted requirement to record water added.
4.7.2.c	3.8.4.7	SR: Sta Batt's; Service test; Refueling	MORE RESTRICTIVE:	Frequency changed to 18 months iaw STS.
4.7.2.d	3.8.4.8	SR: Sta Batt's; performance test; 1/3 refueling	ADMINISTRATIVE:	Frequency changed to 5 years iaw STS. These frequencies are effectively the same, with 5 years having a positive upper bound.
4.7.2.d	3.8.4.7	XCPT: SR 4.7.2.d (performance test) OK 4 SR 4.7.2.c	ADMINISTRATIVE:	Requirement unchanged.
4.7.3	3.8 Relocated	SR: Emerg Light outside CB; verify operable; 1 year	RELOCATED:	Relocated to the Operating Requirements Manual.
4.7.3	3.8 Relocated	SR: Emerg Light in CB; verify operable; before head off	RELOCATED:	Relocated to the Operating Requirements Manual.

TS Number	RTS Number	TS requirement description		Classification and Description of Changes	
4.8	3.7.2		Main Steam Stop Valves		
4.8	3.7.2.1	SR:	MSIVs; verify closure time; Refueling	ADMINISTRATIVE:	Requirement unchanged.
4.9	3.7.5		Auxiliary Feedwater System		
4.9.a.1	3.7.5.2	SR:	MD AFW pumps; start testing; 31 days	LESS RESTRICTIVE:	Existing Technical Specifications require the testing of each AFW pump every 31 days. The proposed Restructured Technical Specifications use the Standard Technical Specification frequency (every 31 days on a STAGGERED TEST BASIS). With the new frequency, any given AFW pump will be tested once per quarter.
4.9.a.1	3.7 Relocated	SR:	MD AFW pumps; start, alt controls; 3 mo	RELOCATED:	No similar requirement in STS or in ASME code, details of testing will be in Surv procedure.
4.9.a.2	3.7.5.2	SR:	TD AFW pump; start testing; 31 days	LESS RESTRICTIVE:	Existing Technical Specifications require the testing of each AFW pump every 31 days. The proposed Restructured Technical Specifications use the Standard Technical Specification frequency (31 days on a STAGGERED TEST BASIS). With the new frequency, any given AFW pump will be tested once per quarter.
4.9.a.2	3.7 Relocated	SR:	TD AFW pump; start, alt controls; 3 mo	RELOCATED:	No similar requirement in STS or in ASME code, details of testing will be in Surv procedure.
4.9.a.3	3.7.5.1	SR:	AFW non-locked valves; chk position; 31 days	ADMINISTRATIVE:	Surveillance Requirement unchanged.
4.9.b.1	3.7.5.3	SR:	AFW Flow CV's; verify auto operation; 18 months	ADMINISTRATIVE:	Surveillance Requirement unchanged.
4.9.b.2	3.7.5.4	SR:	AFW pumps; verify auto start; 18 months	ADMINISTRATIVE:	Surveillance Requirement unchanged.
4.10	3.1.3		Reactivity Anomalies		
4.10	3.1.3	LCO:	Critical Boron; Actual w/in 1% of Predicted	ADMINISTRATIVE:	Requirement Unchanged.
4.10	3.1 Deleted	ADMN:	Crit/Predicted B δk >1%; notify AEC, 24 hrs	LESS RESTRICTIVE:	This reporting requirement was issued as part of the original Palisades Tech Specs, circa 1971. Since that time 10 CFR 50.72 and 50.73 have been issued to replace "Reporting Requirements" of this type.

TS Number	RTS Number	TS requirement description	Classification and Description of Changes	
4.10	3.1 Deleted	ADMN: Crit/Predicted B δk >1%; Eval to AEC, 30 days	LESS RESTRICTIVE:	This reporting requirement was issued as part of the original Palisades Tech Specs, circa 1971. Since that time 10 CFR 50.72 and 50.73 have been issued to replace "Reporting Requirements" of this type.
4.10	3.1.3.1	SR: Crit Boron; compare w predicted; periodically	MORE RESTRICTIVE:	RTS SR frequency is "31 days".
4.11		Deleted		
4.12	5.5.7	ISI for High Energy Lines Outside of Containment	ADMINISTRATIVE:	The proposed Admin Control requirement 5.5.7 contains requirements to have an Inservice Inspection and Testing Program. The individual requirements listed in TS Section 4.12, with the exception of 4.12.1a which is no longer applicable, will be relocated to procedures issued under that program and controlled by 10 CFR 50.59.
4.12.1.a	5.0 Deleted	SR: Initial inspection;	ADMINISTRATIVE:	No longer applicable.
4.12.1.b	5.0 Relocated	SR: Welds in Fig 4.12.A & B; inspect; 3/10 yrs	RELOCATED:	
4.12.1.c	5.0 Relocated	ACTN: Defects in 4.12.1.b insp; inspect; +1/3 welds	RELOCATED:	
4.12.1.c	5.0 Relocated	ACTN: Defects in 4.12.1.c insp; inspect; +1/3 welds	RELOCATED:	
4.12.1.d	5.0 Relocated	ACTN: Weld Repairs Req; Initialize inspection sched	RELOCATED:	
4.12.2.a	5.0 Relocated	SR: Welds not in Fig 4.12.A & B; Inspect iaw Sec XI	RELOCATED:	
4.12.3.a	5.0 Relocated	SR: Welds in Pen Room; inspect insulation; Weekly	RELOCATED:	
4.12.3.a	5.0 Relocated	ACTN: Leak detected in 4.12.3.a insp; Investigate	RELOCATED:	
4.12.3.a	5.0 Relocated	ACTN: Thru wall flaw in 4.12.3.a insp; Isolate or SD	RELOCATED:	
4.12.3.a	5.0 Relocated	ACTN: Flaw fixed in 4.12.3.a insp; Test iaw Sec XI	RELOCATED:	

TS Number	RTS Number		TS requirement description	Classification and Description of Changes	
4.13			Deleted		
4.14	5.5.8		ISI Program for Steam Generators	ADMINISTRATIVE:	Steam Generator inspection requirements moved, unchanged, to a program in the Administrative Controls section of RTS.
4.15	3.4		Primary System Flow Measurement		
4.15	3.4.1.3	SR:	PCS flow; verify >LCO 3.1.1.c; Refueling	ADMINISTRATIVE:	Requirements unchanged.
4.15	3.4.1.3	SR:	PCS flow; verify >LCO 3.1.1.c; After plugging	ADMINISTRATIVE:	Requirements unchanged.
4.15	3.4.1.3	SR:	PCS flow; verify <31 days	LESS RESTRICTIVE:	RTS frequency based on reaching >90% RTP.
4.16	5.5.7		ISI Program for Safety Related Snubbers	ADMINISTRATIVE:	The proposed Admin Control requirement 5.5.7 contains requirements to have an Inservice Inspection and Testing Program. The individual requirements listed in TS Section 4.16 will be relocated to procedures issued under that program and controlled by 10 CFR 50.59.

TS Number	RTS Number	TS requirement description		Classification and Description of Changes	
4.17	3.3		Instrumentation Systems Tests		
4.17.1T	3.3.1/3.3.2	TABL:	RPS instrument SRs	ADMINISTRATIVE:	Requirement unchanged. RPS Inst. SRs in 3.3.1. RPS Logic SRs in 3.3.2.
4.17.1T#1-cc	3.3.2.	SR:	Manual Trip; Chnl Check; Not req	ADMINISTRATIVE:	Requirement unchanged. Applicable SRs specified in LCO. There is no table in LCO 3.3.2.
4.17.1T#1-cft	3.3.3.2	SR:	Manual Trip; Chnl Func Test; 7 days B4 Startup	ADMINISTRATIVE:	Requirement unchanged.
4.17.1T#2-cc	3.3.1.1	SR:	VHPT Chnls; Chnl Check; 12 hrs	ADMINISTRATIVE:	Requirement unchanged.
4.17.1T#2-cft	3.3.1.3	SR:	VHPT Chnls; Chnl Func Test; 31 days	LESS RESTRICTIVE:	Changed to 92 days in accordance with CEN 327, surveillance interval extension, iaw STS.
4.17.1T#2-cal	3.3.1.2	SR:	VHPT Chnls; Cal w Heat bal; 24 hrs	ADMINISTRATIVE:	Requirement unchanged.
4.17.1T#2-cal	3.3.1.4	SR:	VHPT Chnls; Cal Excores; 31 days	ADMINISTRATIVE:	Requirement unchanged.
4.17.1T#2-cal	3.3.1.7	SR:	VHPT Chnls; Chnl Cal; 18 months	ADMINISTRATIVE:	Requirement unchanged.
4.17.1T#3-cc	3.3.1.1	SR:	Hi Rate Chnls; Chnl Check; 12 hrs	ADMINISTRATIVE:	Requirement unchanged.
4.17.1T#3-cft	3.3.1.6	SR:	Hi Rate Chnls; Chnl Func Test; 7 days B4 startup	ADMINISTRATIVE:	Requirement unchanged.
4.17.1T#3-cal	3.3.1.7	SR:	Hi Rate Chnls; Chnl Cal; 18 mo	ADMINISTRATIVE:	Requirement unchanged.
4.17.1T#4-cc	3.3.1.1	SR:	TM/lpt Chnls; Chnl Check; 12 hrs	ADMINISTRATIVE:	Requirement unchanged.
4.17.1T#4-cft	3.3.1.3	SR:	TM/lpt Chnls; Chnl Func Test; 31 days	LESS RESTRICTIVE:	Changed to 92 days in accordance with CEN 327, surveillance interval extension.
4.17.1T#4-cal	3.3.1.5	SR:	TM/lpt Chnls; Chnl Cal; 18 mo	ADMINISTRATIVE:	Requirement unchanged.
4.17.1T#5-cc	3.3.1.1	SR:	Hi Pressurizer pressure Chnls; Chnl Check; 12 hrs	ADMINISTRATIVE:	Requirement unchanged.
4.17.1T#5-cft	3.3.1.3	SR:	Hi Pressurizer press Chnls; Chnl Func Test; 31 days	LESS RESTRICTIVE:	Changed to 92 days in accordance with CEN 327, surveillance interval extension.
4.17.1T#5-cal	3.3.1.7	SR:	Hi Pressurizer pressure Chnls; Chnl Cal; 18 mo	ADMINISTRATIVE:	Requirement unchanged.
4.17.1T#6-cc	3.3.1.1	SR:	Low Flow Chnls; Chnl Check; 12 hrs	ADMINISTRATIVE:	Requirement unchanged.
4.17.1T#6-cft	3.3.1.3	SR:	Low Flow Chnls; Chnl Func Test; 31 days	LESS RESTRICTIVE:	Changed to 92 days in accordance with CEN 327, surveillance interval extension.

TS Number	RTS Number	TS requirement description	Classification and Description of Changes	
4.17.1T#6-cal	3.3.1.7	SR: Low Flow Chnls; Chnl Cal; 18 Months	ADMINISTRATIVE:	Requirement unchanged.
4.17.1T#7-cft	3.3.1.6	SR: Loss of Load; Chnl Func Test; 7 days B4 startup	ADMINISTRATIVE:	Requirement unchanged.
4.17.1T#7-cal	3.3.1.7	SR: Loss of Load; Chnl Cal; 18 mo	ADMINISTRATIVE:	Requirement unchanged.
4.17.1T#8-cc	3.3.1.1	SR: Low "A" SG Level Chnls; Chnl Check; 12 hrs	ADMINISTRATIVE:	Requirement unchanged.
4.17.1T#8-cft	3.3.1.3	SR: Low "A" SG Level Chnls; Chnl Func Test; 31 days	LESS RESTRICTIVE:	Changed to 92 days in accordance with CEN 327, surveillance interval extension.
4.17.1T#8-cal	3.3.1.7	SR: Low "A" SG Level Chnls; Chnl Cal; 18 mo	ADMINISTRATIVE:	Requirement unchanged.
4.17.1T#9-cc	3.3.1.1	SR: Low "B" SG Level Chnls; Chnl Check; 12 hrs	ADMINISTRATIVE:	Requirement unchanged.
4.17.1T#9-cft	3.3.1.3	SR: Low "B" SG Level Chnls; Chnl Func Test; 31 days	LESS RESTRICTIVE:	Changed to 92 days in accordance with CEN 327, surveillance interval extension.
4.17.1T#9-cal	3.3.1.7	SR: Low "B" SG Level Chnls; Chnl Cal; 18 mo	ADMINISTRATIVE:	Requirement unchanged.
4.17.1T#10-cc	3.3.1.1	SR: Low "A" SG Pressure Chnls; Chnl Check; 12 hrs	ADMINISTRATIVE:	Requirement unchanged.
4.17.1T#10-cft	3.3.1.3	SR: Low "A" SG Pressure Chnls; Chnl Func Test; 31 days	LESS RESTRICTIVE:	Changed to 92 days in accordance with CEN 327, surveillance interval extension.
4.17.1T#10-cal	3.3.1.7	SR: Low "A" SG Pressure Chnls; Chnl Cal; 18 mo	ADMINISTRATIVE:	Requirement unchanged.
4.17.1T#11-cc	3.3.1.1	SR: Low "B" SG Pressure Chnls; Chnl Check; 12 hrs	ADMINISTRATIVE:	Requirement unchanged.
4.17.1T#11-cft	3.3.1.3	SR: Low "B" SG Pressure Chnls; Chnl Func Test; 31 days	LESS RESTRICTIVE:	Changed to 92 days in accordance with CEN 327, surveillance interval extension.
4.17.1T#11-cal	3.3.1.7	SR: Low "B" SG Pressure Chnls; Chnl Cal; 18 mo	ADMINISTRATIVE:	Requirement unchanged.
4.17.1T#12-cft	3.3.1.3	SR: Hi Cont Pressure Chnls; Chnl Func Test; 31 days	LESS RESTRICTIVE:	Changed to 92 days in accordance with CEN 327, surveillance interval extension.
4.17.1T#12-cal	3.3.1.7	SR: Hi Cont Pressure Chnls; Chnl Cal; 18 mo	ADMINISTRATIVE:	Requirement unchanged.
4.17.1T#13-cft	3.3.2.1	SR: RPS Matrix Logic Chnls; Chnl Func Test; 31 days	LESS RESTRICTIVE:	Changed to 92 days in accordance with CEN 327, surveillance interval extension.
4.17.1T#14-cft	3.3.2.1	SR: Initiation Logic Chnls; Chnl Func Test; 31 days	LESS RESTRICTIVE:	Changed to 92 days in accordance with CEN 327, surveillance interval extension.
4.17.1T#15	3.3.1.5	SR: TM/LP Calculators; Verify Constants; 92 days	ADMINISTRATIVE:	Requirement unchanged.

TS Number	RTS Number	TS requirement description	Classification and Description of Changes	
4.17.2T#1a-cft	3.3.4.3	SR: Manual SIS Chnls; Chnl Func Test; 18 mo	ADMINISTRATIVE:	Requirement unchanged.
4.17.2T#1b-cft	3.3.4.2	SR: SIS Logic Chnls; Test W. Test Switches; 92 days	ADMINISTRATIVE:	Requirement unchanged.
4.17.2T#1b-cal	3.3.4.4	SR: SIS Logic Chnls; Chnl Func Test; 18 months	ADMINISTRATIVE:	Requirement unchanged.
4.17.2T#1c-cft	3.3.4.4	SR: CHP SIS initiation Chnls; Chnl Func Test; 18 mo	ADMINISTRATIVE:	Requirement unchanged.
4.17.2T#1d-cc	3.3.3.1	SR: Pressurizer Pressure Chnls; Chnl Check; 12 hrs	ADMINISTRATIVE:	Requirement unchanged.
4.17.2T#1d-cft	3.3.3.2	SR: Pressurizer Pressure Chnls; Chnl Func Test; 31 days	LESS RESTRICTIVE:	Changed to 92 days in accordance with CEN 327, surveillance interval extension.
4.17.2T#1d-cal	3.3.3.3	SR: Pressurizer Pressure Chnls; Chnl Cal; 18 mo	ADMINISTRATIVE:	Requirement unchanged.
4.17.2T#2a-cft	3.3.4.3	SR: Manual RAS Chnls; Chnl Func Test; 18 mo	ADMINISTRATIVE:	Requirement unchanged.
4.17.2T#2b-cft	3.3.4.4	SR: RAS logic Chnls; Chnl Func Test; 18 mo	ADMINISTRATIVE:	Requirement unchanged.
4.17.2T#2c-cft	3.3.3.3	SR: SIRWT Level Chnls; Chnl Func test; 18 mo	ADMINISTRATIVE:	A CHANNEL FUNCTIONAL TEST is part of the 18 month CHANNEL CALIBRATION, by definition.
4.17.2T#2c-cal	3.3.3.3	SR: SIRWT Level Chnls; Chnl Cal; 18 mo	ADMINISTRATIVE:	Requirement unchanged.
4.17.2T#3a-cft	3.3.4.3	SR: Manual AFAS Chnls; Chnl Func Test; 18 mo	ADMINISTRATIVE:	Requirement unchanged.
4.17.2T#3b-cft	3.3.4.1	SR: AFAS Logic Chnls; Chnl Func Test; 92 days	ADMINISTRATIVE:	Requirement unchanged.
4.17.2T#3c-cc	3.3.3.1	SR: SG "A" level Chnls; Chnl Check; 12 hrs	ADMINISTRATIVE:	Requirement unchanged.
4.17.2T#3c-cft	3.3.3.2	SR: SG "A" level Chnls; Chnl Func Test; 31 days	LESS RESTRICTIVE:	Changed to 92 days in accordance with CEN 327, surveillance interval extension.
4.17.2T#3c-cal	3.3.3.3	SR: SG "A" level Chnls; Chnl Cal; 18 mo	ADMINISTRATIVE:	Requirement unchanged.
4.17.2T#3d-cc	3.3.3.1	SR: SG "B" level Chnls; Chnl Check; 12 hrs	ADMINISTRATIVE:	Requirement unchanged.
4.17.2T#3d-cft	3.3.3.2	SR: SG "B" level Chnls; Chnl Func Test; 31 days	LESS RESTRICTIVE:	Changed to 92 days in accordance with CEN 327, surveillance interval extension.
4.17.2T#3d-cal	3.3.3.3	SR: SG "B" level Chnls; Chnl Cal; 18 mo	ADMINISTRATIVE:	Requirement unchanged.
4.17.2T#4a-cft	3.8.1.13	SR: DBA Sequencers; Chnl Func Test; 92 days	ADMINISTRATIVE:	Requirement unchanged. Moved to electrical section as part of DG operability.

TS Number	RTS Number	TS requirement description	Classification	Description of Changes
4.17.2T#4a-cal	3.8.1.13	SR: DBA Sequencers; Chnl Cal; 18 mo	ADMINISTRATIVE:	Requirement unchanged. Moved to electrical section as part of DG operability.
4.17.2T#4b-cft	3.8.1.13	SR: Shutdown Sequencers; Chnl Func Test; 18 mo	ADMINISTRATIVE:	Requirement unchanged. Moved to electrical section as part of DG operability.
4.17.2T#4b-cal	3.8.1.13	SR: Shutdown Sequencers; Chnl Cal; 18 mo	ADMINISTRATIVE:	Requirement unchanged. Moved to electrical section as part of DG operability.
4.17.3T#1a-cft	3.3.4.2	SR: CHP Logic Chnls; Chnl Func Test; 18 mo	ADMINISTRATIVE:	Requirement unchanged.
4.17.3T#1b-cft	3.3.3.2	SR: "Left" cont Pres. switches; Chnl Func Test; 31 days	LESS RESTRICTIVE:	Changed to 92 days in accordance with CEN 327, surveillance interval extension.
4.17.3T#1b-cal	3.3.3.3	SR: "Left" cont Pres. switches; Chnl Cal; 18 mo	ADMINISTRATIVE:	Requirement unchanged.
4.17.3T#1c-cft	3.3.3.2	SR: "Right" cont Pres. switches; Chnl Func Test; 31 days	LESS RESTRICTIVE:	Changed to 92 days in accordance with CEN 327, surveillance interval extension.
4.17.3T#1c-cal	3.3.3.3	SR: "Right" cont Press. switches; Chnl Cal; 18 mo	ADMINISTRATIVE:	Requirement unchanged.
4.17.3T#2a-cft	3.3.4.3	SR: Manual CHR Chnls; Chnl Func Test; 18 mo	ADMINISTRATIVE:	Requirement unchanged.
4.17.3T#2b-cft	3.3.4.2	SR: CHR logic Chnls; Chnl Func Test; 18 mo	ADMINISTRATIVE:	Requirement unchanged.
4.17.3T#2c-cc	3.3.3.1	SR: Containment Monitors; Chnl Check; 12 hrs	ADMINISTRATIVE:	Requirement unchanged.
4.17.3T#2c-cft	3.3.3.2	SR: Containment Monitors; Chnl Func Test; 31 days	LESS RESTRICTIVE:	Changed to 92 days in accordance with CEN 327, surveillance interval extension.
4.17.3T#2c-cal	3.3.3.3	SR: Containment Monitors; Chnl Cal; 18 mo	ADMINISTRATIVE:	Requirement unchanged.
4.17.3T#3a-cft	3.3.4.3	SR: Manual SGLP Chnls; Chnl Func Test; 18 mo	ADMINISTRATIVE:	Requirement unchanged.
4.17.3T#3b-cft	3.3.4.4	SR: SGLP Logic Chnls; Chnl Func Test; 18 mo	ADMINISTRATIVE:	Requirement unchanged.
4.17.3T#3c-cc	3.3.3.1	SR: SG "A" pressure Chnls; Chnl Check; 12 hrs	ADMINISTRATIVE:	Requirement unchanged.
4.17.3T#3c-cft	3.3.3.2	SR: SG "A" pressure Chnls; Chnl Func Test; 31 days	LESS RESTRICTIVE:	Changed to 92 days in accordance with CEN 327, surveillance interval extension.
4.17.3T#3c-cal	3.3.3.3	SR: SG "A" pressure Chnls; Chnl Cal; 18 mo	ADMINISTRATIVE:	Requirement unchanged.
4.17.3T#3d-cc	3.3.3.1	SR: SG "B" pressure Chnls; Chnl Check; 12 hrs	ADMINISTRATIVE:	Requirement unchanged.

TS Number	RTS Number	TS requirement description		Classification and Description of Changes	
4.17.3T#3d-cft	3.3.3.2	SR:	SG "B" pressure Chnls; Chnl Func Test; 31 days	LESS RESTRICTIVE:	Changed to 92 days in accordance with CEN 327, surveillance interval extension.
4.17.3T#3d-cal	3.3.3.3	SR:	SG "B" pressure Chnls; Chnl Cal; 18 mo	ADMINISTRATIVE:	Requirement unchanged.
4.17.3T#4a-cc	3.3 Relocated	SR:	East room monitor; Chnl Check; 12 hrs	RELOCATED:	See LCO Table 3.17.2/3.17.3 discussion.
4.17.3T#4a-cft	3.3 Relocated	SR:	East room monitor; Chnl Func Test; 31 days	RELOCATED:	See LCO Table 3.17.2/3.17.3 discussion.
4.17.3T#4a-cal	3.3 Relocated	SR:	East room monitor; Chnl Cal; 18 mo	RELOCATED:	See LCO Table 3.17.2/3.17.3 discussion.
4.17.3T#4b-cc	3.3 Relocated	SR:	West room monitor; Chnl Check; 12 hrs	RELOCATED:	See LCO Table 3.17.2/3.17.3 discussion.
4.17.3T#4b-cft	3.3 Relocated	SR:	West room monitor; Chnl Func Test; 31 days	RELOCATED:	See LCO Table 3.17.2/3.17.3 discussion.
4.17.3T#4b-cal	3.3 Relocated	SR:	West room monitor; Chnl Cal; 18 mo	RELOCATED:	See LCO Table 3.17.2/3.17.3 discussion.
4.17.4T#1-cc	3.3.7.1	SR:	WR Th chnls; Chnl Check; 31 days	ADMINISTRATIVE:	Requirement unchanged.
4.17.4T#1-cal	3.3.7.2	SR:	WR Th chnls; Chnl Cal; 18 mo	ADMINISTRATIVE:	Requirement unchanged.
4.17.4T#2-cc	3.3.7.1	SR:	WR Tc chnls; Chnl Check; 31 days	ADMINISTRATIVE:	Requirement unchanged.
4.17.4T#2-cal	3.3.7.2	SR:	WR Tc chnls; Chnl Cal; 18 mo	ADMINISTRATIVE:	Requirement unchanged.
4.17.4T#3-cc	3.3.7.1	SR:	WR NI chnls; Chnl Check; 31 days	ADMINISTRATIVE:	Requirement unchanged.
4.17.4T#3-cal	3.3.7.2	SR:	WR NI chnls; Chnl Cal; 18 mo	ADMINISTRATIVE:	Requirement unchanged.
4.17.4T#4-cc	3.3.7.1	SR:	Cont water lvl chnls; Chnl Check; 31 days	ADMINISTRATIVE:	Requirement unchanged.
4.17.4T#4-cal	3.3.7.2	SR:	Cont water lvl chnls; Chnl Cal; 18 mo	ADMINISTRATIVE:	Requirement unchanged.
4.17.4T#5-cc	3.3.7.1	SR:	Subcooled margin chnls; Chnl Check; 31 days	ADMINISTRATIVE:	Requirement unchanged.
4.17.4T#5-cal	3.3.7.2	SR:	Subcooled margin chnls; Chnl Cal; 18 mo	ADMINISTRATIVE:	Requirement unchanged.
4.17.4T#6-cc	3.3.7.1	SR:	WR Pzr Level chnls; Chnl Check; 31 days	ADMINISTRATIVE:	Requirement unchanged.
4.17.4T#6-cal	3.3.7.2	SR:	WR Pzr Level chnls; Chnl Cal; 18 mo	ADMINISTRATIVE:	Requirement unchanged.
4.17.4T#7-cc	3.3.7.1	SR:	Cont H_2 chnls; Chnl Check; 31 days	ADMINISTRATIVE:	Requirement unchanged.
4.17.4T#7-cal	3.3.7.2	SR:	Cont H_2 chnls; Chnl Cal; 18 mo	ADMINISTRATIVE:	Requirement unchanged.
4.17.4T#8-cc	3.3.7.1	SR:	CST Level chnls; Chnl Check; 31 days	ADMINISTRATIVE:	Requirement unchanged.

TS Number	RTS Number	TS requirement description	Classification and Description of Changes
4.17.4T#8-cal	3.3.7.2	SR: CST Level chnls; Chnl Cal; 18 mo	ADMINISTRATIVE: Requirement unchanged.
4.17.4T#9-cc	3.3.7.1	SR: WR Pressurizer Pressure chnls; Chnl Check; 31 days	ADMINISTRATIVE: Requirement unchanged.
4.17.4T#9-cal	3.3.7.2	SR: WR Pressurizer Pressure chnls; Chnl Cal; 18 mo	ADMINISTRATIVE: Requirement unchanged.
4.17.4T#10-cc	3.3.7.1	SR: WR Cont Pressure chnls; Chnl Check; 31 days	ADMINISTRATIVE: Requirement unchanged.
4.17.4T#10-cal	3.3.7.2	SR: WR Cont Pressure chnls; Chnl Cal; 18 mo	ADMINISTRATIVE: Requirement unchanged.
4.17.4T#11-cc	3.3.7.1	SR: WR SG"A" Level chnls; Chnl Check; 31 days	ADMINISTRATIVE: Requirement unchanged.
4.17.4T#11-cal	3.3.7.2	SR: WR SG"A" Level chnls; Chnl Cal; 18 mo	ADMINISTRATIVE: Requirement unchanged.
4.17.4T#12-cc	3.3.7.1	SR: WR SG "B" Level chnls; Chnl Check; 31 days	ADMINISTRATIVE: Requirement unchanged.
4.17.4T#12-cal	3.3.7.2	SR: WR SG "B" Level chnls; Chnl Cal; 18 mo	ADMINISTRATIVE: Requirement unchanged.
4.17.4T#13-cc	3.3.7.1	SR: NR SG "A" Pressure chnls; Chnl Check; 31 days	ADMINISTRATIVE: Requirement unchanged.
4.17.4T#13-cal	3.3.7.2	SR: NR SG "A" Pressure chnls; Chnl Cal; 18 mo	ADMINISTRATIVE: Requirement unchanged.
4.17.4T#14-cc	3.3.7.1	SR: NR SG "B" Pressure chnls; Chnl Check; 31 days	ADMINISTRATIVE: Requirement unchanged.
4.17.4T#14-cal	3.3.7.2	SR: NR SG "B" Pressure chnls; Chnl Cal; 18 mo	ADMINISTRATIVE: Requirement unchanged.
4.17.4T#15-cc	3.3.7.1	SR: Pos indic. each cont iso valve; Chnl Check; 31 days	ADMINISTRATIVE: Requirement unchanged.
4.17.4T#15-cal	3.3.7.2	SR: Pos indic. each cont iso valve; Chnl Cal; 18 mo	ADMINISTRATIVE: Requirement unchanged.
4.17.4T#16-cc	3.3.7.1	SR: CETs quad 1; Chnl Check; 31 days	ADMINISTRATIVE: Requirement unchanged.
4.17.4T#16-cal	3.3.7.2	SR: CETs quad 1; Chnl Cal; 18 mo	ADMINISTRATIVE: Requirement unchanged.
4.17.4T#17-cc	3.3.7.1	SR: CETs quad 2; Chnl Check; 31 days	ADMINISTRATIVE: Requirement unchanged.
4.17.4T#17-cal	3.3.7.2	SR: CETs quad 2; Chnl Cal; 18 mo	ADMINISTRATIVE: Requirement unchanged.
4.17.4T#18-cc	3.3.7.1	SR: 4 CETs quad 3; Chnl Check; 31 days	ADMINISTRATIVE: Requirement unchanged.
4.17.4T#18-cal	3.3.7.2	SR: 4 CETs quad 3; Chnl Cal; 18 mo	ADMINISTRATIVE: Requirement unchanged.
4.17.4T#19-cc	3.3.7.1	SR: 4 CETs quad 4; Chnl Check; 31 days	ADMINISTRATIVE: Requirement unchanged.
4.17.4T#19-cal	3.3.7.2	SR: 4 CETs quad 4; Chnl Cal; 18 mo	ADMINISTRATIVE: Requirement unchanged.

TS Number	RTS Number	TS requirement description	Classification and Description of Changes	
4.17.4T#20-cc	3.3.7.1	SR: 2 RVWL chnls; Chnl Check; 31 days	ADMINISTRATIVE:	Requirement unchanged.
4.17.4T#20-cal	3.3.7.2	SR: 2 RVWL chnls; Chnl Cal; 18 mo	ADMINISTRATIVE:	Requirement unchanged.
4.17.4T#21-cc	3.3.7.1	SR: 2 HR Cont Rad chnls; Chnl Check; 31 days	ADMINISTRATIVE:	Requirement unchanged.
4.17.4T#21-cal	3.3.7.2	SR: 2 HR Cont Rad chnls; Chnl Cal; 18 mo	ADMINISTRATIVE:	Requirement unchanged.
4.17.5T#1-cc	3.3.8.2	SR: 1 SU Nuclear Inst chnl; Chnl Check; (a)	ADMINISTRATIVE:	Requirement unchanged.
4.17.5T#1-cft	3.3.1.6/3.3.8.2	SR: 1 SU Nuclear Inst chnl; Chnl func Test; (a)	ADMINISTRATIVE:	The CFT Surveillance Interval is the same as the CC. The instrumentation consists only of an indicator, which is channel checked per SR 3.3.8.2 during the performance of the RPS CHANNEL FUNCTIONAL TEST of SR 3.3.1.6. No specific CFT is performed on this instrument, other than that performed in SR 3.3.1.6.
4.17.5T#1-cal	3.3.8.5	SR: 1 SU Nuclear Inst chnl; Chnl Cal; 18 mo	ADMINISTRATIVE:	Requirement unchanged.
4.17.5T#2-cc	3.3.8.1	SR: 1 Pressurizer Pressure chnl; Chnl Check; 92 days	ADMINISTRATIVE:	Requirement unchanged.
4.17.5T#2-cal	3.3.8.5	SR: 1 Pressurizer Pressure chnl; Chnl Cal; 18 mo	ADMINISTRATIVE:	Requirement unchanged.
4.17.5T#3-cc	3.3.8.1	SR: 1 Pressurizer Level chnl; Chnl Check; 92 days	ADMINISTRATIVE:	Requirement unchanged.
4.17.5T#3-cal	3.3.8.5	SR: 1 Pressurizer Level chnl; Chnl Cal; 18 mo	ADMINISTRATIVE:	Requirement unchanged.
4.17.5T#4-cc	3.3.8.1	SR: 1 Loop 1 Th chnl; Chnl Check; 92 days	ADMINISTRATIVE:	Requirement unchanged.
4.17.5T#4-cal	3.3.8.5	SR: 1 Loop 1 Th chnl; Chnl Cal; 18 mo	ADMINISTRATIVE:	Requirement unchanged.
4.17.5T#5-cc	3.3.8.1	SR: 1 loop 2 Th chnl; Chnl Check; 92 days	ADMINISTRATIVE:	Requirement unchanged.
4.17.5T#5-cal	3.3.8.5	SR: 1 loop 2 Th chnl; Chnl Cal; 18 mo	ADMINISTRATIVE:	Requirement unchanged.
4.17.5T#6-cc	3.3.8.1	SR: 1 Loop 1 Tc chnl; Chnl Check; 92 days	ADMINISTRATIVE:	Requirement unchanged.
4.17.5T#6-cal	3.3.8.5	SR: 1 Loop 1 Tc chnl; Chnl Cal; 18 mo	ADMINISTRATIVE:	Requirement unchanged.
4.17.5T#7-cc	3.3.8.1	SR: 1 Loop 2 Tc chnl; Chnl Check; 92 days	ADMINISTRATIVE:	Requirement unchanged.
4.17.5T#7-cal	3.3.8.5	SR: 1 Loop 2 Tc chnl; Chnl Cal; 18 mo	ADMINISTRATIVE:	Requirement unchanged.
4.17.5T#8-cc	3.3.8.1	SR: 1 SG "A" Pressure chnl; Chnl Check; 92 days	ADMINISTRATIVE:	Requirement unchanged.
4.17.5T#8-cal	3.3.8.5	SR: 1 SG "A" Pressure chnl; Chnl Cal; 18 mo	ADMINISTRATIVE:	Requirement unchanged.

TS Number	RTS Number	TS requirement description	Classification and Description of Changes	
4.17.5T#9-cc	3.3.8.1	SR: 1 SG "B" Pressure chnl; Chnl Check; 92 days	ADMINISTRATIVE:	Requirement unchanged.
4.17.5T#9-cal	3.3.8.5	SR: 1 SG "B" Pressure chnl; Chnl Cal; 18 mo	ADMINISTRATIVE:	Requirement unchanged.
4.17.5T#10-cc	3.3.8.1	SR: 1 SG "A" Level chnl; Chnl Check; 92 days	ADMINISTRATIVE:	Requirement unchanged.
4.17.5T#10-cal	3.3.8.5	SR: 1 SG "A" Level chnl; Chnl Cal; 18 mo	ADMINISTRATIVE:	Requirement unchanged.
4.17.5T#11-cc	3.3.8.1	SR: 1 SG "B" Level chnl; Chnl Check; 92 days	ADMINISTRATIVE:	Requirement unchanged.
4.17.5T#11-cal	3.3.8.5	SR: 1 SG "B" Level chnl; Chnl Cal; 18 mo	ADMINISTRATIVE:	Requirement unchanged.
4.17.5T#12-cc	3.3.8.1	SR: 1 SIRWT Level chnl; Chnl Check; 92 days	ADMINISTRATIVE:	Requirement unchanged.
4.17.5T#12-cal	3.3.8.5	SR: 1 SIRWT Level chnl; Chnl Cal; 18 mo	ADMINISTRATIVE:	Requirement unchanged.
4.17.5T#13-cc	3.3.8.3	SR: 1 AFW Flow to SG "A" chnl; Chnl Check; 18 mo	ADMINISTRATIVE:	Requirement unchanged.
4.17.5T#13-cft	3.3.8.4	SR: 1 AFW Flow to SG "A" chnl; Chnl func test; 18 mo	ADMINISTRATIVE:	Requirement unchanged.
4.17.5T#13-cal	3.3.8.5	SR: 1 AFW Flow to SG "A" chnl; Chnl Cal; 18 mo	ADMINISTRATIVE:	Requirement unchanged.
4.17.5T#14-cc	3.3.8.3	SR: 1 AFW Flow to SG "B" chnl; Chnl Check; 18 mo	ADMINISTRATIVE:	Requirement unchanged.
4.17.5T#14-cft	3.3.8.4	SR: 1 AFW Flow to SG "B" chnl; Chnl func test; 18 mo	ADMINISTRATIVE:	Requirement unchanged.
4.17.5T#14-cal	3.3.8.5	SR: 1 AFW Flow to SG "B" chnl; Chnl Cal; 18 mo	ADMINISTRATIVE:	Requirement unchanged.
4.17.5T#15-cft	3.3.8.4	SR: 1 Pump P-8B Suct. Press. chnl; Chnl fnc tst; 18 mo	ADMINISTRATIVE:	Requirement unchanged.
4.17.5T#15-cal	3.3.8.5	SR: 1 Pump P-8B Suction Pressure chnl; Chnl Cal; 18 mo	ADMINISTRATIVE:	Requirement unchanged.
4.17.5T#16-cft	3.3.8.4	SR: 1 Pump P-8B stm Vlv Cont chnl; Chnl func test; 18 mo	ADMINISTRATIVE:	Requirement unchanged.
4.17.5T#17-cft	3.3.8.4	SR: 1 AFW Flow Cont to SG "A" chnl; Ch. fnc tst; 18 mo	ADMINISTRATIVE:	Requirement unchanged.
4.17.5T#18-cft	3.3.8.4	SR: 1 AFW Flow Cont to SG "B" chnl; Chnl fnc tst; 18 mo	ADMINISTRATIVE:	Requirement unchanged,
4.17.5T#19-cft	3.3.8	SR: C-150 Transfer Switches; Chnl func test; 18 mo	ADMINISTRATIVE:	Unchanged in intent. Operability of the transfer switches is verified in the act of performing SRs on the rest of the equipment in the table. There is no reason to specifically address the switches.

TS Number	RTS Number	TS requirement description	Classification and Description of Changes	
4.17.5T#20-cft	3.3.8	SR: C-150A Transfer Switch; Chnl func test; 18 mo	ADMINISTRATIVE:	Unchanged in intent. Operability of the transfer switches is verified in the act of performing SRs on the rest of the equipment in the table. There is no reason to specifically address the switches.
4.17.6T#1-cc	3.3.9.1	SR: 2 chnls Flux Monitoring; Chnl Check; 12 hrs	ADMINISTRATIVE:	Requirement unchanged.
4.17.6T#1-cft	3.3.1.6	SR: 2 chnls Flux Monitoring; Chnl func test; (a)	ADMINISTRATIVE:	Requirement unchanged.
4.17.6T#1-cal	3.3.9.2	SR: 2 chnls Flux Monitoring; Chnl Cal; 18 mo	ADMINISTRATIVE:	Requirement unchanged.
4.17.6T#2-cc	3.1.5.2	SR: 2 chnls Rod Pos; Chnl Check; 12 hrs	ADMINISTRATIVE:	Requirement unchanged.
4.17.6T#2-cft	3.3 Relocated	SR: 2 chnls Rod Pos; Chnl func test; (b)	RELOCATED:	This requirement does not meet the criterion of 10 CFR 50.36.
4.17.6T#2-cal	3.3 Relocated	SR: 2 chnls Rod Pos; Chnl cal; 18 mo	RELOCATED:	This requirement does not meet the criterion of 10 CFR 50.36.
4.17.6T#3-cc	3.3 Relocated	SR: 2 chnls SIRWT Temp; Chnl Check; 12 hrs	RELOCATED:	This requirement does not meet the criterion of 10 CFR 50.36.
4.17.6T#3-cal	3.3 Relocated	SR: 2 chnls SIRWT Temp; Chnl cal; 18 mo	RELOCATED:	This requirement does not meet the criterion of 10 CFR 50.36.
4.17.6T#4-cc	3.3 Relocated	SR: 2 chnls MFW Flow; Chnl Check; 12 hrs	RELOCATED:	This requirement does not meet the criterion of 10 CFR 50.36.
4.17.6T#4-cal	3.3 Relocated	SR: 2 chnls MFW Flow; Chnl Cal; 18 mo	RELOCATED:	This requirement does not meet the criterion of 10 CFR 50.36.
4.17.6T#5-cc	3.3 Relocated	SR: 2 chnls MFW Temp; Chnl Check; 12 hrs	RELOCATED:	This requirement does not meet the criterion of 10 CFR 50.36.
4.17.6T#5-cal	3.3 Relocated	SR: 2 chnls MFW Temp; Chnl Cal; 18 mo	RELOCATED:	This requirement does not meet the criterion of 10 CFR 50.36.
4.17.6T#6-cc	3.3 Relocated	SR: 2 chnl/line AFW Flow; Chnl Check; 12 hrs	RELOCATED:	This requirement does not meet the criterion of 10 CFR 50.36. This equipment forms part of the AFW trains required by LCO 3.7.5, but the instrumentation, itself, is not required by the safety analyses.
4.17.6T#6-cft	3.3 Relocated	SR: 2 chnl / line AFW Flow; Chnl func test; 18 mo	RELOCATED:	This requirement does not meet the criterion of 10 CFR 50.36. This equipment forms part of the AFW trains required by LCO 3.7.5, but the instrumentation, itself, is not required by the safety analyses.

TS Number	RTS Number	TS requirement description	Classification and Description of Changes	
4.17.6T#6-cal	3.3 Relocated	SR: 2 chnl / line AFW Flow; Chnl Cal; 18 mo	RELOCATED:	This requirement does not meet the criterion of 10 CFR 50.36. This equipment forms part of the AFW trains required by LCO 3.7.5, but the instrumentation, itself, is not required by the safety analyses.
4.17.6T#7-cc	3.4.15.1	SR: 4 chnls diverse PCS leak det; Chnl Check; 12 hrs	ADMINISTRATIVE:	Requirements unchanged.
4.17.6T#7-cft	3.4.15.2	SR: 4 chnls diverse PCS leak det; Chnl func test; 18 mo	ADMINISTRATIVE:	Requirements unchanged.
4.17.6T#7-cal	3.4.15.3 3.4.15.4 3.4.15.5	SR: 4 chnls diverse PCS leak det; Chnl Cal; 18 mo	ADMINISTRATIVE:	Requirements unchanged.
4.17.6T#8-cft	3.4 Relocated	SR: 2 chnls pos ind/safety vlv; Chnl fnc tst; 18 mo	RELOCATED:	This requirement does not meet the criterion of 10 CFR 50.36.
4.17.6T#8-cal	3.4 Relocated	SR: 2 chnls pos ind per safety vlv; Chnl Cal; 18 mo	RELOCATED:	This requirement does not meet the criterion of 10 CFR 50.36.
4.17.6T#9-cc	3.4 Relocated	SR: 3 chnls pos ind per PORV; Chnl Check; 12 hrs	RELOCATED:	This requirement does not meet the criterion of 10 CFR 50.36.
4.17.6T#9-cft	3.4 Relocated	SR: 3 chnls pos ind per PORV; Chnl func test; 18 mo	RELOCATED:	This requirement does not meet the criterion of 10 CFR 50.36.
4.17.6T#9-cal	3.4 Relocated	SR: 3 chnls pos ind per PORV; Chnl Cal; 18 mo	RELOCATED:	This requirement does not meet the criterion of 10 CFR 50.36.
4.17.6T#10-cc	3.4 Relocated	SR: 2 chnls pos ind per Block Vlv; Chnl Check; 12 hrs	RELOCATED:	This requirement does not meet the criterion of 10 CFR 50.36.
4.17.6T#10-cal	3.4 Relocated	SR: 2 chnls pos ind per Block Vlv; Chnl Cal; 18 mo	RELOCATED:	This requirement does not meet the criterion of 10 CFR 50.36.
4.17.6T#11-cft	3.7 Relocated	SR: 1 SWS break detector; Chnl func test; 18 mo	RELOCATED:	This requirement does not meet the criterion of 10 CFR 50.36.
4.17.6T#11-cal	3.7 Relocated	SR: 1 SWS break detector; Chnl cal; 18 mo	RELOCATED:	This requirement does not meet the criterion of 10 CFR 50.36.
4.17.6T#12-cc	3.3 Relocated	SR: 4 Flux ΔT comparitors; Chnl Check; 12 hrs	RELOCATED:	The Flux - ΔT comparitors are used only for indication. They do not provide any protective function, nor do they meet any of the criterion of 10 CFR 50.36.

TS Number	RTS Number	TS requirement description		Classification and Description of Changes	
4.17.6T#12-cft	3.3 Relocated	SR:	4 Flux ΔT comparitors; Chnl func test; 31 days	RELOCATED:	The Flux - ΔT comparitors are used only for indication. They do not provide any protective function, nor do they meet any of the criterion of 10 CFR 50.36.
4.17.6T#12-cal	3.3 Relocated	SR:	4 Flux ΔT comparitors; Chnl cal; 18 mo	RELOCATED:	The Flux - ΔT comparitors are used only for indication. They do not provide any protective function, nor do they meet any of the criterion of 10 CFR 50.36.
4.17.6T#13-cft	3.1 Relocated	SR:	2 chnls Rod seq. cont/Alarm; Chnl fnc tst; 18 mo	RELOCATED:	This requirement does not meet the criterion of 10 CFR 50.36.
4.17.6T#13-cal	3.1 Relocated	SR:	2 chnls Rod sequence control/Alarm; Chnl cal; 18 mo	RELOCATED:	This requirement does not meet the criterion of 10 CFR 50.36.
4.17.6T#14-cft	3.5 Relocated	SR:	2 Boric Acid Tank Lvl Alm; Chnl func test; 18 mo	RELOCATED:	This requirement does not meet the criterion of 10 CFR 50.36.
4.17.6T#15-cft	3.2.5.2	SR:	1 Excore Deviation Alm; Chnl func test; 18 mo	ADMINISTRATIVE:	Requirement unchanged. CFT is part of Channel Calibration.
4.17.6T#15-cal	3.2.5.2	SR:	1 Excore Deviation Alm; Chnl cal; 18 mo	ADMINISTRATIVE:	Requirement unchanged.
4.17.6T#16-cft	3.2 Relocated	SR:	4 chnls ASI Alarm; Chnl func test; 18 mo	RELOCATED:	This requirement does not meet the criterion of 10 CFR 50.36.
4.17.6T#16-cal	3.2 Relocated	SR:	4 chnls ASI Alarm; Chnl cal; 18 mo	RELOCATED:	This requirement does not meet the criterion of 10 CFR 50.36.
4.17.6T#17-cft	3.4.6.4	SR:	2 SDC interlocks; Chnl func test; 18 mo	ADMINISTRATIVE:	Requirements unchanged. Calibration includes cft.
4.17.6T#17-cal	3.4.6.4	SR:	2 SDC interlocks; Chnl cal; 18 mo	ADMINISTRATIVE:	Requirement unchanged.
4.17.6T#18-cft	3.1.7.2	SR:	2 chnls PDIL Alm; Chnl func test; 31 days	ADMINISTRATIVE:	Requirement unchanged.
4.17.6T#18-cal	3.1.7.2	SR:	2 chnls PDIL Alm; Chnl cal; 18 mo	ADMINISTRATIVE:	The PDIL is a computer generated alarm and is not subject to drift. A channel functional test is required by SR 3.1.7.2, which accomplishes the same function.
4.17.6T#19-cc	3.3.10.1	SR:	2 chnls Fuel Pool Monitor; Chnl Check; 24 hrs	ADMINISTRATIVE:	Requirement unchanged.
4.17.6T#19-cft	3.3.10.2	SR:	2 chnls Fuel Pool Monitor; Chnl func test; 31 days	ADMINISTRATIVE:	Requirement unchanged.
4.17.6T#19-cal	3.3.10.3	SR:	2 chnls Fuel Pool Monitor; Chnl cal; 18 mo	ADMINISTRATIVE:	Requirement unchanged.
4.17.6T#20-cc	3.3.6.1	SR:	2 chnls Cont Refuel Monitor; Chnl check; 24 hrs	ADMINISTRATIVE:	Requirement unchanged.

TS Number	RTS Number	TS requirement description	Classification and Description of Changes
4.17.6T#20-cft	3.3.6.2	SR: 2 chnls Cont Refuel Monitor; Chnl func test; 31 days	ADMINISTRATIVE: Requirement unchanged.
4.17.6T#20-cal	3.3.6.3	SR: 2 chnls Cont Refuel Monitor; Chnl cal; 18 mo	ADMINISTRATIVE: Requirement unchanged.

TS Number	RTS Number	TS requirement description		Classification and Description of Changes	
4.18.1	3.2 Relocated		Incore Detection System		
4.18.1.1.a	3.2 Relocated	SR:	Incore Detection Sys; chnl check; 7 days	RELOCATED:	The incore detectors do not meet the criterion of 10 CFR 50.36, and the associated requirements have been relocated to plant procedures. The Incore detectors are used for monitoring linear heat rate, so certain incore related requirements are retained.
4.18.1.1.b	3.2.1.4	SR:	Incore Detection Sys; chnl cal; Refueling	ADMINISTRATIVE:	Requirement unchanged.
4.18.1.2	3.2.1.4	SR:	Datalogger Seq error alm; chnl check; Refueling	ADMINISTRATIVE:	Requirement unchanged.
4.18.2	3.2.1		Excore Monitoring System		
4.18.2.1.a	3.2.1.3	SR:	Target AO; determine using excores; 31 days	ADMINISTRATIVE:	Requirement unchanged.
4.18.2.1.a	3.2.1.3	SR:	Target AO; determine using incores; 31 days	ADMINISTRATIVE:	Requirement unchanged.
4.18.2.1.a	3.2.1.3	SR:	APL; determine using excores; 31 days	ADMINISTRATIVE:	Requirement unchanged.
4.18.2.1.a	3.2.1.3	SR:	APL; determine using incores; 31 days	ADMINISTRATIVE:	Requirement unchanged.
4.18.2.1.b	3.2.1.3	SR:	AO; compare excore w incore; 31 days	ADMINISTRATIVE:	Requirement unchanged.
4.18.2.1.b	3.2.5 D	ACTN:	Excore/incore AO diff >2%; Cal excore sys	ADMINISTRATIVE:	Requirement unchanged.
4.18.2.1.c	3.2.5.2	SR:	Tq; compare excore w incore; 31 days	ADMINISTRATIVE:	Requirement unchanged.
4.18.2.1.c	3.2.5 b.2	ACTN:	Excore/incore Tq diff >2%; cal excore sys	ADMINISTRATIVE:	Requirement unchanged.

TS Number	RTS Number	TS requirement description	Classification and Description of Changes	
4.19	3.2	Power Distribution Limits		
4.19.1	3.2.1	Linear Heat Rates		
4.19.1.1	3.2.1.2	SR: Incore alm sys; Set before 50% w excore LHR	ADMINISTRATIVE:	Requirement unchanged.
4.19.1.1	3.2.1.2	SR: Incore alm sys; set; 7 days w using for LHR		Frequency changed to each 31 days in MODE 1.
4.19.1.2.a	3.2.4.1 3.2.1 B.1.3	SR: Excore AO; last day AO OK; B4 using excore LHR	ADMINISTRATIVE:	This measurement is inherent in the determination of ASI as required by SR 3.2.4.1 (Verify ASI within limits - Continuously) and in the action when shifting LHR measurement instruments from the incores to the excores as required by 3.2.1 B.1.3.
4.19.1.2.b	3.2.1 B.1.3	LCO: Excore Tq <3%; W/using excores LHR	ADMINISTRATIVE:	Requirement unchanged.
4.19.1.2.b	3.2.1 B.1.3	SR: Excore Tq; check in limit; 1 day; W/excore LHR	ADMINISTRATIVE:	Requirement unchanged.
4.19.1.2.c	3.2.1 B.1.2	LCO: Thermal Power <APL w using excore LHR	ADMINISTRATIVE:	Requirement unchanged.
4.19.1.2.c	3.2.1 B.1.3	LCO: Thermal Power <10% above pwr w APL	RELOCATED:	This requirement is included within the calculation methodology for determining the Allowable Power Limit. Therefore, it is relocated to the associated engineering procedure.
4.19.1.2.c	3.2.1 B.1.3	SR: Thermal Power; verify limits; 1 hr	LESS RESTRICTIVE:	APL is verified once per 4 hrs and previously while in this condition APL was verified each hour. The slightly relaxed SR period still allows ample time to detect THERMAL POWER that would be greater than APL. Ample margin exists for LHR to ensure 4 hrs is adequate to monitor this parameter.
4.19.1.2.d	3.2.1 B.1.3	LCO: AO <5% from target w using excore LHR	ADMINISTRATIVE:	Requirement unchanged.
4.19.1.2.d	3.2.4.1	SR: AO; verify w/in limit; Continuously	LESS RESTRICTIVE:	Frequency reduced from "continuously" to 15 minutes. This is adequate time to safely monitor ASI since any effects of Xenon redistribution due to rod insertion, boron changes, etc have other immediate indications which would flag the possibility of an ASI change.

TS Number	RTS Number		TS requirement description	Classification and Description of Changes	
4.19.2	3.2.2		Radial Peaking Factors		
4.19.2.1.a	3.2.2.1	SR:	Assembly Fr; verify; Refueling (B4 50%)	ADMINISTRATIVE:	LCO 3.23.2 is applicable >25%; SRs must be current prior to entering applicability.
4.19.2.1.a	3.2.2.1	SR:	Int Rod Fr; verify; Refueling (B4 50%)	ADMINISTRATIVE:	LCO 3.23.2 is applicable >25%; SRs must be current prior to entering applicability.
4.19.2.1.b	3.2.2.1	SR:	Assembly Fr; verify w/in limit; Weekly at power	ADMINISTRATIVE:	Requirement unchanged.
4.19.2.1.b	3.2.2.1	SR:	Int Rod Fr; verify w/in limit; Weekly at power	ADMINISTRATIVE:	Requirement unchanged.
4.20	3.1.4		Moderator Temperature Coefficient		
4.20.1	3.1.4.1	SR:	MTC; verify w/in limit; Refueling (B4 2%)	ADMINISTRATIVE:	Requirement unchanged.

TS Number	RTS Number	TS requirement description	Classification and Description of Changes	
5.0	4.0	Design features		
5.1	4.1	DESC: Description of Site-Location/Size	ADMINISTRATIVE:	Description unchanged.
5.2	3.6 Bases	DESC: Description of Containment Design Features	ADMINISTRATIVE:	Description moved to Bases of Section 3.6, Containment.
5.3.1	3.4 Bases	DESC: Description of Primary Coolant System	ADMINISTRATIVE:	Description of PCS features moved to Bases of Section 3.4, Primary Coolant System.
5.3.2	4.2	DESC: Description of Reactor Core and Control	ADMINISTRATIVE:	Description of reactor core and reactivity control moved to RTS Section 4.2. Reference to FSAR Figure 3-5 was corrected to Figure 3-2. This reference to the subject figure was overlooked during an FSAR revision.
5.3.3	3.5 Bases	DESC: ECCS-SIT/HPSI/LPSI/SIRW	ADMINISTRATIVE:	Description of ECCS components moved to bases of Section 3.5, ECCS.
5.4.1	4.3.1	DESC: New Fuel Storage	ADMINISTRATIVE:	Description of new fuel storage facilities moved to RTS Section 4.3.1.
5.4.2	3.7.15	DESC: Spent Fuel Storage	ADMINISTRATIVE:	Description of spent fuel storage facilities moved to RTS bases Section 3.7.15.
5.4.2a	3.7.15, Bases	DESC: Spent Fuel Storage before shipment	ADMINISTRATIVE:	Description moved to RTS bases Section 3.7.15.
5.4.2b		Deleted		
5.4.2c	3.7.15, Bases	DESC: SFP (Region I Design)	ADMINISTRATIVE:	The description of the spent fuel Region I racks has been moved to RTS bases Section 3.7.15.
5.4.2d	3.7.15, Bases	DESC: SFP (Region II Design)	ADMINISTRATIVE:	The description of the spent fuel Region II racks has been moved to RTS bases Section 3.7.15.
5.4.2d	3.7.15	LCO: Limitation on burnup of fuel placed in Region II	ADMINISTRATIVE:	Requirement unchanged. Fuel storage limitations moved to LCO 3.7.15.
5.4.2e		Deleted		
5.4.2f	3.7.14	LCO: Boron >1720 ppm; monthly	MORE RESTRICTIVE:	Changed surveillance to 7 days.
5.4.2f	3.7.14.1	SR: Verify SFP boron; monthly	MORE RESTRICTIVE:	Changed surveillance to 7 days.
5.4.2g	4.3.2.e	DESC: Spent fuel racks Class I structure	ADMINISTRATIVE:	Requirement unchanged.
5.4.2h		Deleted		

TS Number	RTS Number	TS requirement description	Classification and Description of Changes	
5.4.2i	3.7.15	LCO: Region II and North Pit Restrictions	ADMINISTRATIVE:	Requirement unchanged.
5.4.2 Note	3.7.15, Bases	NOTE: Allowance to remove empty rack	ADMINISTRATIVE:	Discussion moved to RTS bases Section 3.7.15.
Fig. 5.4-1	3.7.15-1, Bases	FIG: Spent Fuel Pool Layout	ADMINISTRATIVE:	Requirement unchanged.
Table 5.4-1	3.7.15-1	TABL: Spent Fuel Pit (Region II)	ADMINISTRATIVE:	Requirement unchanged.
Fig. 5-1	4.0 Relocated	DESC: Site layout	RELOCATED:	Similar figure provided in FSAR.

ENCLOSURE 3

CONSUMERS POWER COMPANY
PALISADES PLANT
DOCKET 50-255

TECHNICAL SPECIFICATION CHANGE REQUEST

Comparison of Revised and Standard Technical Specifications

Palisades Revised Tech Spec Requirement List. (03/28/96)

A listing of the proposed Palisades Revised Tech Specs (RTS) correlated to the CE Standard Tech Specs (STS).

First Column; Proposed Palisades Revised Tech Spec (RTS) number

Each RTS item is listed in the left-most column.
If a STS item has been omitted from RTS, the word 'Omitted' is used.

Second Column; CE Standard Tech Spec (STS) number

The corresponding STS item is listed in the second column.
If a RTS item does not appear in STS, it is noted as 'Added'.

Third Column; Existing Palisades Tech Spec (TS) number

The closest TS item is listed in the third column.
If a RTS item does not appear in TS, it is noted as 'New'.

Fourth Column; RTS Item Description

An abbreviation of the RTS item appears in the third column.
Each item is identified as: LCO, ACTION, SR, ADMIN, Exception, etc.
In cases where a STS item was omitted from RTS, the description is of the STS item.

Description Key:	RTS requirement type:	Column 4 syntax:
	Safety Limit	SL: Safety limit; Applicable conditions
	Limiting Condition for Operation	LCO: LCO Description; Applicable conditions
	Condition	COND: Description of non-conforming condition
	Action	ACTN: Required action; Completion time
	Surveillance Requirement	SR: Test description; Frequency
	Table	TABL: Title
	Administrative Requirement	ADMN: Administrative requirement
	Defined Term	DEF: Name of defined term

Fifth Column; Comments and Explanations of Differences between RTS and STS.

A brief explanation of differences between RTS and STS is provided in the fifth column.

Other abbreviations used in the listing are:

NA:	Not Applicable
CFT:	Channel Functional Test
CHNL:	Channel

RTS Number	STS Number	TS Number	RTS (STS) requirement Description	Explanation of Differences

Global differences between the proposed Palisades Technical Specifications and the Standard Technical Specifications for CE plants, Nureg 1432:

The following changes are not discussed in the explanation of differences for each TS requirement.

1) Bracketed values have been replaced with appropriate values for Palisades. Typically, the basis for these values is provided in the bases document.

2) Each required action of the form "Perform SR X.X.X.X . . ." has been altered by a parenthetical summary of the SR requirements. This change allows a reader to understand the required actions without constantly turning pages to locate the referenced SR.

3) Terminology has been changed to reflect Palisades usage:

"RWT"	becomes	"SIRWT"	Safety Injection Refueling Water Tank
"CEA"	becomes	"Control Rod" or "Rod"	Palisades uses cruciform control rods rather than the multifingered "Control Element Assemblies" of later CE plants.
"RCS"	becomes	"PCS"	Palisades terminology is "Primary Coolant System" rather than "Reactor Coolant System"
"SIAS"	becomes	"SIS"	Palisades terminology is "Safety Injection Signal" rather than "Safety Injection Actuation Signal"
"AC Vital bus"	becomes	"Preferred AC bus"	Palisades terminology.
"PAMI"	becomes	"AMI"	Accident Monitoring Instrumentation, Palisades terminology
"ESFAS"	becomes	"ESF Instrumentation"	There is no stand-alone ESFAS system or cabinet at Palisades; ESF instruments actuate the ESF functions
"DG LOVS"	becomes	"DG UV Start"	Palisades Terminology
"Remote Shutdown System"	becomes	"Alternate Shutdown System"	Palisades Terminology
"Power Rate of Change-High"	becomes	"High Startup Rate"	Palisades Terminology

RTS Number	STS Number	TS Number	RTS (STS) requirement Description	Explanation of Differences
1.1	1.1	1.1	DEFINITION SECTION	Note: Several definitions relating to physics parameters differ from the standard since Palisades is not only an older CE design than that modeled in the standard TS, but uses a different fuel vendor.
1.1 (1)	1.1 (1)	New	DEF: ACTIONS	Unchanged.
1.1 (2)	Added	1.1.(14)	DEF: F_r^A	Palisades specific definition
1.1 (3)	Added	1.1.(16)	DEF: AO	Palisades specific definition
1.1 (4)	1.1 (2)	1.1.(16)	DEF: ASI	Palisades specific definition
1.1 (5)	1.1 (11)	1.4.(6)	DEF: $\bar{E}$	Unchanged. Arranged alphabetically by name, rather than by abbreviation in order to be consistent with other entries in this section.
Omitted	1.1 (3)	NA	DEF: (AZIMUTHAL POWER TILT (Digital))	NA Palisades.
Omitted	1.1 (4)	NA	DEF: (AZIMUTHAL POWER TILT (Analog))	NA Palisades.
1.1 (6)	1.1 (5)	1.3.(3)	DEF: CHANNEL CALIBRATION	Retained existing Channel Calibration definition. STS definition contains new requirements in sentences discussing RTDs and thermocouples, and inplace cross calibrations. The existing TS and proposed RTS contain explicit requirements for calibration of thermocouples. The remainder of the Palisades definition is very similar to the STS definition.
1.1 (7)	1.1 (6)	1.3.(1)	DEF: CHANNEL CHECK	Unchanged.
1.1 (8)	1.1 (7)	1.3.(2)	DEF: CHANNEL FUNCTIONAL TEST	Unchanged.
1.1 (9)	1.1 (8)	1.1(8)	DEF: CORE ALTERATION	Unchanged from Rev 0 of NUREG. Change BWR-05-C3 is inappropriate for Palisades. Removal of the Upper Guide Structure, at Palisades, must be considered a CORE ALTERATION due to the possibility of a fuel assembly remaining attached. The original wording, with its broader implications, is more appropriate.
1.1 (10)	1.1 (9)	NA	DEF: COLR	Unchanged other than using the term "plant" instead of "unit".
1.1 (11)	1.1 (10)	1.4(5)	DEF: DOSE EQUIVALENT I-131	Unchanged.

RTS Number	STS Number	TS Number	RTS (STS) requirement Description	Explanation of Differences
Omitted	1.1 (11)	NA	DEF: (ESF RESPONSE TIME)	Palisades does not use this term. An SER issued during SEP found it unnecessary to perform response time testing at Palisades. This is discussed further in the discussion of deleting the response time SRs.
Omitted	1.1 (12)	NA	DEF: (L_a)	The definition of L_a was moved to the Containment Leak Testing Program in accordance with the NRC/NEI model Tech Specs implementing Appendix J, Option B testing.
1.1 (12)	1.1 (13)	New	DEF: LEAKAGE	Changed to use Palisades specific terminology and to make the second half of paragraph a.2 an "and" rather than an "or".
1.1 (13)	1.1 (14)	New	DEF: MODE	Unchanged except for the use of Palisades specific terminology.
1.1 (14)	1.1 (15)	1.4(1)	DEF: OPERABLE	Unchanged.
1.1 (15)	1.1 (16)	1.1(10)	DEF: PHYSICS TESTS	Item a. deleted. It is not applicable to Palisades.
1.1 (16)	1.1 (17)	New	DEF: PTLR	PTLR definition changed to reflect the wording of Tech Spec Task Force change TSTF-4 (WOG-1.3).
1.1 (17)	Added	1.1(13)	DEF: T_q	Palisades specific definition.
1.1 (18)	1.1 (18)	1.1(1)	DEF: RTP	Unchanged, except for use of Palisades specific terminology.
Omitted	1.1 (19)	NA	DEF: (RPS RESPONSE TIME)	Palisades does not use this term. An SER issued during SEP found it un-necessary to perform response time testing at Palisades. This is discussed further in the discussion of deleting the response time SRs.
1.1 (19)	1.1 (20)	1.1(9)	DEF: SDM	Unchanged, except for use of Palisades specific terminology.
1.1 (20)	1.1 (21)	New	DEF: STAGGERED TEST BASIS	Unchanged.
1.1 (21)	1.1 (22)	New	DEF: THERMAL POWER	Unchanged.
1.1 (22)	Added	1.1(15)	DEF: F_r^T	Palisades specific definition.
Omitted	1.1 (23)	NA	DEF: (UNRODDED PEAKING FACTOR (Analog))	NA Palisades
Omitted	1.1 (24)	NA	DEF: (UNRODDED PEAKING FACTOR (Digital))	NA Palisades
1.1-1	1.1-1	New	Tabl: MODE Definitions	Unchanged.
1.1-1(1)	1.1-1(1)	1.1(3)	DEF: MODE 1 (Power Operation)	Unchanged

RTS Number	STS Number	TS Number	RTS (STS) requirement Description	Explanation of Differences
1.1-1(2)	1.1-1(2)	1.1(4)	DEF: MODE 2 (Startup)	Unchanged.
1.1-1(3)	1.1-1(3)	1.1(5)	DEF: MODE 3 (Hot Standby)	Unchanged.
1.1-1(4)	1.1-1(4)	New	DEF: MODE 4 (Hot Shutdown)	Unchanged.
1.1-1(5)	1.1-1(5)	1.1(7)	DEF: MODE 5 (Cold Shutdown)	Unchanged.
1.1-1(6)	1.1-1(6)	1.1(8)	DEF: MODE 6 (Refueling)	Unchanged.
1.2	1.2	New	ADMN: Logical Connector discussion	Unchanged.
1.3	1.3	New	ADMN: Completion Time discussion	The completion times of Example 1.3-3 were changed to reflect items actually contained in proposed RTS (LCO 3.8.1). The equivalent the of example in STS does not appear in the Palisades proposed RTS. Completion times in examples 1.3-4 and 1.3-5 have been changed to reflect the Palisades 30 hours for reaching MODE 4. Example 1.3-6 was deleted and 1.3-7 renumbered. Example 1.3-6 represents a Completion Time form not used in the proposed RTS.
1.4	1.4	New	ADMN: Frequency Discussion	The word "met," in the first paragraph of the description section, has been changed to "performed" to better fit the context. The text following example 1.4-3 has been re-arranged and an introductory sentence added; the published text appears to have been disarranged.

RTS Number	STS Number	TS Number	RTS (STS) requirement Description	Explanation of Differences
2.0	2.0		SAFETY LIMITS	
2.1.1.1	2.1.1.1	2.1	SL: DNBR ≥ 1.17/1.154/1.141; MODES 1 & 2	The existing Safety Limits were retained. Palisades is currently licensed with three DNBR Safety Limits. These Safety Limits were approved by Amendment 168 on June 13, 1995.
2.1.1.2	2.1.1.2	New	SL: Linear heat rate ≤ 21 kw/ft; MODES 1 & 2	Unchanged.
2.1.2	2.1.2	2.2	SL: PCS pressure ≤ 2750 psia; MODES 1-5	Unchanged.
2.2.1	2.2.1	6.7	ACTN: If SL 2.1.1.1 or SL 2.1.1.2 is violated;	Unchanged.
2.2.2	2.2.2	6.7	ACTN: If SL 2.1.2 is violated;	Unchanged.
2.2.2.1	2.2.2.1	6.7	ACTN: SL 2.1.2 violated in MODES 1 or 2;	Unchanged.
2.2.2.2	2.2.2.2	6.7	ACTN: SL 2.1.2 violated in MODES 3, 4, 5, or 6.	Unchanged.

RTS Number	STS Number	TS Number	RTS (STS) requirement Description	Explanation of Differences
3.0	3.0		APPLICABILITY SECTION	
3.0.1	3.0.1	3.0.1	LCO: LCOs shall be met except as provided in LCO 3.0.2.	Unchanged.
3.0.2	3.0.2	3.0.1	LCO: Upon failing to meet a LCO the ACTIONS shall be met.	Unchanged.
3.0.3	3.0.3	3.0.3	LCO: SD Required when beyond LCO & ACTIONS; MODES 1,2,3,4	Changed time to MODE 4 from 13 to 31 hours. Palisades cannot degas primary coolant system sufficiently to allow opening system for maintenance within 13 hour period, and must have elevated pressure/temperature to accomplish degas flow. Time to MODE 5 is unchanged. In addition, the word "unit" was changed to "plant" as plant specific usage.
3.0.4	3.0.4	3.0.4	LCO: Limits MODE entry unless LCOs met	Unchanged.
3.0.5	3.0.5	New	LCO: Equip declared inop may be operated to show OPERABILITY	Unchanged.
3.0.6	3.0.6	New	LCO: Equip may be made inoperable for SRs and . . .	Unchanged.
3.0.7	3.0.7	New	LCO: Special Test Exceptions	Unchanged.
3.0.1	3.0.1	4.0.3	SR: Failure to meet SR or Frequency is failure to meet LCO.	Unchanged.
3.0.2	3.0.2	4.0.2	SR: The Frequency is met if within 1.25X interval specified.	Unchanged.
3.0.3	3.0.3	4.0.3	SR: When failed to do SR; may delay for up to 24 Hrs.	Unchanged.
3.0.4	3.0.4	4.0.4	SR: Shall not entry applicability unless the SRs met.	Unchanged.

RTS Number	STS Number	TS Number	RTS (STS) requirement Description	Explanation of Differences
3.1	3.1	3.10	REACTIVITY CONTROL SECTION	Several major differences exist between Palisades and the "Standard" CE plant which affect this section: Palisades is the oldest CE PWR and has different hardware and analyses from the newer CE plants; Palisades also uses Siemens Power Corp.(SPC) fuel rather than CE fuel. Therefore several of the LCOs, Actions, etc in this section differ from RSTS. Actions, Completion times, SRs and frequencies were kept as close to the RSTS as possible while implementing a different set of limitations and requirements. The conditions and actions specified reflect current tech specs and operating practice.
3.1.1	3.1.1	3.10.1.a	LCO: Shutdown margin ≥ 2%; MODE 3 ≥ 525 F	Used Palisades value (2%) and applicability. Palisades Safety Analysis assumes 2% SDM as an initial condition therefore; Siemens Power Corp. analyzes to this value for this applicability range. MODES 1 and 2 SDM requirements are assured by LCO 3.1.6 and 3.1.7. Reactivity units changed to meet industry standard.
3.1.1 A	3.1.1 A	3.0.3	COND: SDM < limit	Unchanged.
3.1.1 A.1	3.1.1 A.1	3.0.3	ACTN: Borate to restore SDM; 15 Min.	Unchanged.
3.1.1.1	3.1.1.1	New	SR: Verify SDM; 24 hours	Reworded SR to agree with SR 3.1.2.1, which must support 2 different limits. Wording of 2 SRs requiring the same task should be worded alike.
3.1.2	3.1.2	3.10.b	LCO: SDM shall be ≥ 3.75% MODE 3 < 525, MODE 4, and 5	Used Palisades bounding value for former < 4 PCP operation. This value is an initial assumption to the Palisades safety analysis and allows for the maintenance of SL integrity in the event of a DBA for stated range of applicability. Reactivity units changed to meet industry standard.
3.1.2 A	3.1.1 A	3.0.3	COND: SDM < limit	Unchanged.
3.1.2 A.1	3.1.2 A.1	3.0.3	ACTN: Borate to restore SDM; 15 Min.	Unchanged.
3.1.2.1	3.1.2.1	New	SR: Verify SDM; Within 2 hours following a RX trip; 24 hours	Changed wording to remove SDM limit. Added frequency of verifying SDM within 2 hours following a reactor trip or shutdown. This added frequency allows SDM to be verified within 2 hours from a reactor trip. This circumvents the case were the reactor trips 1 minute after the 24 hour surveillance was performed and then would not be required to be performed for 23 hours and 59 minutes following a reactor trip.
3.1.3	3.1.3	4.10	LCO: Reactivity Balance; MODES 1 & 2	Unchanged.

RTS Number	STS Number	TS Number	RTS (STS) requirement Description	Explanation of Differences
3.1.3 A	3.1.3 A	4.10	COND: Core reactivity balance not w/in limit	Reworded to agree with LCO.
3.1.3 A.1	3.1.3 A.1	4.10	ACTN: Determine Rx OK; 72 hrs	Unchanged.
3.1.3 A.2	3.1.3.A.2	4.10	ACTN: Establish restrictions; 72 hrs	Unchanged.
3.1.3 B	3.1.3 B	4.10	COND: Required action & completion time not met	Unchanged.
3.1.3 B.1	3.1.3 B.1	4.10	ACTN: Be in MODE 3; 6 hours	Unchanged.
3.1.3.1	3.1.3.1	4.10	SR: Verify core reactivity balance OK; 31 days	Reworded to agree with LCO.
3.1.4	3.1.4	3.12	LCO: MTC w/in limits stated in the COLR; MODES 1, and 2	Added maximum positive value from current license.
3.1.4 A	3.1.4 A	3.0.3	COND: MTC not w/in limits	Unchanged.
3.1.4 A.1	3.1.4 A.1	3.0.3	ACTN: MODE 3; 6 hours	Unchanged.
3.1.4.1	3.1.4.1	4.20.1	SR: Verify MTC w/in limits in COLR.	Retained only 'Prior to MODE 1 operation after each refueling' frequency. This frequency meets ANSI standard 19.6.1 for startup physics testing. The Beginning Of Core (BOC) MTC value is an adequate verification of nuclear methods for predicting MTC. Determining the BOC MTC yields the greatest challenge to nuclear methods prediction due to excessively high boron concentrations at BOC. Therefore, the current SR is adequate to ensure that the MTC is within design limits throughout the fuel cycle.
Omitted	3.1.4.2	NA	SR: (Mid-Cycle MTC Test)	See note for SR 3.1.4.1.
3.1.5	3.1.5	3.10.5	LCO: Control Rod Operability and Alignment	Used Palisades terms and values; omitted CEA Motion Inhibit, which has no equivalent at Palisades since Palisades uses cruciform control blades. Conditions and required actions were changed to reflect different hardware, analyses, and operating practice.
3.1.5 A	New	3.10.4.b	COND: One rod inoperable	See note for LCO 3.1.5
3.1.5 A.1	3.1.5 A.2.1	3.10.1.d	ACTN: Verify SDM; 1 hr	Unchanged.
3.1.5 A.2	3.1.5 A.2.2	3.10.4.c	ACTN: Initiate boration to restore SDM; 1 hr	Unchanged.
Omitted	3.1.5 A.3.1	3.0.3	ACTN: (Restore misaligned rod; 2 hrs)	It is implied that restoration to a condition that places the plant within the limits of the LCO is an option.
Omitted	3.1.5 A.3.2	3.0.3	ACTN: (Re-Align; 2 hrs)	Re-Align is always an option.

RTS Number	STS Number	TS Number	RTS (STS) requirement Description	Explanation of Differences
3.1.5 B	3.1.5 B	3.10.4.c	COND: One rod misaligned	See note for LCO 3.1.5
3.1.5 B.1	Added	3.10.4.a	ACTN: Declare rod inoperable; 1 hr	See note for LCO 3.1.5
3.1.5 B.2.1	Added	3.10.4.c	ACTN: Verify radial peaking factors; 2 hrs	Retained from current license base. See note for LCO 3.1.5
3.1.5 B.2.2	3.1.5 B.1	3.10.4.c	ACTN: Restrict power ≤ 75%; 2 hrs	Unchanged except 75% RTP retained from current license. See note for LCO 3.1.5
Omitted	3.1.5 C	NA	COND: (Motion Inhibit inoperable)	No comparable function at Palisades.
3.1.5 C	Added	3.10.4.c	COND: One rod misaligned by > 20"	See note for LCO 3.1.5
3.1.5.C.1	Added	3.10.4.a	ACTN: Declare the rod inoperable	See note for LCO 3.1.5
3.1.5 C.2	Added	New	ACTN: Verify SDM; 1 hr	Verifies SDM with a misaligned rod.
3.1.5 C.3	Added	New	ACTN: Restrict power ≤ 50%; 4 hrs	A rod misaligned greater than 20 inches may be considered a dropped rod. Reflects Palisades ability to pick up a dropped rod as long as power is restricted.
3.1.5 D	3.1.5 D	3.10.4	COND: Deviation alarm circuit inoperable	Unchanged
3.1.5 D.1	3.1.5 D.1	3.10.4	ACTN: Perform SR 3.1.5.1 (Rod Position Verification); 15 Min.	Changed time to 15 minutes following rod motion. This reflects Palisades rod movement is only a manual capability.
3.1.5 E	3.1.5 E	3.0.3	COND: Two or More control rods inoperable	Changed to agree with preceding wording.
Omitted	3.1.5 E	NA	COND: (One or more rods Untrippable)	Omitted since untrippable rods are declared inoperable and fall into condition stated previously.
3.1.5 E	3.1.5 E	3.0.3	COND: Required Action not met	Changed to agree with preceding conditions
3.1.5.E.1	3.1.5 E.1	3.10.4.b	ACTN: MODE 3; 12 hrs	The action time of 12 hours in retained. This differs from the CE standard due to Palisades inherent low leakage core design. In the event a rod is misaligned, the local peaking factors are substantially elevated in that locality. The much larger reactivity worth and peaking influence from a mispositioned cruciform blade as opposed to a CEA would warrant a slower derate ensuring radial peaking remains in design limits while not initiating any core instabilities.
3.1.5.1	3.1.5.1	New	SR: Check Rod position; 12 hours	Used Palisades value; no other changes
3.1.5.2	3.1.5.2	4.1.3.2.a	SR: Compare rod pos indicators; 12 hours	Changed wording to reflect different equipment and terminology; used Palisades value; no other changes.

RTS Number	STS Number	TS Number	RTS (STS) requirement Description	Explanation of Differences
Omitted	3.1.5.3	NA	SR: (CEA Motion Inhibit; 31 days)	No comparable equipment at Palisades.
3.1.5.3	3.1.5.4	New	SR: Rod pos deviation Alm; 92 days	Used Palisades terminology and retained surveillance frequency.
3.1.5.4	3.1.5.5	4.2.2.2	SR: Exercise each rod; 92 days	Used Palisades terminology. Palisades has different type rod drive mechanisms.
3.1.5.5	3.1.5.6	4.2.2.1	SR: Rod drop times; 18 months	Used Palisades value; no other changes
3.1.5.6	3.1.5.7	4.1.3.2.c	SR: Primary rod pos channel cal test; 18 months	Used Palisades terms; no other changes
3.1.6	3.1.6	3.10.3/.6	LCO: SD & PL Rod withdrawal; MODES 1 & 2	Added Part Length rods to LCO, there is no counter part in RSTS; used Palisades value & terminology. No other changes.
3.1.6 A	3.1.6 A	3.0.3	COND: SD or PL Rod not within limits	Added PL rods.
3.1.6 A.1.1	3.1.6 A.1	3.0.3	ACTN: Verify SDM ≥ 2%; 1 hour	Unchanged, with the exception of updating the SDM value to match Palisades requirements for MODES 1 and 2.
3.1.6 A.1.2	3.1.6.A.1.2	3.0.3	ACTN: Initiate boration to restore SDM ≥ 2%; 1 hr	Unchanged.
3.1.6 B	3.1.6 B	3.0.3	COND: Required action not met	Unchanged.
3.1.6.B.1	Added	3.0.3	ACTN: Verify SDM ≥ 2%	Added to verify core reactivity configuration prior to power reduction.
3.1.6.B.2	3.1.6.B.1	3.0.3	ACTN: Be in MODE 3; 12 hours	Changed completion time from 6 to 12 hours to ensure safe shutdown with a skewed power distribution. Palisades low leakage core design and cruciform blades provide a very steep gradient on the radial power distribution. A longer time period would be warranted to shutdown from a mispositioned rod condition to ensure peaking factors are not violated.
3.1.6.1	3.1.6.1	New	SR: Verify SD & PL rod position; 12 hrs & etc	Unchanged.
3.1.7	3.1.7	3.10.5	LCO: Reg rod insertion limits; MODES 1 & 2	Unchanged.
3.1.7 A	3.1.7 A	3.10.5.a	COND: Reg rods beyond limit	Omitted reference to "transient limit" since Palisades has no such limit.
3.1.7 A.1.1	3.1.7 A.1.1	3.10.5.a	ACTN: Verify SDM ≥ 2%; 1 hr	Unchanged.
3.1.7 A.1.2	3.1.7 A.1.2	3.10.5.a	ACTN: Initiate boration to restore SDM ≥ 2%; 1 hr	Unchanged.
3.1.7 A.2	3.1.7 A.2	3.10.5.a	ACTN: Reduce Thermal Power to limits stated in the COLR; 2 hr	Unchanged.

RTS Number	STS Number	TS Number	RTS (STS) requirement Description	Explanation of Differences
Omitted	3.1.7 A.2.1	3.10.5.a	ACTN: (Restore rod within limits; 2 hrs)	Omitted since this is implied that restoring the condition to within limits satisfies the LCO.
3.1.7 B	Added	3.0.3	COND: Seq or Overlap exceeds limit	RSTS provided no Condition or Action for part of LCO.
3.1.7 B.1	Added	3.0.3	ACTN: Verify SDM ≥ 2%; 1 hr	Specified action like that in 3.1.7 A.1
Omitted	3.1.7 B	NA	COND: (Rods between Transient & SS limits)	Omitted, Palisades has only a single limit
Omitted	3.1.7 C	NA	COND: (Rods between Transient & SS limits)	Omitted, Palisades has only a single limit
3.1.7 C	3.1.7 D	3.0.3	COND: PDIL Alm inoperable	Unchanged.
3.1.7 C.1	3.1.7 D.1	New	ACTN: Verify rod group pos; 15 minutes	SR changed to 15 minutes following any rod motion since Palisades only has manual rod manipulation not automatic.
3.1.7 D	3.1.7 E	3.0.3	COND: Required action not met	Reworded to agree with altered Actions.
3.1.7 D.1	Added	New	ACTN: Verify SDM; 1 hr	Added since if Condition 3.1.7 A is not corrected, SDM is not assured.
3.1.7 D.2	3.1.7 E.1	3.0.3	ACTN: Be in MODE 3; 6 hrs	Unchanged.
3.1.7.1	3.1.7.1	New	SR: Verify reg group position; 12 hrs	Unchanged.
Omitted	3.1.7.2	NA	SR: (Verify times between limits; 24 hrs)	Palisades does not have a transient limit.
3.1.7.2	3.1.7.3	New	SR: Demonstrate PDIL alm OPERABLE; 31 days	Unchanged.
Omitted	3.1.7-1	NA	Figr: (Rod insertion limit figure)	Palisades single insertion limit is contained within the COLR.
3.1.8	3.1.8	3.10.7/.8	LCO: Test exemption, SDM MTC & Rods; MODES 2 & 3	Added LCO 3.1.2, 3.1.5, 3.1.6 to be suspended to support current startup physics testing program used for Palisades.
3.1.8 A	3.1.8 A	New	COND: LCO not met	Unchanged.
3.1.8 A.1	3.1.8 A.1	New	ACTN: Initiate boration; 15 min	Unchanged.

Palisades RTS Cross Reference to STS. (03/28/96).

RTS Number	STS Number	TS Number	RTS (STS) requirement Description	Explanation of Differences
3.1.8.1	3.1.8.1	New	SR: Verify rod position; 2 hrs	Unchanged.
3.1.8.2	3.1.8.2	New	SR: Verify withdrawn rods trippable; w/in 7 days	Unchanged.
Omitted	3.1.9	3.10.7/.8	LCO: (Test exemption, Rods, SDM, Power; MODES 1 & 2)	This LCO has been omitted since Palisades startup physics testing is performed after each refueling and covers both STE's 3.1.8 and 3.1.9. STE 3.1.8 has been modified to incorporate this. STE 3.1.9 is geared toward Mid-cycle MTC testing which Palisades does not perform per current license.

RTS Number	STS Number	TS Number	RTS (STS) requirement Description	Explanation of Differences
3.2	3.2	3.23	POWER DISTRIBUTION	Several major differences exist between Palisades and the "Standard" CE plant which affect this section: Palisades is the oldest CE PWR and has different hardware and analyses from the newer CE plants; Palisades also uses ANF fuel rather than CE fuel. Therefore several of the LCOs, actions, etc is this section differ from RSTS. Actions, Completion times, SRs and frequencies were kept as close to the RSTS as possible while implementing a different set of limitations and requirements. The conditions and actions specified reflect current tech specs and operating practice.
3.2.1	3.2.1	3.23.1	LCO: LHR < limit and Incore Alms OPERABLE; ≥50%	The LCO statement is essentially unchanged with the exception of changing the applicability to MODE 1 ≥ 50%. The 50% RTP applicability is retained from the current license. Palisades has a great deal of thermal margin below this power range.
3.2.1 A	3.2.1 A	3.23.1	COND: LHR not within limits incores	Essentially unchanged, reworded for clarity.
Omitted	3.2.1 A	3.23.1	COND: LHR not within limits excores	See note for section 3.2.
3.2.1 A.1	3.2.1 A.1	3.23.1	ACTN: Restore LHR; 1 hour	Unchanged.
3.2.1 B	Added	3.23.1	COND: Incore alarm system inoperable	Condition added to support Incore alm system in LCO.
3.2.1 B.1.1	Added	3.23.1	ACTN: Verify Excores avail for LHR monitoring; 2 hrs	Added action to support added LCO requirement
3.2.1 B.1.2	Added	3.23.1	ACTN: Restrict power to APL; 2 hrs	Added action to support added LCO requirement
3.2.1 B.1.3	Added	3.23.1	ACTN: Verify T_q; pwr & ASI; each 4 hrs	Added action to support added LCO requirement
3.2.1 B.2.1	Added	3.23.1	ACTN: Restrict power to < 85%; 2 hrs	Added action to support added LCO requirement
3.2.1 B.2.2	Added	3.23.1	ACTN: Verify LHR w. manual incore readings; each 4 hrs	Added action to support added LCO requirement
3.2.1 C	3.2.1 B	3.0.3	COND: Required Action not met	Unchanged.
3.2.1 C.1	3.2.1 B.1	3.23.1	ACTN: Be < 50% RTP; 2 hrs	Changed action taking plant out of applicability range < 50% RTP. This value is retained from current license and allows the core to be placed in a conservative state with ample thermal margin.
3.2.1.1	Added	4.19.1.2.d	SR: Verify AO is w/in 0.05 of target; 15 minutes	This is retained from Palisades current license and has no comparable function in STS
3.2.1.2	Added	New	SR: Verify Incore alm system function for LHR monitor; 12 hrs	This SR ensures that operators are informed by the Plant process computer that the incore system is not functional for LHR monitoring.

RTS Number	STS Number	TS Number	RTS (STS) requirement Description	Explanation of Differences
3.2.1.3	Added	New	SR: Verify LHR w/in limit; 4 hours	LHR is continuously monitored by the Incore Monitoring System however this surveillance has been modified to a frequency of 4 hours to allow for the manual reading of Incores if the condition warrants it necessary.
3.1.2.4	3.2.1.3	4.19.2.1	SR: Update Incore Alarm Set points; 31 days	Removed unnecessary notes and reworded to apply to reflect Palisades current Power Distribution monitoring and incore alarm updates.
3.2.1.5	Added	4.18.2.1.a	SR: Verify APL, T_q, Target AO; 31 days	The note modifies this SR to illustrate that this is only applicable when using the excore monitoring system for LHR monitoring. This SR ensures that the excore monitoring system can be used for LHR monitoring.
3.2.1.6	Added	4.17	SR: Perform incore alarm CHANNEL CALIBRATION	An incore alarm CHANNEL CALIBRATION is performed to ensure alarm actuation upon signal receipt within limits.
Omitted	3.2.1.1	NA	SR: (Verify ASI alm setpoints)	NA to Palisades LHR LCO; see Palisades RTS SR 3.2.5.2
Omitted	3.2.1.2	NA	SR: (Demonstrate Local power density alms)	NA Palisades
3.2.2	3.2.3	3.23.2	LCO: Radial peaking factors: ≥ 25%	Changed LCO and applicability to reflect Palisades requirements.
3.2.2 A	3.2.3 A	3.23.2	COND: Radial peaking not w/in limit	Reworded to reflect Palisades limits.
3.2.2 A.1	3.2.3 A.1	3.23.2	ACTN: Restore radial peaking factors; 6 hrs	Reworded to reflect Palisades limits.
Omitted	3.2.3 A.2	NA	ACTN: (Withdraw CEAs above long term limit; 6 hrs)	NA to Palisades; we have no comparable limit or requirement.
Omitted	3.2.3 A.3	NA	ACTN: (Establish a revised upper THERMAL POWER limit)	NA Palisades has no comparable limit or requirement.
3.2.2 B	3.2.3 B	3.0.3	COND: Required action not met	Changed applicability to take plant below 25% RTP placing the plant outside of the LCO requirements and placing the plant in a conservative state.
3.2.2.1	3.2.2.1	4.19.2.1.b	SR: Verify Radial Peaking and T_q	Changed SR to reflect Palisades limits and requirements. Standard SR 's 3.2.3.1,3.2.3.2, and 3.2.3.3 have been combined into the Palisades specific SR 3.2.2.1 since when radial peaking is verified quadrant power tilt is also verified by default.
Omitted	3.2.3.2	NA	SR: (Verify F_r)	Palisades does not use F_{xy}.
Omitted	3.2.3.3	NA	SR: Verify (T_q)	Palisades uses a different parameter labeled T_q, which is the subject of RTS LCO 3.2.3.

RTS Number	STS Number	TS Number	RTS (STS) requirement Description	Explanation of Differences
Omitted	3.2.3	NA	LCO: (Total Planar Radial Peaking Factor)	Palisades does not use this parameter. Entire LCO with actions and SRs omitted.
3.2.3	3.2.4	3.23.3	LCO: T_q < 5%; ≥ 25%	The parameters represented by T_q are similar, but not identical. The limits and specified actions were retained from current Palisades Tech Specs.
3.2.3 A	3.2.4 A	3.23.3.1	COND: 5% < T_q < 10%	Changed quadrant power tilt to be expressed in a percentage and changed the lower limit to a Palisades specific value from current T.S. of 5%.
Omitted	3.2.4 A.1	3.23.3.1.a	ACTN: (Restore Tq; 2 hrs)	Unnecessary; restoration is always an option, whether before or after 2 hours.
3.2.3 A.1	3.2.4 A.2	3.23.3.1.b	ACTN: Verify Radial Peaking Factors; 2 hrs & every 8 hrs	Reworded with intent and action remaining unchanged.
3.2.3 B	Added	3.23.3.2	COND: T_q > 10%	Unchanged. Retained from current T.S.
3.2.3 B.1	3.2.4 B.1	3.23.3.2.b	ACTN: Restrict power; 4 hrs	Unchanged. Retained from current T.S.
3.2.3 B.2	3.2.4 A.2	3.23.3.2.b	ACTN: Verify Radial Peaking Factors; 4 hrs & each 8 hrs	This step moved to after power reduction action since power reduction required w/o respect to radial peaking factor results, and the power decrease required by action B.1 is what LCO 3.2.2 would require for radial peaking out of spec.
3.2.3 C	Added	3.23.3.3	COND: Required action not met, or Tq > 15%	Unchanged. Retained from current T.S.
3.2.3 C.1	3.2.4 C.2	3.23.3.3	ACTN: be out of applicability (25%; 12 hrs	Unchanged. Retained from current T.S. A 12 hr completion time for power reduction is necessary to ensure a safe and orderly shutdown from this condition. Power reduction to < 25 % RTP ensures adequate thermal margin and places the plant in a conservative condition.
Omitted	3.2.4 C.1	NA	ACTN: (Verify Radial Peaking Factors; 1 hr)	Once in this condition action states to place the plant < 25% RTP which allows for adequate thermal margin and places the plant in a conservative condition. Peaking factor verification is not warranted.
Omitted	3.2.4 C.3	NA	ACTN: (Restore T_q ≤ 3%; Prior to increase)	Restore is always an option
3.2.3.1	3.2.4.1	4.18.2.1	SR: Verify T_q; 12 hrs	Unchanged.
3.2.4	3.2.5	New	LCO: ASI w/in limit; ≥ 25%	Used Palisades applicability. Deleted reference to specific figure in the COLR.
3.2.4 A	3.2.5 A	New	COND: ASI not w/in limit	Unchanged.

RTS Number	STS Number	TS Number	RTS (STS) requirement Description	Explanation of Differences
3.2.4 A.1	3.2.5 A.1	New	ACTN: Restore ASI; 2 hrs	Unchanged.
3.2.4 B	3.2.5 B	New	COND: Required action not met	Changed to reflect different applicability.
3.2.4.1	3.2.5.1	New	SR: Verify ASI each 12 hrs	Unchanged
3.2.5	Added	4.18 & 4.19	LCO: Three ASI channels and deviation alarm operable	Added LCO and subsequent conditions required actions and surveillances to assure accurate LHR monitoring.

RTS Number	STS Number	TS Number	RTS (STS) requirement Description	Explanation of Differences
3.3	3.3	3.16/.17	INSTRUMENTATION	
3.3.1	3.3.1/3.3.2	2.3/3.17.1	LCO: Four RPS channels OPERABLE; Modes 1 & 2 and MODES 3, 4, 5 w > 1 rod capable of withdrawal.	RTS LCO 3.3.1 has similar APPLICABILITY to STS LCO 3.3.1 and 3.3.2, since Palisades requires all trips to be OPERABLE in the lower modes. Therefore STS LCO 3.3.2 has been eliminated. STS LCO 3.3.2 only requires MODE 3, 4, 5, APPLICABILITY for High Startup Rate. This is Less Restrictive than RTS. The APPLICABILITY for the lower MODES is consistent with existing Palisades TS and is similar to STS except that it specifies More than one Control Rod capable of withdrawal, rather than one rod capable of withdrawal. Palisades has a rod drop test panel downstream of the clutch power supplies which allows individually removing power to rods. This capability does not exist elsewhere. One rod withdrawn is assumed for SDM calculation purposes in the lower MODES. The listed RPS trip units are those assumed OPERABLE in the Palisades safety analyses. The allowable values specified are the same as in the existing Palisades Tech Specs. Trips are listed in the order in which they appear on the front of the RPS.
3.3.1 A	3.3.1 A	3.17.1.2	COND: One RPS instrument channel inoperable	Unchanged, except that "excore not calibrated with incores" deleted from STS, since Palisades does not have an APD trip. Instead, "Hi Start Up Rate or Loss of Load" is excepted in RTS to be consistent with current TS. At Palisades, these equipment protective trips have fewer than four sensor channels, and cannot be repaired at power.
Omitted	3.3.1 A.1	NA	ACTN: (Place in bypass or trip, 1 hr.)	This action is not proposed. It would comprise a new requirement for Palisades. Placing an inoperable channel in bypass provides no safety benefit over leaving it unbypassed, and in some instances could preclude trouble shooting or repair. Current TS does not have this requirement.
Omitted	3.3.1.A.2.1	NA	ACTN: (Restore in 48 hours)	Restore is always an option. This action is not in existing TS and is not proposed.
3.3.1 A.1	3.3.1 A.2.2	3.17.1.2 a	ACTN: Trip RPS trip units; 7 days	Completion Time in STS is 48 hours. TS is 7 days
3.3.1 B	3.3.1 B	3.17.1.3	COND: Two RPS inst channels inoperable	Unchanged except for the exception of Loss of Load and Hi Start Up Rate in RTS, vice Ex-core versus Incore Cal in STS. Similar reasoning as for RTS Condition A. This is as in TS.
3.3.1.B.1	3.3.1 B.1	3.17.1.3 a	ACTN: Trip one channel; 1 hour	Deleted requirement to bypass one channel, for reasoning similar to Condition A. Placement of one channel in Trip in 1 hr is consistent with STS and TS.

RTS Number	STS Number	TS Number	RTS (STS) requirement Description	Explanation of Differences
3.3.1 B.2	3.3.1 B.2	3.17.1.3 c	ACTN: Restore one channel in 7 days	Unchanged except completion time is 48 hours in STS. It is 7 days in TS. This is retained in RTS.
Omitted	3.3.1 C	NA	COND: (One or more excore channel not cal w. incores)	There is no equivalent requirement at Palisades. There is no APD Trip.
3.3.1 C	Added	3.3.1 a	COND: One Loss of Load or Hi Start Up Rate inoperable	Same as TS. Palisades has fewer than four sensor channels on these functions. They cannot be repaired at power.
3.3.1 C.1	Added	New	ACTN: Restore before Start Up	New requirement. Current TS does not specify restoration. Since Loss of Load or Hi Start Up Rate may not be repairable at power, this requires repair when shutdown.
3.3.1 D.	Added	3.17.1.3 a	COND: Two Hi Start Up Rate or Loss of Load channel inoperable:	Same as TS
3.3.1 D.1/D.2	Added	3.17.1.3 a/c	ACTN: Place 1 in trip and restore 1 before Start Up	Same as TS, but restoration step is not specified in TS. Since Loss of Load and Hi Start Up Rate may not be repairable at power, this requires repair when shutdown.
3.3.1 E.	3.3.1 D/E	New	COND: One or more function with one or two bypass channel inop.	Same intent as STS. STS Conditions combined, since Actions the same. No bypass removal in TS.
3.3.1 E.1	3.3.1 D.1/E.1	New	ACTN: Disable bypass channels, 1 hr	Same as STS
3.3.1 E.2	3.3.1 D.2/E.2	New	ACTN: Declare Trip Units inoperable, enter appropriate Condition	Same intent as STS. Since some bypass channels (Loss of Load and Hi Start Up Rate) affect functions that do not require the same Actions as others, entering the same Condition as the affected inoperable channel is a clean way reflecting the different required actions.
3.3.1 F	3.3.1 F	3.17.1.6	COND: Required action not met	Unchanged.
3.3.1 F.1	3.3.1 F.1	3.17.1.6 a	ACTN: Be in Mode 3; 6 hours	Unchanged.
3.3.1 F.2.1	3.3.1 F.2	3.17.1.6 b	ACTN: Ensure < 2 rods can be withdrawn	Places the plant in a condition where the LCO does not apply. Times consistent with LCO 3.0.3. Analogous to shutdown Track of LCO STS 3.3.2. This additional step is required since RTS LCO 3.3.1 is applicable in lower modes, whereas in STS, LCO 3.3.2 addresses lower Modes.
3.3.1 F.2.2	Added	3.17.6 b	ACTN: Ensure PCS boron > LCO 3.9.1 limit	Added this action as an altermate to 3.3.1 F.2.1 because either action would take plant out of applicability for LCO 3.3.1.
3.3.1 G	Added	New	COND: Control room > 90°F	Added condition to reflect Control Room temperature exceeding Thermal Margin Monitor (TMM) qualification.

RTS Number	STS Number	TS Number	RTS (STS) requirement Description	Explanation of Differences
3.3.1 G.1	Added	New	ACTN: Enter 3.0.3; Immediately	Added action to reflect all TMM channels being inoperable due to exceeding temperature.
3.3.1.1	3.3.1.1	4.17.1t	SR: Channel Check all but Loss of Load and CHP, 12 hrs.	Same as STS, except CHP not excepted in STS. CHP is pressure switch. Same requirements as TS.
3.3.1.2	3.3.1.2	4.17.1t (b)	SR: Daily Calorimetric NI and Delta T Power, 24 hours	Same as STS, except deleted Note 2 of STS, which permits suspension of calorimetric during physics testing. This provision is not needed at Palisades, since power ascension procedures do not require suspension.
Omitted	3.3.1.3	NA	SR: (Calibrate Power Range NI channels using Incores)	There is no APD Hi trip at Palisades. Therefore this is not RPS-related instrumentation. Other power distribution monitoring addressed in the power distribution monitoring LCO section.
3.3.1.3	3.3.1.4	4.17.1t	SR: Perform CFT except Loss of Load & Hi Start Up Rate, 92 days	Unchanged
3.3.1.4	3.3.1.5	4.17.1t (c)	SR: Calibrate the Power Range NIs with Test Signal, 31 days	RTS test same as TS. Similar to STS, but use of internal test signal specified in lieu of standard CHANNEL CALIBRATION wording. Actual CHANNEL CALIBRATION done every 18 months, per SR 3.3.1.8, as in TS. CHANNEL CALIBRATION Interval in STS is 92 days. This Calibration with a test signal is retained as 31 days in TS to RTS conversion.
3.3.1.5	Added	4.17.1t 15.	SR: Verify TMM constants, 92 days	The TMM is a digital device not part of the STS hardware. It calculates the TM/LP and VHPT. Interval same as in TS
3.3.1.6	3.3.1.6	4.17.1t (a)	SR: Perform CFT of LOL and Hi SUR, 7 days before Start Up	Unchanged
3.3.1.4/6	3.3.1.7	NA	SR: Perform CFT on bypass removal channels	Bypass removal channels are not specified in TS. CFT on bypass rem. channel is done at same interval as the source hardware. For WR NIs, this is 7 days before Start Up per SR 3.3.1.6. For Loss of Load, sensed from power range NIs, it is 31 days per SR 3.3.1.4
3.3.1.7	3.3.1.8	4.17.1t1	SR: perform Channel Cal. every 18 months	Unchanged. Same as Pal TS. In TS and RTS, Pwr Range NI Cal done every 18 months. Therefore note excepting neutron detectors has been added. In STS, NI cal done more frequently (92 days)
3.3.1.8	Added	New	SR: Verify Control Room Temperature ≤ 90°F; 12 hours	Added SR to verify Control Room temperature. In support of TMM operability.
Omitted	3.3.1.9	NA	SR: (Response Time Testing, 18 months)	Not required at Palisades. Not in TS.

RTS Number	STS Number	TS Number	RTS (STS) requirement Description	Explanation of Differences
3.3.1t	3.3.1t	2.3.1t	Tabl: Required RPS inst & setpoints	Used Palisades values from table 2.3.1 of existing Tech Specs. Otherwise, format in accordance with STS.
3.3.1t1	3.3.1t1	2.3.1t1	LCO: VHP trip setpoint	Plant specific setpoint. Otherwise, no change.
3.3.1t2	3.3.1t2	NA	LCO: Hi Startup Rate	Allowable value omitted, since there is no analytical basis; Otherwise, no change.
3.3.1t3	3.3.1t3	2.3.1t2	LCO: Low Flow setpoint	Plant specific setpoint and bypass removal provisions. Palisades does not require raising the Zero Power Mode Bypass (ZPMB) setpoint during physics testing, as in Note b of STS. Therefore, this provision is deleted. In addition, Palisades is administratively prohibited from going into ZPMB unless the RPS is not required (fewer than two control rods capable of withdrawal), hence note b has been amended.
3.3.1t4	3.3.1t7a	2.3.1t5	LCO: Low SG A level setpoint	Plant specific setpoint, otherwise no change.
3.3.1t5	3.3.1t7b	2.3.1t5	LCO: Low SG B level setpoint	Plant specific setpoint, otherwise no change
3.3.1t6	3.3.1t6	2.3.1t6	LCO: Low SG A Pressure setpoint	The "standard" CE plant auctioneers its SGLP signals from each SG, thereby using only one RPS trip unit. Palisades uses two trip units. Setpoint plant specific. Bypass removal at Palisades is part of the Zero Power Mode Bypass circuitry. Other plants use separate bypass bistable sensed from SG pressure. Hence, note c in STS is NA to Palisades.
3.3.1t7	3.3.1t6	2.3.1t6	LCO: Low SG B Pressure setpoint	Same as above (SG A Pressure).
3.3.1t8	3.3.1t4	2.3.1t3	LCO: High Pressurizer pressure setpoint	Plant specific setpoint, otherwise no change
Omitted	3.3.1t8	NA	LCO: (APD Hi Trip Setpoint)	NA to Palisades. This trip does not exist.
3.3.1t9	3.3.1t9a	2.3.1t4	LCO: TM/LPT setpoint	Palisades uses a digital Thermal Margin Monitor to generate Setpoint. Algorithm specified numerically in TS, rather than in Figures. Therefore, STS figures are deleted, and RTS uses an equation to specify setpoint constants, as in current TS.
Omitted	3.3.1t9b	NA	LCO: (SG Pressure Difference)	This function does not exist at Palisades.
3.3.1t10	3.3.1t10	NA	LCO: Loss of Load Trip Setpoint.	Allowable value omitted, since there is no analytical basis; Bypass, referenced by note b, is also plant specific. Otherwise no change
3.3.1t11	3.3.1t5	2.3.1t7	LCO: High Containment Pressure setpoint	Plant specific setpoint, otherwise no change

RTS Number	STS Number	TS Number	RTS (STS) requirement Description	Explanation of Differences
Omitted	3.3.2	NA	LCO: (4 RPS Channel required OPERABLE in MODES 3, 4, 5 etc.)	The APPLICABILITY has been included in 3.3.1. The CE standard plant only required Hi Start Up Rate to be OPERABLE in the lower modes. Palisades requires all trips.
3.3.2	3.3.3	3.17.1.1	LCO: RPS logic and manual trip channels OPERABLE; Modes 1-5	Reworded to reflect Palisades use of contactors rather than RTCBs. The contactors used at Palisades are part of the Initiation Logic, and are not tested separately, as are RTCBs. RTS APPLICABILITY is "more than one control rod capable of being withdrawn" rather than STS "any CEAs (control rods) capable of being withdrawn". This reflect the absence of RTCBs and the capability at Palisades to use a Rod Drop Test Panel to individually incapacitate control rods. It is consistent with TS usage, and reflects the assumption of a single stuck control rod in the SDM calculation.
3.3.2 A	3.3.3 A	3.17.1.4	COND: One matrix channel inoperable	Unchanged.
3.3.2 A.1	3.3.3 A.1	3.17.1.4 a	ACTN: Restore channel to OPERABLE; 48 hours	Unchanged.
3.3.2 B	3.3.3 B	3.17.1.5	COND: One initiation channel inoperable	Omitted reference to RTCBs, which Palisades does not have, and to inoperable manual trip channels. Manual trip channels are addressed in RTS condition C.
3.3.2 B.1	3.3.3 B.1	3.17.1.5 a	ACTN: De-energize affected CRDM power supplies; 1 hour	Reworded to reflect Palisades use of contactors rather than RTCBs. Otherwise the RTS reflects the STS actions. Palisades uses clutch power supplies in a selective two out of four logic similar to that employed by the RTCBs.
3.3.2 C	3.3.3 B	3.17.1.1	COND: One manual trip inoperable	Palisades has only two manual trip buttons, either of which trips the plant. They cannot be tested at power. Therefore they cannot be repaired at power.
3.3.2.C.1	Added	3.17.1.1 a	ACTN: Restore before startup	Manual trip cannot be tested at power. This is a plant specific difference from the CE standard plant which has four manual trip buttons in a selective two out of four logic. RTS Completion Time is the same as TS.
Omitted	3.3.3 C	NA	COND: (One ch. of manual, RTCBs, or init. inop in MODES 3, 4,. 5)	Omitted. RTS similar to TS. STS Action C.1 is irrelevant in the case of manual trip, since it must be restored prior to startup, per RTS Action C.1. There are no RTCBs. Initiation logic is addressed by Condition B.1. Palisades TS makes no distinction between upper and lower MODES in LCO 3.3.1 from the standpoint of OPERABILITY.

RTS Number	STS Number	TS Number	RTS (STS) requirement Description	Explanation of Differences
Omitted	3.3.3 D	NA	COND: (Two ch. of RTCBs/init log. affecting same trip leg inop)	Condition NA to Palisades. This condition was written all later CE plants, which split matrix power supplies. It is thus possible to deenergize two supplies on loss of a vital bus or matrix power supply, deenergizing two trip paths. The condition was written to permit continued operation as long as the initiation logic deenergized as designed. In the case of Palisades, this is not a credible single failure, since the matrix supplies are fully auctioneered, and loss of a single supply will not deenergize two trip paths.
3.3.2 D	3.3.3 E	3.17.1.6	COND: Required Actions not met	Unchanged.
3.3.2 D.1	3.3.3 E.1	3.17.1.6 a	ACTION: Be in MODE 3, 6 hrs.	Unchanged.
3.3.2 D.2	3.3.3 E.2	3.17.1.6 b	ACTION: No more than 1 rod withdrawn; 30 hrs	Unchanged, except that Action B.2 reflects the slightly differing APPLICABILITY from the standard. In RTS, placing the plant in a condition in which the LCO does not apply requires assuring that no more than one rod can be withdrawn. 30 hrs for the completion time is explained in LCO 3.0.3
3.3.2.1	3.3.3.1	4.17.1t	SR: Channel Functional Test each Logic channel; 92 days	Unchanged, except reference to RTCBs is deleted. 92 day interval in accordance with CEN 327.
3.3.2.2	3.3.3.2	4.17.1t	SR: Channel Functional Test Manual trips; 7 days B4 startup	Unchanged.
Omitted	3.3.3.3	NA	SR: (Channel Functional Test RTCBs; 18 months)	Palisades does not use RTCBs.
3.3.3	3.3.4	3.16.1/3.17.2	LCO: Four ESF inst channels OPERABLE; Modes 1,2,3	Required Functions and specified allowable values are consistent with existing Palisades Tech Specs. Term ESFAS changed to ESF Instrumentation to be consistent with plant vernacular. There is no ESFAS as such at Palisades.
3.3.3 A	3.3.4 A	3.17.2.4	COND: One SIRWT Channel Inoperable	The Function, at Palisades, which has actions different from other ESF Functions is SIRWT Level, which provides Recirculation Actuation. Palisades has no CSAS signal; Containment Spray is initiated from Containment High Pressure (CHP) along with containment Isolation.
3.3.3 A.1	3.3.4 A.1	3.17.2.4 a	ACTN: Bypass inoperable RAS level switch; 8 hours	Action and Completion Time consistent with existing TS. It is preferable to bypass rather than trip RAS since inadvertent function actuation could result in switching SIS to a dry containment sump. 8 hours required due to absence of installed bypass capability.
3.3.3 A.2	Added	3.17.2.4 b	ACTN: Restore inoperable RAS channel; 7 days	Action and Completion Time consistent with TS.

RTS Number	STS Number	TS Number	RTS (STS) requirement Description	Explanation of Differences
3.3.3 B	3.3.4 B	3.17.2.2	COND: One ESF instrument channel inoperable, except SIRWT	Newer CE plants use an ESFAS cabinet with logic networks similar to the RPS. Palisades has no equivalent. Palisades typically uses a bistable in each instrument loop with its contact pairs wired into a 2 out of 4 logic. CHP uses pressure switches rather than instrument loops; RAS uses capacitance sensing level probes. There are no built in bypass or trip capabilities for each channel. SIRWT is excepted, as in TS, since it uses a selective two out of four logic, and the preferred failure mode for RAS is in an untripped condition.
Omitted	3.3.4.B.1	NA	ACTN: (place affected Trip Unit in bypass or trip)	This action is not proposed. It would comprise a new requirement for Palisades. Placing an inoperable channel in bypass provides no safety benefit over leaving it unbypassed, and in some instances could preclude trouble shooting or repair. Current TS does not have this requirement.
Omitted	3.3.4 B.2.1	NA	ACTN: (Restore in 48 hours)	Restore is always an option. This Action not in TS.
3.3.3 B.1	3.3.4.B.2.2	3.17.2.2 a	ACTN: Place affected trip unit in trip; 7 days	Action and completion time per TS. Requirement to bypass (STS Action B.1) is eliminated, since there are no installed bypass capabilities. Circuit modifications are required to trip the function.
3.3.3 C	3.3.4 C	3.17.2.3	COND: Two ESF Channels Inoperable	Unchanged except that RTS and TS except SIRWT level, and STS excepts CSAS. SIRWT is selective two out of four, and CSAS does not exist at Palisades.
3.3.3 C.1	3.3.4 C.1	3.17.2.3 a	ACTN: Place one trip unit in trip; 8 hours	Consistent with TS. STS allows 1 hour. This cannot be done at Palisades due to lack of built in trip capability. The STS bypass action was omitted since, at Palisades, only the RPS and AFAS trip units have a built in trip and bypass capability. The AFAS circuitry has no interlock preventing bypassing multiple channels. Associated ESF circuitry cannot be bypassed or tripped without lifting leads or opening links; such actions are neither advisable in a short time nor required for these circuits.
3.3.3 C.2	3.3.4 C.2	3.17.2.3 b	ACTN: Restore to OPERABLE, 7 days	7 days consistent with TS. STS allows 48 hours.
3.3.3 D	3.3.4 D/E	New	COND: One or two Bypass removal channels inoperable	Combined STS Conditions D and E. This is more conservative than STS.
3.3.3 D.1	3.3.4 D.1/E.1	New	ACTN: Disable the Bypass channels, 1 hour	Unchanged.

RTS Number	STS Number	TS Number	RTS (STS) requirement Description	Explanation of Differences
Omitted	3.3.4 D.2.1	NA	ACTN: (place affected trip unit in bypass or trip; 48 hrs)	The STS action is inappropriate for Palisades. Theis action is omitted because at Palisades the bypass instrument channels are combined into logic completely independently of the instrument channels of the bypassed function. The bypass is accomplished downstream of the bypass 3/4 enable logic. Therefore bypassing or tripping the affected ESF actuation trip unit would have no effect. Proposed Action 3.3.3 D.2 replaces STS Actions D.2.1, D.2.2.1, and D.2.2.2. Declaring the logic channel inoperable places the plant under Condition 3.3.4 A.
Omitted	3.3.4 D.2.2.1	NA	ACTN: (Restore bypass channel & affected trip units; 48 hours)	See discussion following omitted STS action d.2.1, above.
Omitted	3.3.4 D.2.2.2	NA	ACTN: (place in trip; 48 hrs)	See discussion following omitted STS action d.2.1, above.
3.3.3 D.2	Added	New	ACTN: Declare affected logic channel inoperable;1 hour	The wording reflects the fact that at Palisades the bypass instrument channels are combined into logic completely independently of the instrument channels of the bypassed function. The bypass is accomplished downstream of the bypass 3/4 enable logic. Declaring the logic channel inoperable places the plant under Condition 3.3.3 A.
Omitted	3.3.4 E	NA	COND: (2 bypass channels inoperable)	STS Conditions 3.3.4 D and 3.3.4 E were replaced by proposed Condition 3.3.3 D. The STS actions associated with those conditions are inappropriate for Palisades. The proposed action is more restrictive.
3.3.3 E	3.3.4 F	3.17.2.6	COND: Required Actions not met,	Unchanged
3.3.3 E.1	3.3.4 F.1	3.17.2.6 a	ACTN: Be in MODE 3, 6 hrs	Unchanged
3.3.3 E.2	3.3.4 F.2	3.17.2.6 b	ACTN: Be in MODE 4, 30 hrs	Unchanged except for completion time. Palisades used a 30 hour time to Mode 4.
3.3.3.1	3.3.4.1	4.17.2t	SR: Channel check ESF instruments; 12 hours	Excepted CHP and RAS from channel check since no indicators are provided in the trip initiating instrument channels. CHP uses pressure switches; RAS uses capacitance probe level detectors. This exception is not in STS, since normal analog transmitters are assumed.
3.3.3.2	3.3.4.2	4.17.2t	SR: CFT of each channel except SIRWT Level sw., 92 days	Unchanged except for SIRWT level switch exception. Capacitance probes are tested by physically lifting them above the existing fluid in the tank. This is not done at power.

RTS Number	STS Number	TS Number	RTS (STS) requirement Description	Explanation of Differences
Omitted	3.3.4.3	NA	SR: (CFT on Bypass removal Channels; 92 days before startup)	This would constitute a new requirement for Palisades. The actuation of the bypass removal bistable contacts is required, by definition, in the channel functional testing required by RTS SR 3.3.3.2. The functioning of the bypass removal logic is verified by RTS SR 3.3.3.3.
3.3.3.3	3.3.4.4	4.17.2t	SR: Perform CHANNEL CALIBRATION, 18 months	Unchanged. This CHANNEL CALIBRATION also includes a CHANNEL FUNCTIONAL TEST of the SIRWT Level Probes (by definition, a Channel Calibration includes a CFT). This satisfies TS Table 3.17.2 requirement for a CHANNEL FUNCTIONAL TEST on these probes. Capacitance probes cannot be tested at power. SR 3.3.3.2 exempts level switches. The bypass removal functions are also specified in this SR, as in STS 3.3.4.4. CHANNEL CALIBRATION. This is consistent with existing TS.
Omitted	3.3.4.5	NA	SR: (Response time test, 18 months)	Not required at Palisades. Not in TS. NRC evaluated this item during the Palisades Systematic Evaluation Program and concluded, Nureg 0820, Page 4-35, Item 4.22, that such testing would have little effect on risk and would not be required.
3.3.3-1t	3.3.4-1t	3.17.2t/3.17.3tTabl:	Required ESF Inst. and setpoints	Tables similar in format. The MODES column has been deleted since all are applicable in MODES 1, 2, and 3. It was retained in STS in case there are plant-specific requirements for other MODES. Setpoints derived from Table 3.16 in TS. Signal naming consistent with Palisades vernacular. Palisades does not have many of the traditional actuation signals, and groups them differently. Naming and grouping consistent with TS.
3.3.3-1t1	3.3.4-1t1	3.16t/3.17.2t	LCO: SIS Inst	Unchanged except name change from SIAS to SIS
3.3.3-1t1a	3.3.4-1t1b	3.16.t/3.17.2t	LCO: Pressurizer Pressure SIS input	Unchanged, uses Palisades setpoint and bypass setpoint per note a.
Omitted	3.3.3-1t1a	NA	LCO: (Cont. Press. input to SIS)	Palisades does not have separate CHP instrumentation input channels to SIS. The CHP actuation logic is an input to SIS, as in LCO 3.3.4
3.3.3-1t2	3.3.4-1t3	3.16t/3.17.2t	LCO: CHP Signal	The CHP signal at Palisades is similar to the CIAS in STS. The CHP logic output isolates containment, and provides a logic input to SIS, which is addressed in LCO 3.3.4. Palisades setpoints used
3.3.3-1t2a/b	3.3.4-1t3a	3.16t/3.17.3t	LCO: Cont. Press. left and right train	Palisades has train-specific sensor channels. This differs from the CE standard design. The resulting logic output is the CHP. The CHR is a separate signal which isolates a similar though different subset of components. This also differs from the CE standard.

RTS Number	STS Number	TS Number	RTS (STS) requirement Description	Explanation of Differences
3.3.3-1t3/3a	3.3.4-1t3b	3.16t/3.17.3t	LCO: Cont High Radiation	CHR employs four sensor channels, but is a different actuation signal from CHP.
3.3.3-1t4	3.3.4-1t4	3.16t/3.17.3t	LCO: SGLP	The SGLP signals are analogous to the MSIS in STS.
3.3.3-1t4a/b	3.3.4-1t4a	3.16t/3.17.3t	LCO: SG Press low SG A, B	The SGLP uses two out of four logic from both SGs. Either SGLP input closes both MSIVs, but generator-specific feedwater isolation. This differs from the standard. The SG pressure low bypass is similar to STS, but uses plant specific setpoints. Note d in STS allows MSIS to be inoperable when the associated valves are closed and deactivated. This provision is not in current Palisades TS, and the note has been eliminated.
3.3.3-1t5	3.3.4-1t6	3.16t/3.17.2t	LCO: AFAS	Palisades AFAS does not have SG Delta P logic. It feeds on low water level only. Therefore the STS Table 3.3.4-1t5c is Not Applicable to RTS.
3.3.3-1t5a/b	3.3.4-1t5a/b	3.16t/3.17.2t	LCO: SG water level input to AFAS	Similar in concept to STS.
3.3.3-1t6	3.3.4-1t5	3.16/3,17,2t	LCO: RAS signal	Similar to standard
3.3.3-1t6a	3.3.4-1t5a	3.16/3.17.2t	LCO: Low SIRWT Level RAS input	Similar to STS, but Level switches used at Palisades.
Omitted	3.3.4-1t2	NA	LCO: (CSAS)	There is no CSAS unction at Palisades. Containment spray is one of several SIS functions.
3.3.4	3.3.5	3.17.2/.3	LCO: Two ESF Manual & two actuation channels; Modes 1,2,3	Reworded to reflect Palisades hardware & applicability removed from table. Palisades does not have actuation Logic separate from the instrument channels, but uses actuating relays arranged into two trains. The APPLICABILITY for all Palisades ESF functions is the same so the column was removed from the table to the applicability line.
3.3.4 A	3.3.5 A/C	3.17.2.1/3.1	COND: One ESF manual channel or actuation train inoperable	RSTS conditions combined since, with all functions having the same APPLICABILITY, hence the required actions are identical.
3.3.4 A.1	3.3.5 A/C	3.17.2.1a/3.1a	ACTN: Restore inoperable ESF actuation channel; 48 hours	Unchanged.
3.3.4 B	3.3.5 B	3.17.2.6/3.5	COND: Required Action not met	Unchanged.
3.3.4 B.1	3.3.5 B.1	3.17.2.6a/3.5a	ACTN: Be in Mode 3; 6 hours	Unchanged.
3.3.4 B.2	3.3.5 B.2	3.17.2.6b/3.5b	ACTN: Be in Mode 4; 30 hours	Used Palisades time to Mode 4.
Omitted	3.3.5 D	NA	COND: (Required Action not met)	No equipment required in Mode 4 addressed by LCO.

RTS Number	STS Number	TS Number	RTS (STS) requirement Description	Explanation of Differences
3.3.4.1	3.3.5.1	4.17.2t.3.a	SR: Channel Functional Test AFAS trains; 92 days	Specified only SIS and AFAS since other ESF actuation trains cannot be tested on line. A Channel Functional Test is specified for the remaining ESF trains each 18 months. Notes in STS omitted since they are not applicable to Palisades equipment.
3.3.4.2	3.3.5.1	4.17.2t.1b	SR: Channel Functional Test SIS logic, normal and lop, 92 days	See 3.3.4.1 discussion, above.
3.3.4.3	3.3.5.1	4.17.2t/3t	SR: Channel Functional Test ESF trains; 18 months	See explanation for 3.3.4.1, above.
3.3.4.4	3.3.5.2	4.17.2t/3t	SR: Channel Functional Test ESF manual channels; 18 months	Unchanged.
3.3.4t1	3.3.5t1	3.17.2t1	LCO: Two SIS Manual, CHP input, & actuation channels	Similar, except RTS lists components of the SIS. STS does not. This is needed since SIS has a CHP logic input which must be addressed. Mode applicability deleted, since they are all the same and addressed by the LCO APPLICABILITY statement.
3.3.4t2	3.3.5t3	3.17.3t1	LCO: Two CHP Manual & actuation channels.	CHP manual is by individual component actuation, per note a. CHP is analogous to CIAS. MODEs addressed by APPLICABILITY
3.3.4t3	3.3.5t3	3.17.3t2	LCO: Two CHR Manual & actuation channels	MODEs addressed by APPLICABILITY. CHR operates an overlapping subset of components with CHP.
3.3.4t4	3.3.5t4	3.17.3t3	LCO: Two SGLP Manual & actuation channels	MODEs addressed by APPLICABILITY. Manual actuation by individual components per note a.
3.3.4t5	3.3.5T6	3.17.2t3	LCO: Two AFAS Manual & actuation channels	MODEs addressed by APPLICABILITY. manual actuation by individual components, per note a
3.3.4t6	3.3.5t5	3.17.2.2	LCO: Two RAS Manual & actuation channels	MODEs addressed by APPLICABILITY. Manual actuation by individual components (note a)
3.3.5	3.3.6	New	LCO: Two UV channels per DG OPERABLE; when DG required	Reworded LCO to use Palisades usage (we do not use LOVS acronym) and to reflect the use of three sensors in both the undervoltage and loss of voltage functions. Palisades has two UV channels per DG, one time-undervoltage (degraded voltage), and one loss of voltage. APPLICABILITY reflects when the capability is needed.
3.3.5 A	3.3.6A/B/C	New	COND: One or more UV channel inoperable	Palisades has three sensors per function in a 1 out of 3 logic. There is neither trip nor bypass capability. If inoperable, the associated logic is inoperable. This differs from the standard. Therefore it does not matter how many sensor channels are inoperable, and conditions are combined.

RTS Number	STS Number	TS Number	RTS (STS) requirement Description	Explanation of Differences
Omitted	3.3.6 A.1	NA	ACTN: (Place channel in bypass or trip.)	This step is inappropriate. There is no installed bypass capability. If inoperable, the inoperable channel must be restored to OPERABLE.
Omitted	3.3.6 A.2.1	NA	ACTN: (Restore UV channel; 48 hours)	Deleted. Preference is to declare DG inoperable. There is no built in trip capability as per STS A.2.2.
Omitted	3.3.6 A.2.2	NA	ACTN: Place the UV channel in trip; 48 hours	There is no built in trip capability as per STS A.2.2.
3.3.5 A.1	3.3.6 B.1/C./D	New	ACTN: Declare DG inoperable; immediately	Action consistent with similar STS Condition B and Action B.1. STS Completion time shortened to Immediately. This is consistent with the RTS condition statement of "one or more sensor or logic channels inoperable per DG inoperable". Logic channels mentioned in condition statement to address auxiliary relays which actuate the UV start from the primary sensing relays. This RTS action also addresses the STS shutdown track of STS Condition D.
Omitted	3.3.6.1	NA	SR: Channel check UV channels; 12 hours	There is no instrumentation associated with the UV sensors to channel check.
Omitted	3.3.6.2	NA	SR: Channel Functional Test UV channels; 92 days	This SR is inappropriate for the Palisades system. There is no provision for such testing without actually de-energizing and stripping the associated class 1E bus. The RSTS carries a note excluding testing of the end devices, in a relay system there is nothing else. Note that a Channel Functional test is includes, by definition, into the channel calibration.
3.3.5.1	3.3.6.3	New	SR: Channel Calibration, UV channels; 18 months	Unchanged. Plant specific numbers used.
3.3.6	3.3.7	3.17.6t 20	LCO: Two refueling CHR channels OPERABLE; Mode 6	Palisades has no comparable system to the CPIS of STS LCO 3.3.7. Purge isolation is accomplished by CHP or CHR which are addressed by LCO 3.3.4. However, during refueling, additional refueling radiation monitors are manually switched into the CHR logic to provide complete CHR isolation in the event of fuel handling accidents. There is one monitor per train. Hence, STS LCO 3.3.7 is the pattern, though actions differ. Since one out of one logic is employed, and all containment isolation valves are actuated, actions related to one inoperable channel in a two out of four logic system are inappropriate, as are actions requiring only closure of CPIS valves. Applicability is same as STS CPIS. It is similar to TS, where operability is required during refueling. RTS requires 2 channels OPERABLE. STS only requires one OPERABLE.

RTS Number	STS Number	TS Number	RTS (STS) requirement Description	Explanation of Differences
3.3.6.A	3.3.7 A/B	3.17.6 20	COND: One or two Refueling CHR inoperable	RTS A Condition encompasses Conditions A and B of STS, since in a 1 out of 1 logic channel, each monitor disables one entire train.
Omitted	3.3.7 A.1	NA	ACTN: Place channel in trip; 4 hours	This action was omitted because it is inappropriate for a system with 1 out of 2 logic.
3.3.6 A.1	3.3.7 A.2.1	3.17.6.20 a	ACTN: Suspend core alterations	Unchanged.
3.3.6 A.2	3.3.7 A.2.2	New	ACTN: Suspend fuel movement	Unchanged.
Omitted	3.3.7 B	NA	COND: > 1 chnl, 1 manual chnl, or logic inoperable	Condition B and associated actions omitted. Actions required under condition A take plant out of applicable conditions. There is no logic network at Palisades other than for the Manual actuation, which uses the operating CHR logic. Manual actuation is part of the "channel" and need not be addressed seperately.
3.3.6.1	3.3.7.1	4.17.6t 20	SR: Refueling monitor CHANNEL CHECK 24 hrs	Unchanged from STS and TS. Frequency of 24 hours vice 12 hrs in STS to be consistent with TS.
3.3.6.2	3.3.7.2	4.17.6t 20	SR: Refueling Monitor CHANNEL FUNCTIONAL TEST, 31 days	Unchanged from STS, except STS interval is 92 days. 31 days is TS value
Omitted	3.3.7.3	NA	SR: Logic channel CHANNEL FUNCTIONAL TEST, 31 days	The Refueling Monitors actuate the CHR relays directly. Each channel is effectively 1 out of 1 logic. There is no multi channel logic to be tested, other than that tested by the manual actuation SR.
3.3.6.3	3.3.7.4	4.17.6t 20	SR: Refueling Monitor CHANNEL CALIBRATION, 18 months.	Same as TS and STS
3.3.6.4	3.3.7.5	New	SR: CHANNEL FUNCTIONAL TEST on manual channel	Unchanged.
Omitted	3.3.7.6	NA	SR: Verify Response Times	Palisades not required to do response time tests
Omitted	3.3.8	NA	LCO: CRIS system OPERABLE; Modes 1,2,3,4, Etc	Palisades has no comparable system. Control room isolation is accomplished by CHP or CHR which are addressed by LCO 3.3.4.
Omitted	3.3.9	NA	LCO: CVCS isolation channels OPERABLE; Modes 1, 2, 3, 4	Palisades has no comparable system
Omitted	3.3.10	NA	LCO: SBFAS channels OPERABLE; Modes 1, 2, 3, 4	Palisades has no comparable system
3.3.7	3.3.11	3.17.4	LCO: AMI Instruments (Tabl 3.3.7-1) OPERABLE Modes 1, 2, 3	Unchanged, except name "PAMI" changed to "AMI" to be consistent with plant vernacular. LCO conditions and actions were retained as in TS. Only format changed as in STS

RTS Number	STS Number	TS Number	RTS (STS) requirement Description	Explanation of Differences
3.3.7 A	3.3.11 A	3.17.4.1/5	COND: One AMI channel inoperable,	Unchanged
3.3.7 A.1	3.3.11.A.1	3.17.4.1a/5a	ACTN: Restore in 7 days	Unchanged except STS allows 30 days. No change from TS.
3.3.7 B	3.3.11 C	3.17.4.2/6	COND: Two required channels inop	Unchanged except for deletion STS of note exempting hydrogen monitors. Condition as in TS
3.3.7 B.1	3.3.11 C.1	3.17.4.2.a	ACTN: Restore in 48 hours	Unchanged from STS except STS completion time is 7 days. No change from TS
3.3.7 C	3.3.11 F	3.17.4.4/7	COND: Required actions not met	Eliminated use of STS Condition E to reference STS Condition F. Condition wording cleaner and more straightforward for Palisades AMI without Condition E. Same condition applicability as TS
3.3.7 C.1	3.3.11 F.1	3.17.4.4.a	ACTN: Be in MODE 3; 6 hrs	Unchanged.
3.3.7 C.2	3.3.11 F.2	3.17.4.4.b	ACTN: MODE 4 30 hrs	Unchanged except for Palisades MODE 4 completion Time of 30 hours. TS presently allows 48 hours to MODE 4.
3.3.7 D	3.3.11 B/G	3.17.4.7	COND: Required Actions not met	Eliminated use of STS Condition E to refer to STS Condition G. Condition wording cleaner and more straightforward for Palisades AMI without Condition E. Same condition applicability as in TS.
3.3.7 D.1/2	3.3.11 B.1/G.1	3.17.4.7 c	ACTN: Init. Act. iaw 5.6.7,immed; restore after MODE 6 entry	Same actions as TS. RTS D.1 similar to STS G.1. Added restoration provision as in TS
Omitted	3.3.11 D	NA	COND: Two Hydrogen monitors inoperable	There is no separate provision for hydrogen monitors in TS. TS provisions retained.
Omitted	3.3.11 E	NA	COND: Refer to table for SD Track	Grouping of AMI function at Palisades makes table entry per Cond. E redundant. No other LCO uses this method, which is suitable for involved tables, but confusing otherwise.
3.3.7.1	3.3.11.1	4.17.4t	SR: Channel Check AMI instruments; 31 days	Unchanged from STS, except that STS statement "that is normally energized" is eliminated" since all are normally energized. Containment valve position is exempted since there is only one channel of indication. Same as TS
3.3.7.2	3.3.11.2	4.17.4t	SR: Perform a CHANNEL CALIBRATION, 18 months	Unchanged except note excepting Excore detectors is eliminated since it is included in the definition of CHANNEL CALIBRATION

RTS Number	STS Number	TS Number	RTS (STS) requirement Description	Explanation of Differences
3.3.7-1t	3.3.11-1t	3.17.4t	SR: Table of AMI Instrumentation	Table entries identical to TS. Third column in STS table eliminated since table entry to establish shutdown track is no longer required. Refer to discussion of omitted STS LCO 3.3.11.E, above.
3.3.8	3.3.12	3.17.5	LCO: Alternate Shutdown System (C-150) OPERABLE; Modes 1,2,3	unchanged.
3.3.8 A	3.3.12 A	3.17.5.1	COND: One or more channel inoperable	Unchanged except STS "Functions" replaced with TS actions used throughout this LCO.
3.3.8 A.1	Added	3.17.5.1a	ACTN: Provide alternate monitoring, 7 days	No equivalent STS Action, since table is function based rather than channel based, ability to provide alternate monitoring is implicit in the STS. This action is the same as in TS.
3.3.8 A.2	3.3.12 A.1	3.17.5.1b	ACTN: Restore to OPERABLE, 60 days	Unchanged except STS has 30 day completion time. 60 days is in TS. Note that in RTS alternative monitoring is in place from Action A.1.
3.3.8 B	3.3.12 B	3.17.5.2	COND: Required Action not met	Unchanged.
3.3.8 B.1	3.3.12 B.1	3.17.5.2a	ACTN: Be in Mode 3; 6 hours	Unchanged.
3.3.8 B.2	3.3.12 B.2	3.17.5.2b	ACTN: Be in Mode 4; 30 hours	Used Palisades time to Mode 4. TS allows 48 hours
3.3.8.1	3.3.12.1	4.17.5t	SR: Channel Check C-150 Instruments; 92 days	SR Flux and AFW flow indication omitted from channel check because these instruments will normally have no indication during power operation. Specified 92 days (the frequency specified in existing Palisades Tech Specs), rather than 31 days used in RSTS, since Palisades instruments use same transmitter as one control room channel. A channel check requires switching the control room channel out of service to verify operability of the remote channel, causing the associated alarms, etc., to actuate. The existing SR frequency was approved in TS amendment #85(?).
3.3.8.2	Added	4.17.5t a	SR: channel check neutron flux, 7 days before Startup	This is consistent with CFT of the neutron flux channel in LCO 3.3.1, and per existing TS.
Omitted	3.3.12.2	4.17.5t19,20	SR: verify control circuits, transfer switches, 18 months.	Redundant. All functions use transfer switches. Transfer switches and controls are automatically checked when associated instrumentation is tested.
3.2.8.3	Added	4.17.5t	SR: CHANNEL CHECK of AFW Flow, 18 months	Refer to discussion under SR 3.3.8.1. Same as TS.
3.3.3.4	Added	4.17.5t	SR: CHANNEL FUNCTIONAL TEST AFW controls	Refer to discussion under SR 3.3.8.1. Same as TS.

RTS Number	STS Number	TS Number	RTS (STS) requirement Description	Explanation of Differences
3.3.8.5	3.3.12.3	4.17.5t	SR: CHANNEL CALIBRATION, 18 months	Unchanged, except for deletion of STS note exempting excore detectors. This note is addressed in the definition of CHANNEL CALIBRATION
Omitted	3.3.12.4	NA	SR: Response Time Testing, 18 months	No TS requirement.
3.3.8-1	3.3.12-1	3.17.5t	Tabl: Required AHSD Panel Instruments	Listed Palisades installed equipment, as in existing Tech Specs. Transfer switches omitted, since their operability is demonstrated by performing a channel check.
3.3.9	3.3.13	3.17.6.1	LCO: Two neutron flux channels OPERABLE; Modes 3, 4, 5	Specified "Neutron Flux" channels, since, at Palisades, these are the instruments providing Flux level information during shutdown periods. APPLICABILITY reflects that LCO 3.3.1 protects when more than one rod can be withdrawn
3.3.9 A	3.3.13 A	3.17.6.1	COND: One SR channel inoperable	Unchanged.
3.3.9 A.1	3.3.13 A.1	3.17.6.1a	ACTN: Suspend + reactivity Additions; immediately	Unchanged.
3.3.9 A.2	3.3.13 A.2	3.17.6.1b	ACTN: Perform SDM calculation; 4 hours & every 12	Unchanged.
3.3.9.1	3.3.13.1	4.17.6t1	SR: Channel Check SR channels; 12 hours	Unchanged.
Omitted	3.3.13.2	NA	SR: Channel Functional Test SR channels; 92 days	CFT Consistent with LCO 3.3.1 frequency. Palisades has only two channels which are not tested at power.
3.3.9.2	Added	4.17.6t1	SR: Channel Calibration SR channels; 18 months	Refer to above discussion (STS Omitted SR 3.3.13.2). Neutron detectors omitted from calibration requirement by CHANNEL CALIBRATION definition.
3.3.10	Added	3.17.6.19	LCO: Two SFP Rad Monitors Operable	Unchanged from TS 2.17.6, Item 19 (Fuel Pool Area Radiation Monitor
3.3.10 A	Added	3.17.6.19	COND: One or 2 SFP Monitors Inoperable:	Unchanged in intent
3.3.10.A.1	Added	3.17.6.19.a)	ACTN: Suspend fuel movement.	Unchanged from 3.17.6.19a) in intent. 3.17.6.19 a) Required Action is to "Stop Refueling Operations in the containment".
3.3.10.A.2	Added	3.17.6.19.b)	ACTN: Restore in 72 hrs or provide equivalent monitoring	Unchanged.

RTS Number	STS Number	TS Number	RTS (STS) requirement Description	Explanation of Differences
3.4	3.4		PRIMARY COOLANT SYSTEM	
3.4.1	3.4.1	3.1.1.c, f and g	LCO: PCS Pressure, Temperature and Flow	Replaced STS "DNB Parameters" with equivalent spec for Palisades analyses.
3.4.1 Notes	3.4.1 Notes	NA	NOTE: Pressure LCO NA during transients	Unchanged.
3.4.1 A	3.4.1 A	3.0.3	COND: Pressure or flow rate not w/in limit	Unchanged.
3.4.1 A.1	3.4.1 A.1	3.0.3	ACTN: Restore Parameters; 2 hrs	Unchanged.
3.4.1 B	3.4.1 B	3.0.3	COND: Required action not met	Unchanged.
3.4.1 B.1	3.4.1 B.1	3.0.3	ACTN: MODE 2; 6 hrs	Unchanged.
3.4.1 C	3.4.1 C	3.0.3	COND: Tc not w/in limit	Unchanged.
3.4.1 C.1	3.4.1 C.1	3.1.1.g(1)	ACTN: Restore Tc; 2 hours	Unchanged.
3.4.1 D	3.4.1 D	3.0.3	COND: Required action not met	Unchanged.
3.4.1 D.1	3.4.1 D.1	3.0.3	ACTN: Reduce thermal power; 6 hrs	Unchanged.
3.4.1.1	3.4.1.1	4.17.1T #4	SR: Verify press pressure w/in limits; 12 hrs	Unchanged.
3.4.1.2	3.4.1.2	4.17.1T #4	SR: Verify Tc; 12 hrs	Maximum Tc specified to reflect Palisades LCO.
Omitted	3.4.1.3	NA	SR: (Verify Flow indication; 12 hrs)	Not required by TS.
3.4.1.3	3.1.4.4	4.15	SR: Verify measured PCS flow rate; 18 months; plug > 10 S/G tubes	Reworded to clarify minimum flow rate at RTP.
3.4.2	3.4.2	3.1.3.a	LCO: Minimum temp for criticality	Unchanged - Applicability changed iaw TSRF-26.
3.4.2 A	3.4.2 A	3.0.3	COND: T_{ave} low	Unchanged.
3.4.2 A.1	3.4.2 A.1	3.0.3	ACTN: Be in MODE 2 with K_{eff} < 1.0; 30 minutes	TSTF-26.
3.4.2.1	3.4.2.1	New	SR: Verify Tave w/in limit; 1 hour	TSTF-27. Changed SR Frequency. This SR comprises a new requirement for Palisades. Palisades has no other 30 minute SRs and therefore proposes a frequency of 1 hour so that existing administrative processes can be used to administer this SR.
3.4.3	3.4.3	3.1.2	LCO: PCS P/T limits; at all times	Unchanged.

RTS Number	STS Number	TS Number	RTS (STS) requirement Description	Explanation of Differences
3.4.3 A	3.4.3 A	3.1.2 Aa	COND: P/t not w/in limits in MODES 1, 2, 3 or 4	Unchanged.
3.4.3 A.1	3.4.3 A.1	3.1.2 Aa.1	ACTN: Restore parameters; 30 min	Unchanged.
3.4.3 A.2	3.4.3 A.2	3.1.2 Aa.2	ACTN: Verify PCS is OK; 72 hrs	Unchanged.
3.4.3 B	3.4.3 B	3.1.2 Ab	COND: Required action not met	Unchanged.
3.4.3 B.1	3.4.3 B.1	3.1.2 Ab.1	ACTN: Be in MODE 3; 6 hrs	Unchanged.
3.4.3 B.2	3.4.3 B.2	3.1.2 Ab.2	ACTN: Be in MODE 5 w/ pressure < 270 psia; 36 hrs	Unchanged.
3.4.3 C	3.4.3 C	3.1.2 Aa	COND: P/t not w/in limits anytime not in MODES 1, 2, 3 or 4	Unchanged.
3.4.3 C.1	3.4.3 C.1	3.1.2 Aa.1	ACTN: Restore parameters, immediately	Unchanged.
3.4.3 C.2	3.4.3 C.2	3.1.2 Aa.2	ACTN: Verify PCS is OK; Prior to entering MODE 4	Unchanged.
3.4.3.1	3.4.3.1	New	SR: Verify P/T w/in limits; 30 min during HU & CD	Unchanged - used Palisades terminology of hydrostatic testing in place of ILHT.
3.4.4	3.4.4	3.1.1.b/d	LCO: 2 PCS Loops operating; MODES 1 & 2	Unchanged.
3.4.4 A	3.4.4 A	3.0.3	COND: LCO not met	Unchanged.
3.4.4 A.1	3.4.4 A.1	3.0.3	ACTN: Be in MODE 3; 6 hours	Unchanged.
3.4.4.1	3.4.4.1	New	SR: Verify both loops operating; 12 hours	Unchanged.
3.4.5	3.4.5	3.1.1.d	LCO: PCS loops - MODE 3	Unchanged.
3.4.5 Notes	3.4.5 Notes		NOTE: Zero PCS flow < 1 hour	Added Note 2 on PCP start criteria.
3.4.5 A	3.4.5 A	3.0.3	COND: One loop inoperable	Unchanged.
3.4.5 A.1	3.4.5 A.1	3.0.3	ACTN: Restore loop; 72 hrs	Unchanged.
3.4.5 B	3.4.5 B	3.0.3	COND: Required action not met	Unchanged.
3.4.5 B.1	3.4.5 B.1	3.0.3	ACTN: Be in MODE 4; 12 hrs	Unchanged.
3.4.5 C	3.4.5 C	3.0.3	COND: No loops operable or in operation	Unchanged.
3.4.5 C.1	3.4.5 C.1	New	ACTN: Suspend PCS boron dilution activities; immediately	Unchanged.

RTS Number	STS Number	TS Number	RTS (STS) requirement Description	Explanation of Differences
3.4.5 C.2	3.4.5 C.2	3.0.3	ACTN: Initiate activities to restore one loop in operation; immediately	Unchanged.
3.4.5.1	3.4.5.1	New	SR: Verify required loops in operation; 12 hrs	Unchanged.
3.4.5.2	3.4.5.2	New	SR: SG level > -84%; 12 hrs	Unchanged - specified Palisades minimum S/G level w/ forced or natural circulation for decay heat removal.
3.4.5.3	3.4.5.3	New	SR: Verify correct breaker alignment and power available for required PCP not in operation; 7 days	Unchanged.
3.4.6	3.4.6	3.1.9.1 3.1.1.a	LCO: PCS loops - MODE 4	Add in minimum SDC flow rate of 2810 gpm.
3.4.6 Notes	3.4.6 Notes	3.1.9.1 E	NOTE: Zero PCS flow < 1 hour	Revised Note 2 to reflect Palisades PCP start criteria and added Note 3 on PCP restriction below 300°F.
3.4.6 A	3.4.6 A	3.1.9.1 A1	COND: Required loop inoperable and two SDC trains inoperable	Unchanged.
3.4.6 A.1	3.4.6 A.1	3.1.9.1 A1.a	ACTN: Initiate actions to restore loop or SDC train; immediately	Unchanged.
3.4.6 B	3.4.6 B	3.1.9.1 A1	COND: One SDC train inoperable and two loop inoperable	Unchanged.
3.4.6 B.1	3.4.6 B.1	3.1.9.1 A.1.c	ACTN: Be in MODE 5; 24 hrs	Unchanged.
3.4.6 C	3.4.6 C	3.1.9.1 A2	COND: Required loop or SDC train inoperable or no PCS flow	Unchanged.
3.4.6 C.1	3.4.6 C.1	3.1.9.1 A2.a	ACTN: Suspend all dilutions; immediately	Unchanged.
3.4.6 C.2	3.4.6 C.2	3.1.9.2 A2.b	ACTN: Initiate action to restore one loop or train operations; immediately	Unchanged.
3.4.6 D	Added	3.10.1.c	COND: SDC flow rate < 2810 gpm	TS requirement to allow boron dilution is core flow rate ≥ 2810 gpm.
3.4.6 D.1	Added	3.10.1.c.2	ACTN: Suspend all dilution; immediately	TS requirement.
3.4.6 D.2	Added	3.10.1.c	ACTN: Assure SDC flow > 1000 gpm; Immediately	TS requirement of 650 gpm increased to 1000 gpm (TS 2.1.9.3).
3.4.6 D.3.1	Added	3.10.1.c.1.b	ACTN: Electrically disable two charging pumps; 1 hr	TS requirement to limit unplanned boron dilutions.
3.4.6 D.3.2	Added	3.10.c.2	ACTN: Verify SDM; within 15 minutes. etc.	TS requirement.
3.4.6 E	Added	3.17.6.17	COND: One of two SDC suction valves interlock channels inoperable	TS requirement.

RTS Number	STS Number	TS Number	RTS (STS) requirement Description	Explanation of Differences
3.4.6 E.1	Added	3.17.6.17 A	ACTN: Place circuit breaker in "Racked Out" position; 1 hour	TS requirement - added completion time of 1 hour.
3.4.6.1	3.4.6.1	New	SR: Verify PCS loop or SDC train flow rate ≥ 2810 gpm in operation; 12 hrs	Reworded to reflect Palisades LCO.
3.4.6.2	3.4.6.2	New	SR: Verify S/G secondary side level; 12 hrs	Unchanged.
3.4.6.3	3.4.6.3	New	SR: Verify breaker alignment and power source; 7 days	Unchanged.
3.4.6.4	Added	4.17.6T #17	SR: Calibrate SDC suction interlocks; 18 months	Interlock allows SDC inlet valve to open.
3.4.7	3.4.7	3.1.9.2 3.1.1.9	LCO: PCS loops - MODE 5, loops filled	Added minimum SDC flow rate of 2810 gpm.
3.4.7 Notes	3.4.7 Notes	3.1.9.2 E	NOTES: Zero SDC flow < 1 hour and maintenance < 2 hours	Revised PCP start criteria and added note on PCP restriction below 300°F.
3.4.7 A	3.4.7 A	3.1.9.2 A1	COND: One SDC train inoperable and low S/G level	Unchanged.
3.4.7 A.1	3.4.7A.1	3.1.9.2 A1.a	ACTN: Initiate action to restore second SDC train; immediately	Unchanged.
3.4.7 A.2	3.4.7 A.2	New	ACTN: Initiate action to restor S/G level; Immediately	Unchanged.
3.4.7 B	3.4.7 B	3.1.9.2 A2	COND: Required SDC train inoperable or no SDC in operation	Unchanged.
3.4.7 B.1	3.4.7 B.1	3.1.9.2 A2.a	ACTN: Suspend boron dilution; Immediately	Unchanged.
3.4.7 B.2	3.4.7 B.2	3.1.9.2 A2.b	ACTN: Initiate action to restore SDC to operating; Immediately	Unchanged.
3.4.7 C	Added	3.10.1.c	COND: SDC flow rate < 2810 gpm	TS requirement to allow boron dilution is core flow rate ≥ 2810 gpm.
3.4.7 C.1	Added	3.10.1.c.2	ACTN: Suspend all dilution; Immediately	TS requirement.
3.4.7.C.2	Added	3.10.1.c.2	ACTN: Assure SDC flow > 1000 gpm; Immediately	TS requirement - increased min. flow rate to 1000 gpm (TS 3.1.9.3).
3.4.7 C.3.1	Added	3.10.1.c.1.b	ACTN: Electrically disable two charging pumps; 1 hr	TS requirement to limit unplanned boron dilutions.
3.4.7 C.3.2	Added	3.10.c.2	ACTN: Verify SDM; w/in 15 minutes, etc.	TS requirement.
3.4.7.1	3.4.7.1	New	SR: Verify SDC train flow rate > 2810 gpm; 12 hrs	Reworded to reflect Palisades LCO.
3.4.7.2	3.4.7.2	New	SR: Verify S/G level; 12 hrs	Unchanged.
3.4.7.3	3.4.7.3	New	SR: Verify breaker alignment and power source; 7 days	Unchanged.

RTS Number	STS Number	TS Number	RTS (STS) requirement Description	Explanation of Differences
3.4.8	3.4.8	3.1.9.3/ 3.1.1.a	LCO: PCS loops - MODE 5, loops not filled	Added minimum SDC flow rate of 2810 gpm.
3.4.8 Note	3.4.8 Note	3.1.9.3 E	NOTE: Zero SDC flow < 1 hour and maintenance < 2 hours	Time increase to 1 hour iaw TS.
3.4.8 A	3.4.8 A	3.1.9.3 A1	COND: One SDC train inoperable	Unchanged.
3.4.8 A.1	3.4.8 A.1	3.1.9.3 A1.a	ACTN: Initiate action to restore; Immediately	Unchanged.
3.4.8 B	3.4.8 B	3.1.9.3 A2	COND: Required SDC train inoperable or no SDC in operation	Unchanged.
3.4.8 B.1	3.4.8 B.1	3.1.9.3 A2.a	ACTN: Suspend boron dilution; Immediately	Unchanged.
3.4.8 B.2	3.4.8 B.2	3.1.9.3 A2.b	ACTN: Initiate action to restore to operating; Immediately	Unchanged.
3.4.8 C	Added	3.10.1.c	COND: SDC flow rate < 2810 gpm	TS requirement to allow boron dilutions is core flow rate ≥ 2810 gpm.
3.4.8 C.1	Added	3.10.1.c.2	ACTN: Suspend all dilution; Immediately	TS requirement.
3.4.8 C.2	Added	3.1.9.3	ACTN: Assure SDC flow > 1000 gpm; Immediately	TS requirement.
3.4.8 C.3	Added	3.10.c.1.b	ACTN: Electrically disable two charging pumps; 1 hr	TS requirement to limit unplanned boron dilutions.
3.4.8 C.4	Added	3.10.c.2	ACTN: Verify SDM; w/in 15 minutes, etc.	TS requirement.
3.4.8.1	3.4.8.1	New	SR: Verify one SDC train flow rate ≥ 2810 gpm; 12 hrs	Unchanged - Reworded to reflect Palisades LCO.
3.4.8.2	3.4.8.2	New	SR: Verify breaker alignment and power source; 7 days	Unchanged.
3.4.9	3.4.9	3.1.1.j	LCO: Press. OPERABLE w proper level & heaters; MODES 1,2,3 ≥ 430°F	Reworded to reflect Palisades configuration and applicability.
3.4.9 A	3.4.9 A	New	COND: Pressurizer level not w/in limits	Unchanged.
3.4.9 A.1	3.4.9 A.1	New	ACTN: MODE 3 & tripped; 6 hours	Reworded to reflect Palisades configuration.
3.4.9 A.2	3.4.9 A.2	New	ACTN: MODE 4; 12 hr	Unchanged.
3.4.9 B	3.4.9 B	3.1.1.j	COND: Less than required heaters OPERABLE	Reworded to reflect Palisades LCO.
3.4.9 B.1	3.4.9 B.1	3.1.1.j	ACTN: Fix heaters; 72 hrs	Reworded to reflect Palisades LCO.
3.4.9 C	3.4.9 C	3.0.3	COND: Required action of cond B not met	Unchanged.
3.4.9 C.1	3.4.9 C.1	3.0.3	ACTN: MODE 3; 6 hrs	Unchanged.

RTS Number	STS Number	TS Number	RTS (STS) requirement Description	Explanation of Differences
3.4.9 C.2	3.4.9 C.2	3.0.3	ACTN: MODE 4; 12 hours	Unchanged.
3.4.9.1	3.4.9.1	New	SR: Verify pressurizer level; 12 hrs	Unchanged.
3.4.9.2	3.4.9.2	New	SR: Verify ≥375 Kw pressurizer hrs per bus; 92 days	Reworded to reflect Palisades LCO.
Omitted	3.4.9.3	NA	SR: (Verify emergency power supply; 18 months)	Not required by TS.
3.4.10	3.4.10	3.1.7.1	LCO: 3 Pressurizer safeties; MODES 1, 2, 3≥430°F	Changed applicability to complement Palisades PORV-PT LCO as was done in STS.
Omitted	3.4.10 Notes	NA	NOTE: (Lift setting exception)	Lift setting performed/verified off site.
3.4.10 A	3.4.10 A	3.1.7.1A	COND: 1 Primary safety inoperable	Unchanged.
3.4.10 A.1	3.4.10 A.1	New	ACTN: Fix; 15 minutes	Unchanged.
3.4.10 B	3.4.10 B	3.1.7.1 A	COND: Required action not met or 2 valves inoperable	Unchanged.
3.4.10 B.1	3.4.10 B.1	3.1.7.1 A.a	ACTN: MODE 3; 6 hrs	Unchanged.
3.4.10 B.2	3.4.10 B.2	3.1.7.1 A.b	ACTN: Be < 430°F; 12 hrs	Changed to reflect different applicability.
3.4.10.1	3.4.10.1	4.2.2T #3	SR: Check primary safeties; iaw ISI program	Reworded to be consistent w/ 3.7.1.1
3.4.11	3.4.11	3.1.8.1	LCO: 2 PORVs & block valves OPERABLE; ≥ 430°F	Changed applicability to reflect Palisades appendix G analyses requirements. Palisades operates with the PORV blocks closed except when the PORVs are used for LTOP.
Omitted	3.4.11 A	NA	COND: (1 or more PORVs inoperable - can be manually cycled)	PORV is OPERABLE if it can be manually cycled.
Omitted	3.4.11 A.1	NA	ACTN: (Close block valve; 1 hr)	
3.4.11 A	3.4.11 B	3.1.8.1 Aa.2	COND: 1 PORV inoperable - can not be manually cycled	Unchanged.
3.4.11 A.1	3.4.11 B.1	3.1.8.1 Aa.2	ACTN: Close block valve; 1 hr	Unchanged.
3.4.11 A.2	3.4.11 B.2	NA	ACTN: Remove power from block; 1 hr	Unchanged.
3.4.11 A.3	3.4.11 B.3	3.1.8.1 Aa.3	ACTN: Restore PORV to OPERABLE; 72 hrs	Unchanged.
3.4.11 B	3.4.11 C	3.1.8.1 Aa.1	COND: One block valve inoperable	Unchanged.
3.4.11 B.1	3.4.11 C.1	3.1.8.1 Aa.1	ACTN: Place PORV in "Closed" position; 1 hr	Changed to reflect Paliades configuration.
3.4.11 B.2	3.4.11 C.2	3.1.8.1 Aa.3	ACTN: Restore block valve to OPERABLE; 72 hrs	Unchanged.

RTS Number	STS Number	TS Number	RTS (STS) requirement Description	Explanation of Differences
3.4.11 C	3.4.11 D	3.1.8.1 A.c	COND: Required action not met	Unchanged.
3.4.11 C.1	3.4.11 D.1	3.1.8.1 A.c	ACTN: Be in MODE 3; 6 hrs	Unchanged.
3.4.11 C.2	3.4.11 D.2	3.1.8.1 A.c	ACTN: Reduce T_{avg} to < 430°F; 12 hrs	Reworded to reflect Palisades LCO.
3.4.11 D	3.4.11 E	3.1.8.1 A.b	COND: 2 PORVs inoperable - can not be manually cycled	PORV is OPERABLE if it can be manually cycled.
3.4.11 D.1	3.4.11 E.1	3.1.8.1 Ab.2	ACTN: Close both block valves; 1 hr	Unchanged.
3.4.11 D.2	3.4.11 E.2	New	ACTN: Remove power from block valves; 1 hr	Unchanged.
3.4.11 D.3	Added	3.1.8.1 Ab.3	ACTN: Restore one PORV to operable; 2 hours	TS requirement.
Ommited	3.4.11 E.3	N/A	ACTN: (Be in MODE 3; 6 hrs)	STS ACTN included in 3.4.11 G.1.
Omitted	3.4.11 E.4	NA	ACTN: (Be in MODE 4; 12 hrs)	STS ACTN included in 3.4.11 G.2
3.4.11 E	3.4.11 F	3.1.8.1 Ab.1	COND: Both block valve inoperable	Unchanged.
3.4.11 E.1	3.4.11 F.1	3.1.8.1 Ab.1	ACTN: Place PORVs in "Closed" position; 1 hr	Changed to reflect Palisades configuration.
3.4.11 E 2	3.4.11 F.2	3.1.8.1 Ab.3	ACTN: Restore one block valve; 2 hrs	Unchanged.
3.4.11 F	3.4 11 G	3.1.8.1 A.c	COND: Required actions not met	Reworded to cover both COND D and E.
3.4.11 F.1	3.4.11 G.1	3.1.8.1 A.c	ACTN: Be in MODE 3; 6 hrs	Unchanged.
3.4.11 F.2	3.4.11 G.2	3.1.8.1 A.c	ACTN: Be in MODE 4; 12 hrs	Reworded to reflect Palisades LCO.
3.4.11.1	3.4.11.1	4.1.3.b	SR: Cycle each block valve; prior to heatup from MODE 5	Chanced frequency iaw TS. Palisades operates with block valves shut & opening valves during power operation could cause PORV to cycle.
3.4.11.2	3.4.11.2	4.1.3.a	SR: Cycle each PORV; 18 months	Unchanged.
Omitted	3.4.11.3	NA	SR: (Cycle each solenoid air and check valves; 18 months)	Palisades PORVs do not rely on air supply.
Omitted	3.4.11.4	NA	SR: (Demonstrate backup PORV power; 18 months)	PORVs and bloc valves powered by safety class power supplies.
3.4.12	3.4.12	3.1.8.2	LCO: LTOP system OPERABLE	Revised STS LTOP LCO to correspond to current TS since applicability for Palisades PORVs and HPSI limitations are different. Reworded LCOs accordingly. LTOP setpoint specified in the PTLR (TSTF-4).
3.4.12 Note	3.4.12 Note	3.3.5 N	NOTE: Emergency use of HPSI pumps for PCS make-up	TS Note on HPSI pump operation.

RTS Number	STS Number	TS Number	RTS (STS) requirement Description	Explanation of Differences
3.4.12 A	3.4.12 A	3.3.5	COND: HPSI incapable of injecting when PCS < 300°F	Palisades LTOP curve based on no automatic HPSI below 300°F
3.4.12 A.1	3.4.12 A.1	3.3.5	ACTN: Verify no HPSI capable of infection; Immediately	Palisades LTOP requirement.
Omitted	3.4.12 B	NA	COND: (Two or more charging pumps)	Palisades LTOP analysis assume 3 charging pumps can automatically start.
Omitted	3.4.12 C	NA	COND: (SIT not isolated)	Palisades SIT injection pressure is lower than min LTOP setpoint.
Omitted	3.4.12 D	NA	COND: (Required action not completed)	The required actions were omitted.
3.4.12 B	3.4.12 E	3.1.8.2 Aa.2	COND: PORV inoperable with pressurizer level ≤ 57%	Reworded to reflect Palisades condition.
3.4.12 B.1	3.4.12 E.1	3.1.8.2 Aa.2	ACTN: Restore PORV; 7 days	Unchanged.
3.4.12 C	3.4.12 F	3.1.8.2 Aa.1	COND: PORV inoperable with pressurizer level > 57%	Reworded to reflect Palisades condition.
3.4.12 C.1	3.4.12 F.1	3.1.8.2 Aa.1	ACTN: Restor PORV; 24 hrs	Unchanged.
3.4.12 D	3.4.12 G	3.1.8.2 Ab	COND: LTOP system inoperable	Editorial change only.
3.4.12 D.1	Added	New	ACTN: Be in MODE 4 w/SDC inlet valves open; 8 hrs	MODE changes where PORV are not required.
3.4.12 D.2	3.4.12 G.1	3.1.8.2 Ab	ACTN: Depressiurize and vent PCS; 24 hrs	Time extended to 24 hrs for controlled cooldown using SDC system.
3.4.12.1	3.4.12.1	4.1.5	SR: HPSI pump restriction; 12 hrs	Reworded to reflect Palisades licensing basis.
Omitted	3.4.12.2	NA	SR: (Charging pump restriction; 12 hrs)	No charging pump restrictions are required by Palisades licensing basis.
Omitted	3.4.12.3	NA	SR: (SIT restriction; 12 hrs)	SIT injection pressure is less than minimum LTOP pressure.
3.4.12.2	3.4.12.4	3.1.8.2 Ab.1 3.1.8.2 Ab.2	SR: Verify vent is open; Unlocked; 12 hrs Locked: 31 days	Reworded to support Palisades LCO.
3.4.12.3	3.4.12.5	4.1.4(b)	SR: Verify block valve open; 72 hrs	Unchanged.
3.4.12.4	3.4.12.6	4.1.4(a)	SR: Channel Functional Test; 31 days	Unchanged.
3.4.12.5	3.4.12.7	4.1.2	SR: Channel calibration; 18 months	Unchanged.
3.4.13.a	3.4.13.a	New	LCO: No PCS pressure Boundary leakage	Unchanged.

RTS Number	STS Number	TS Number	RTS (STS) requirement Description	Explanation of Differences
3.4.13.b	3.4.13.b	3.1.5.a	LCO: < 1 gpm unidentified leakage	Unchanged.
3.4.13.c	3.4.13.c	3.1.5.b	LCO: < 10 gpm identified leakage	Unchanged.
3.4.13.d	3.4.13.d	3.1.5.d	LCO: < 0.3 gpm SG tube leakage at steady state	Revised STS LCO to correspond to current TS.
3.4.13.e	3.4.13.e	3.1.5.d	LCO: < 0.6 gpm SG tube leakage following load changes	Revised STS LCO to correspond to current TS.
3.4.13 A	3.4.13 A	3.1.5.a/.b	COND: Leakage exceeds limit	Unchanged.
3.4.13 A.1	3.4.13 A.1	3.1.5.a/.b	ACTN: Restore leakage to w/in limit; 4 hours	Unchanged.
3.4.13 B	3.4.13 B	3.1.5.a/.b	COND: Required action not met or Pressure boundary leakage	Unchanged.
3.4.13 B.1	3.4.13 B.1	3.1.5.a/.b	ACTN: MODE 3; 6 hrs	Unchanged.
3.4.13 B.2	3.4.13 B.2	3.1.5.a/.b	ACTN: MODE 5; 36 hrs	Unchanged.
3.4.13.1	3.4.13.1	4.2.2.T#7	SR: Perform PCS inventory; 72 hrs	Unchanged.
3.4.13.2	3.4.13.2	4.14	SR: Verify SG tube integrity	Unchanged.
3.4.14	3.4.14	4.3.1T	LCO: Pressure isolation valve leakage w/in limits	Omitted SDC valve exception.
3.4.14 A	3.4.14 A	3.3.3 b	COND: One or more flow paths exceed limit	Unchanged.
3.4.14 A.1	3.4.14 A.1	4.3.i	ACTN: Isolate low pressure piping with one valve; 4 hrs	Unchanged.
3.4.14 A.2	3.4.14 A.2	New	ACTN: Restore PCS PIV to w/in limits; 72 hrs	Unchanged.
3.4.14 B	3.4.14 B	3.0.3	COND: Required action not met	Unchanged.
3.4.14 B.1	3.4.14 B.1	3.0.3	ACTN: Be in MODE 3; 6 hrs	Unchanged.
3.4.14 B.2	3.4.14 B.2	3.0.3	ACTN: Be in MODE 5; 36 hrs	Unchanged.
Omitted	3.4.14 C	NA	COND: (SDC autoclosure inoperable)	No autoclosure function at Palisades.
3.4.14.1	3.4.14.1	4.3.h 3.3.3.a	SR: Verify PCS PIV leakage is w/in limits	Reworded to reflect Palisades licensing basis. Added Hot Leg Injection check valves. Frequency reworded to correspond to TS.
Omitted	3.4.14.2	NA	SR: (Verify SDC autoclosure interlock for opening; 18 months)	No autoclosure function at Palisades.
Omitted	3.4.14.3	NA	SR: (Verify SDC autoclosure interlock for closing; 18 months)	No autoclosure function at Palisades.

RTS Number	STS Number	TS Number	RTS (STS) requirement Description	Explanation of Differences
3.4.14.2	Added	4.3.j	SR: Verify all four LPSI check valves are closed; after SDC operation	TS requirement.
3.4.14.3	Added	4.3.i	SR: Monitor line with leaking PIV; 24 hrs	TS requirement.
3.4.15	3.4.15	3.17.6	LCO: PCS leakage detection instruments OPERABLE	Listed Palisades instrumentation.
Omitted	3.4.15 A	N/A	COND: (Cont. sump or CAC flow rate monitor inoperable)	Replaced by new 3.4.15 A and B.
Omitted	3.4.15 B	N/A	COND: (Radioactivity inoperable)	Replaced by new 3.4.15 A and B.
Omitted	3.4.15 C	N/A	COND: (CAC condensate flow rate monitor inoperable)	Replaced by new 3.4.15 A and B.
Omitted	3.4.15 D	N/A	COND: (CAC condensate flow rate monitoring and radioactivity) monitor inoperable	Replaced by new 3.4.15 A and B.
3.4.15 A	Added	3.17.6.7.1	COND: One required leak rate detection monitor inoperable	TS requirement.
3.4.15 A.1	Added	3.17.6.7.1.a	ACTN: Restore monitor prior to entering MODE 3	TS requirement.
3.4.15 B	Added	3.17.6.7.2	COND: Two or three required leak rate monitors inoperable	TS requirement.
3.4.15 B.1	Added	4.2.2T#7	ACTN: Perform PCS water inventory balance; once per 24 hrs	TS requirement. (RST 3.4.13.1 frequency is 72 hrs).
3.4.15 B.2	Added	3.17.6.7.2.a	ACTN: Restore three required leak detection instruments; 30 days	Current TS requirement.
3.4.15 C	3.4.15 E	3.17.6.21	COND: Required actions not met	Unchanged.
3.4.15 C.1	3.4.15 E.1	3.17.6.21.a	ACTN: Be in MODE 3; 6 hrs	Unchanged.
3.4.15 C.2	3.4.15 E.2	3.17.6.21.b	ACTN: Be in MODE 5, 36 hrs	Unchanged.
3.4.15 D	3.4.15 F	3.0.3	COND: All required monitors inoperable	Unchanged.
3.4.15 D.1	3.4.15 F.1	3.0.3	ACTN: Enter LCO 3.0.3; Immediately	Unchanged.
3.4.15.1	3.4.15.1	4.17.6T#7	SR: Channel Check listed required leak detection inst; 12 hours	Surveillance changed to TS requirements.
3.4.15.2	3.4.15.2	4.17.6T.#7	SR: Channel Functional Test Cont humidity Monitor: 18 months	Surveillance changed to TS requirement.
3.4.15.3	3.4.15.3	4.17.6T#7	SR: Chnl Cal Cont Sump level monitor; 18 months	Unchanged.
3.4.15.4	3.4.15.4	4.17.6T#7	SR: Chnl Cal Cont gaseous monitor; 18 months	Unchanged.

RTS Number	STS Number	TS Number	RTS (STS) requirement Description	Explanation of Differences
3.4.15.5	3.4.15.5	4.17.6T#7	SR: Chnl Cal CAC condensate level switch; 18 months	Changed to reflect Palisades installed equipment.
3.4.16	3.4.16	3.1.4.a	LCO: PCS specific activity limits; $T_{ave} \geq 500°F$	Unchanged.
3.4.16 A	3.4.16 A	3.1.4.b	COND: DE I-131 > 1.0 μCi/gm	Unchanged.
3.4.16 A.1	3.4.16 A.1	3.1.4.e	ACTN: Demonstrate DE I-131 < 40 μCi/gm; each 4 hours	Substituted 40 μCi/gm for "acceptable region of STS Figure 3.4.16-1". Palisades has no equivalent figure, but uses the single value listed.
3.4.16 A.2	3.4.16 A.2	3.1.4.b	ACTN: Restore DE I-131 to w/in limits; 48 hours	Unchanged.
3.4.16 B	3.4.16 B	3.1.4.c	COND: Required Actions not met OR DE I-131 > 40	Substituted 40 μCi/gm for "acceptable region of STS Figure 3.4.16-1". Palisades has no equivalent figure, but uses the single value listed.
3.4.16 B.1	3.4.16 B.1	3.1.4.c	ACTN: Be < 500°F T_{ave}; 6 hrs	Unchanged.
3.4.16 C	3.4.16 C	3.1.4.d	COND: Gross PCS activity > limit	Unchanged.
3.4.16 C.1	3.4.16 C.1	3.1.4.e	ACTN: Verify DE I-131 < 1 μ Ci/gm; 4 hrs	Unchanged.
3.4.16 C.2	3.4.16 C.2	3.1.4.d	ACTN: Be in MODE 3 with T_{ave} < 500°F; 6 hrs	Unchanged.
3.4.16.1	3.4.16.1	4.2.1T#1	SR: Demonstrate gross activity < limit; 7 days	Unchanged.
3.4.16.2	3.4.16.2	4.2.1T#1	SR: Demonstrate DE I-131 < limit; 14 days, etc	Unchanged.
3.4.16.3	3.4.16.3	4.2.1T#1	SR: Determine $\bar{E}$; 184 days	Unchanged.
Omitted	3.4.16-1	N/A	Figr: (DE I-131 vs power)	Palisades uses a single limit of 40 μCi/gm.
3.4.17	3.4.17	3.1.3.b	LCO: STE PCS loops	Exception given to LCO 3.4.2, "PCS Minimum Temperature for Criticality"
3.4.17 A	3.4.17 A	New	COND: Thermal power not w/in limit	Unchanged.
3.4.17 A.1	3.4.17 A.1	New	ACTN: Trip reactor; immediately	Reworded because tripping reactor open relays not breaker at Palisades.
3.4.17 B	Added	3.1.3.b	COND: T_{ave} < 500°F	Lower creditability limits allowed during performance of Physics Test.
3.4.17 B.1	Added	New	ACTN: Be in MODE 2 with K_{eff} < 1.0; 30 minutes	Same actions as LCO 3.4.2 A.1.
3.4.17.1	3.4.17.1	New	SR: Verify thermal power < 5%; 1 hr	Unchanged.

RTS Number	STS Number	TS Number	RTS (STS) requirement Description	Explanation of Differences
3.4.17.2	3.4.17.2	4.17.1 T#1 4.17.1 T#2	SR: Chnl function check power level monitors; 12 hr, etc.	Frequency changed.
3.4.17.3	Added	3.1.3.b	SR: Verify $T_{avg} \geq 500°F$; every 30 minutes	Same as SR 3.4.2.1 w/ lower allowed temperature of 500°F.

RTS Number	STS Number	TS Number	RTS (STS) requirement Description	Explanation of Differences
3.5	3.5	3.3	ECCS SECTION	
3.5.1	3.5.1	3.3.1.b	LCO: 4 SITs operable; MODES 1 and 2	Retained existing applicability. The Palisades TS require the SIT's OPERABLE when the reactor is critical. The STS require them > 700#. This difference is necessary to allow palisades to fill the SITs to bring them in spec without HPSI flow entering the PCS. The specified applicability allows the PCS heatup to be completed prior to starting the SIT fill operation. Newer CE plants have an additional SIT fill line which avoids the need to fill the SITs with the normal HPSI lines.
3.5.1 A	3.5.1 A	3.3.2.a	COND: SIT Boron out of limit	Unchanged.
3.5.1 A.1	3.5.1 A.1	3.3.2.a	ACTN: Restore boron to w/in limits; 72 hours	Unchanged.
3.5.1 B	3.5.1 B	3.3.2.a	COND: SIT inoperable, other than boron	Unchanged.
3,5,1 B.1	3.5.1 B.1	3.3.2.a	ACTN: Restore SIT; 1 hr	Unchanged.
3.5.1 C	3.5.1 C	3.3.2.a	COND: Required Actions A or B not met	Unchanged.
3.5.1 C.1	3.5.1 C.1	3.3.2	ACTN: MODE 3; 6 hrs	Unchanged.
Omitted	3.5.1 C.2	NA	ACTN: (Reduce RCS pressure < 700 psia)	This action for Palisades applicability. Action C.1 requires plant to be out of applicable conditions.
3.5.1 D	3.5.1 D	3.0.3	COND: More than 1 SIT inoperable	Unchanged.
3.5.1 D.1	3.5.1 D.1	3.0.3	ACTN: Enter 3.0.3; immediately	Unchanged.
3.5.1.1	3.5.1.1	4.6.4.a	SR: SIT isolation valve check; 12 hrs	Unchanged.
3.5.1.2	3.5.1.2	4.2.2.10	SR: SIT volume check; 12 hrs	Reworded slightly to utilize Palisades' limitation of level switches rather than indicated level.
3.5.1.3	3.5.1.3	4.2.2.10	SR: SIT nitrogen pressure check; 12 hrs	Omitted upper pressure limitation. Existing Palisades TS have no upper bound on SIT pressure. Palisades has low pressure (200#) SITs which have no analyzed upper limit other than tank structural limits. the tank structure is assured by the relief valve setting. Newer plants, with high pressure (600#) SITs have an upper limit imposed to avoid nitrogen binding of the SG tubes following a LOCA.

RTS Number	STS Number	TS Number	RTS (STS) requirement Description	Explanation of Differences
3.5.1.4	3.5.1.4	4.2.1.5	SR: SIT Boron check; 31 days	Moved boron concentration limits to COLR. Core design changes require cycle specific minimum boron concentration requirements. Omitted second part of Frequency. The proposed SR Frequency is unchanged from the existing license. The additional frequency requirement of the STS, to verify boron concentration upon a SIT level increase is not proposed. Palisades' SITs are located high above the PCS. The connection piping has a volume of about 1000 gallons, so that inleakage fluid is unlikely to enter the SIT itself and would therefore not affect the sample results on the short term. In addition, the long sensing lines (the level detectors are located at about 595' elevation, the tank mid point about 735') for the level detectors cause the indicated level to be sensitive to containment temperature, a SR based on minor level variation would initiate SIT boron testing if containment temperature varied.
3.5.1.5	3.5.1.5	4.6.4.a	SR: SIT Valve power check; 31 days	Omitted reference to pressure; it is unnecessary with Palisades applicability.
3.5.2	3.5.2	3.3.1	LCO: 2 ECCS trains operable; MODES 1, 2, 3 ≥ 325°F	Retained existing applicability.
3.5.2 A	3.5.2 A	3.3.2	COND: ECCS equip inoperable, but 100% of 1 train flow avail	Unchanged.
3.5.2 A.1	3.5.2 A.1	3.3.2	ACTN: Restore equip to OPERABLE status; 72 hrs	Unchanged.
3.5.2 B	3.5.2 B	3.3.2	COND: Required action not met	Unchanged.
3.5.2 B.1	3.5.2 B.1	3.3.2	ACTN: MODE 3; 6 hrs	Unchanged.
3.5.2 B.2	3.5.2 B.2	3.3.2	ACTN: < 325°F; 24 hours	Changed to reflect Palisades applicability.
3.5.2.1	3.5.2.1	4.6.4 b&c	SR: ECCS Locked Valve Check; 12 hrs	Used list of valve requirements from Pal TS. Since Palisades valves are not motor operated, the power removal was replaced with appropriate conditions.
3.5.2.2	3.5.2.2	New	SR: ECCS Valve line up; 31 days	Unchanged.
3.5.2.3	Added	4.6.4.b	SR: CV-3006 air check; 31 days	Retained existing Pal TS check on air supply to SDC flow control valve CV-3006. Used 31 day frequency like that for balance of valve alignment check.
Omitted	3.5.2.3	NA	SR: (Vent ECCS piping; 31 days)	It is not proposed to add this surveillance requirement. It is not currently in the Palisades TS.
3.5.2.4	3.5.2.4	4.0.5	SR: ECCS Pump checks; 92 days	Unchanged.

RTS Number	STS Number	TS Number	RTS (STS) requirement Description	Explanation of Differences
3.5.2.5	3.5.2.5	4.0.5	SR: Charging pump test; 92 days	Unchanged.
3.5.2.6	3.5.2.6	4.1.2.3.b	SR: ECCS Valve auto actuation on SIS; 18 months	Split STS SR 3.5.2.6 into two, to better identify which signal effects needed to be verified.
3.5.2.7	3.5.2.6	4.1.2.12.a	SR: ECCS Valve auto actuation on RAS; 18 months	Split STS SR 3.5.2.6 into two, to better identify which signal effects needed to be verified.
3.5.2.8	3.5.2.7	4.1.2.3.b	SR: HPSI & LPSI Pump auto start; 18 months	Changed wording to agree with Palisades usage, to omit charging pumps whose auto start is not an assumption of the safety analyses, and to maintain consistency with other SRs in this section.
3.5.2.9	3.5.2.8	4.1.2.12.a	SR: LPSI trip on RAS; 18 months	Changed wording to include specific signal name, consistent with other Pal SRs.
3.5.2.10	3.5.2.9	New	SR: ECCS Hot leg injection valve check; 18 months	Changed wording to include a stroking requirement as well as verification of the stop position.
3.5.2.11	3.5.2.10	New	SR: ECCS containment sump check; 18 months	Reference to 'trash racks' omitted; Palisades has only screens; otherwise unchanged.
3.5.3	3.5.3	New	LCO: 1 HPSI pump available, MODES 3 < 325°F, 4, & 5.	Proposed LCO requires 1 HPSI available, rather than OPERABLE. Existing TS require that both HPSI pumps be incapable of injection into the PCS (for other than emergency makeup) when the PCS is below 300°F, in support of the Appendix G analyses. Palisades currently has no HPSI TS requirements when below 325°F. A long standing operating practice has been to assure that at least 1 HPSI pump could be made ready for use within 30 minutes. LCO 3.5.3 has been revised to require that practice to continue.
3.5.3 A	3.5.3 A	New	COND: Required HPSI train not available	Reworded to reflect LCO requirement for availability rather than operability.
3.5.3 A.1	3.5.3 A.1	New	ACTN: Restore HPSI train to required status; 1 hour	Reworded to reflect LCO requirement for availability rather than operability.
3.5.3 B	3.5.3 B	New	COND: Required action not met	Unchanged.
3.5.2 B.1	Added	New	ACTN: Initiate action to restore HPSI pump; immediately	Added action to initiate action to restore HPSI pump to required status, since action cannot force plant out of applicable conditions.
3.5.3 B.2	3.5.3 B.1	New	ACTN: MODE 5; 24 hrs	Unchanged.

RTS Number	STS Number	TS Number	RTS (STS) requirement Description	Explanation of Differences
3.5.3.1	3.5.3.1	New	SR: Perform SRs 3.5.2.2 & 3.5.2.11	Specified those SRs which support LCO and can be completed under required conditions.
3.5.4	3.5.4	3.3.1	LCO: SIRWT operable; MODES 1, 2, & 3	Applicability changed to agree with changed applicability of supported equipment (ECCS & Spray pumps). Existing applicability is MODES 1 and 2.
3.5.4 A	3.5.4 A	3.0.3	COND: SIRWT boron or temp not w/in limit	Unchanged.
3.5.4 A.1	3.5.4 A.1	3.0.3	ACTN: Restore SIRWT to OPERABLE status; 8 hrs	Unchanged.
3.5.4 B	3.5.4 B	3.0.3	COND: SIRWT inoperable other than Condition A	Unchanged.
3.5.4 B.1	3.5.4 B.1	3.0.3	ACTN: Restore SIRWT level; 1 hr	Unchanged.
3.5.4 C	3.5.4 C	3.0.3	COND: Required Action not met	Unchanged.
3.5.4 C.1	3.5.4 C.1	3.0.3	ACTN: MODE 3; 6 hrs	Unchanged.
3.5.4 C.2	3.5.4 C.2	3.0.3	ACTN: MODE 4; 30 hrs	Rewritten to agree w. Palisades LCO applicability.
3.5.4.1	3.5.4.1	New	SR: SIRWT temp check; 24 hrs	Omitted note, otherwise unchanged.
3.5.4.2	3.5.4.2	New	SR: SIRWT Level check; 7 days	Unchanged.
3.5.4.3	3.5.4.3	4.2.1.3	SR: SIRWT Boron check; 31 days	Moved boron concentration limits to COLR. Core design changes require cycle specific minimum boron concentration requirements. Retained existing 31 day SR frequency instead of 7 days from STS. Palisades SIRWT recirculation pump, used for assuring a representative sample, takes approx seven days to recirculation the tank volume once, as required prior to sampling. 20 years of operating history, with a 31 day frequency, has shown no trend for the tank concentration to drift out of limits.
3.5.5	3.5.5	3.19	LCO: TSP Baskets OPERABLE; MODES 1, 2, 3	Unchanged.
3.5.5 A	3.5.5 A	3.19.1	COND: TSP not w/in limits	Unchanged.
3.5.5 A.1	3.5.5 A.1	3.19.1	ACTN: Restore TSP; 72 hours	Unchanged.
3.5.5 B	3.5.5 B	3.19.2	COND: Required Action not met	Unchanged.
3.5.5 B.1	3.5.5 B.1	3.19.2	ACTN: MODE 3; 6 hrs	Unchanged.
3.5.5 B.2	3.5.5 B.2	3.19.2	ACTN: MODE 4; 30 hrs	Used Palisades 30 hour time to MODE 4.

RTS Number	STS Number	TS Number	RTS (STS) requirement Description	Explanation of Differences
3.5.5.1	3.5.5.1	4.2.2#12a	SR: TSP quantity check; 18 months	Reworded slightly using wording of existing SR.
3.5.5.2	3.5.5.2	4.2.2#12b	SR: TSP quality check; 18 months	Reworded slightly using wording of existing SR.

RTS Number	STS Number	TS Number	RTS (STS) requirement Description		Explanation of Differences
3.6	3.6	3.6		CONTAINMENT	
3.6.1	3.6.1	3.6.1.a	LCO:	Containment OPERABLE MODES 1, 2, 3, 4	Unchanged.
3.6.1 A	3.6.1 A	3.0.3	COND:	Containment inoperable	Unchanged.
3.6.1 A.1	3.6.1 A.1	3.0.3	ACTN:	Restore Containment to OPERABLE status; 1 hr	Unchanged.
3.6.1 B	3.6.1 B	3.0.3	COND:	Required Actions Not Met	Unchanged.
3.6.1 B.1	3.6.1 B.1	3.0.3	ACTN:	MODE 3; 6 hrs	Unchanged.
3.6.1 B.2	3.6.1 B.2	3.0.3	ACTN:	MODE 5; 36 hrs	Unchanged.
3.6.1.1	3.6.1.1	4.5.1	SR:	Required leak rate testing; iaw Containment Leak Rate Testing Program	RTS references the Containment Leak Rate Testing Program iaw NRC letter to Mr. David J. Modeen, Nuclear Energy Institute, dated Nov. 02, 1995.
3.6.1.2	3.6.1.2	4.5.4.a/ 4.5.5.a/ 4.5.8	SR:	Structural Integ. Test; iaw Containment Structural Integrity Surveillance Program	RTS redescribes to encompass the entire structure whereas STS limits scope to tendons.
3.6.2	3.6.2	3.6.1.a	LCO:	Air Locks OPERABLE; MODES 1, 2, 3, 4	Unchanged.
3.6.2 A	3.6.2 A	4.5.2C(3)	COND:	Door Inoperable	Unchanged.
3.6.2 A.1	3.6.2 A.1	3.6.1 A.b	ACTN:	Verify operable door closed; within 1 hr	Unchanged.
3.6.2 A.2	3.6.2 A.2	4.5.2C(3)	ACTN:	Verify operable door is locked; 24 hrs	Unchanged.
3.6.2 A.3	3.6.2 A.3	New	ACTN:	Verify door closed & locked; each 31 days	Unchanged.
3.6.2 B	3.6.2 B	New	COND:	Inter lock Inoperable	Unchanged.
3.6.2 B.1	3.6.2 B.1	New	ACTN:	Verify operable door closed; 1 hr	Unchanged.
3.6.2 B.2	3.6.2 B.2	New	ACTN:	Lock operable door; 24 hrs	Unchanged.
3.6.2 B.3	3.6.2 B.3	New	ACTN:	Verify door closed & locked; each 31 days	Unchanged.
3.6.2 C	3.6.2 C	4.5.2.c(2)/(3)	COND:	Air lock inoperable for reasons other than A & B	Unchanged.
3.6.2 C.1	3.6.2 C.1	4.5.2.c(2)/(3)	ACTN:	Evaluate overall cont. leak rate; immediately	Unchanged.
3.6.2 C.2	3.6.2 C.2	4.5.2.c(3)	ACTN:	Verify 1 door closed: 1 hr	Unchanged.

RTS Number	STS Number	TS Number	RTS (STS) requirement Description	Explanation of Differences
3.6.2 C.3	3.6.2 C.3	4.5.2.c(2)/(3)	ACTN: Restore air lock to operable; 24 hrs	Unchanged.
3.6.2 D	3.6.2 D	4.5.2.c(2)	COND: Reg. Actions not met	Unchanged.
3.6.2 D.1	3.6.2 D.1	4.5.2.c(2)	ACTN: MODE 3; 6 hrs	Unchanged.
3.6.2 D.2	3.6.2 D.2	4.5.2.c(2)	ACTN: MODE 5; 36 hrs	Unchanged.
3.6.2.1	3.6.2.1	4.5.2.d(1)b	SR: Air lock leak testing; iaw Containment Leak Rate Testing Program	RTS references the Containment Leak Rate Testing Program iaw NRC letter to Mr.David J. Modeen, Nuclear Energy Institute, dated, Nov. 02, 1995
3.6.2.2	3.6.2.2	New	SR: Test air lock door Interlock; 24 months	Frequency changed iaw TSTF-17.
3.6.3	3.6.3	3.6.1.a	LCO: Each Isolation Valve Operable; MODES 1, 2, 3, 4	Revises Action Note 1 exception to provide Palisades plant specific purge valve identification.
3.6.3 A	3.6.3 A	3.6.1 A	COND: One isolation valves inoperable	Revised exception to provide Palisades specific purge valve identification
3.6.3 A.1	3.6.3 A.1	3.6.1 A	ACTN: Isolate flow path; 4 hrs	Unchanged.
3.6.3 A.2	3.6.3 A.2	New	ACTN: Verify affected penetration isolated; each 31 days, etc.	Unchanged.
3.6.3 B	3.6.3 B	3.6.1A	COND: 2 isolation valves inoperable	Revised exception to provide Palisades specific purge valve identification.
3.6.3 B.1	3.6.3 B.1	New	ACTN: Isolate flow path; 1 hr	Unchanged.
3.6.3 C	3.6.3 C	New	COND: One isolation valve on closed system	Unchanged.

RTS Number	STS Number	TS Number	RTS (STS) requirement Description	Explanation of Differences
3.6.3 C.1	3.6.3 C.1	New	ACTN: Isolate flow path; 72 hrs	This represents a new requirement for Palisades because present TS do not address single isolation valves on closed systems. RTS proposes a 72 hour AOT for inoperable containment isolation valves in these systems. This AOT is reasonable based on the low potential for the loss of the integrity of a closed system. The loss of the integrity of these closed systems is guarded against by 10 CFR 50 Appendix J, Type A testing, system leak tests, and leakage monitoring of the systems by various other means. As such, the use of a closed system to isolate a penetration flow path with a failed containment isolation valve is no different than using a single valve in a system that is open to the containment atmosphere or a single airlock door to isolate a penetration flow path. STS Required Actions allow the use of a single valve or airlock door to isolate a penetration flow path for an indefinite amount of time. While this is not being proposed, the 72 hour AOT provides a reasonable time period to perform repairs on a failed containment isolation valve when relying on an intact closed system. The 72 hour AOT is typically provided for losing one train of redundancy throughout the NUREGs.
3.6.3 C.2	3.6.3 C.2	New	ACTN: Verify isolated; each 31 days	Unchanged.
Omitted	3.6.3 D	NA	COND: Containment Bypass Leakage not within limits	Doesn't apply because configuration doesn't exist at Palisades.
Omitted	3.6.3 D.1	NA	ACTN: Restore Leakage; 4 hrs	Doesn't apply because configuration doesn't exist at Palisades.
3.6.3 D	3.6.3 E	3.6.5.b	COND: Purge valve leakage outside limits	Revised to provide Palisades specific purge valve identification.
3.6.3 D.1	3.6.3 E.1	3.6.5.b	ACTN: Isolate flow path; 1 hour	Revised to eliminate configuration that doesn't exist at Palisades.
3.6.3 D.2	3.6.3 E.2	New	ACTN: Verify flow path isolated; each 31 days	Unchanged.
3.6.3 D.3	3.6.3 E.3	New	ACTN: Test resilient seal valves closed; each 92 days	Unchanged.
3.6.3 E	3.6.3 F	3.6.1 A.d	COND: Required Action not met	Unchanged.
3.6.3 E.1	3.6.3 F.1	3.6.1 A.d	ACTN: MODE 3; 6 hrs	Unchanged.
3.6.3 E.2	3.6.3 F.2	3.6.1 A.d	ACTN: MODE 5; 36 hrs	Unchanged.
Omitted	3.6.3.1	NA	SR: Verify 42 in purge valves closed; 31 days	Palisades has no 42 in purge valves; only the 8" and 12" valves covered by RTS 3.6.3.1 have resilient seals.

RTS Number	STS Number	TS Number	RTS (STS) requirement Description	Explanation of Differences
3.6.3.1	3.6.3.2	4.2.2.13.a	SR: Check purge & vent valves elec locked closed; 31 days	Revised to provide Palisades specific purge valve identification. Omitted allowing valves to be opened; Palisades analyses do not support operating with valves open. Added existing requirement for them to be electrically locked closed (de-energized).
3.6.3.2	3.6.3.3	3.6.3	SR: Verify non-auto valves outside CB closed and not locked; 31 days	Revised to remove locked, sealed or otherwise secured valves iaw TSTF-45.
3.6.3.3	3.6.3.4	3.6.3	SR: Verify non-auto valves inside CB closed and not locked; 92 days, etc.	Revised to remove locked, sealed or otherwise secured valves iaw TSTF-45.
3.6.3.4	3.6.3.5	4.5.6.c	SR: Demonstrate valve closure times	Revised to clarify requirements applies only to automatic valves iaw TSTF-46. Testing program title changed and reference to 92 days deleted because test frequency is specified in test program.
3.6.3.5	3.6.3.6	4.2.2.13b	SR: Perform leak rate testing; 18 months, etc.	Revised to provide Palisades specific purge valve identification.
3.6.3.6	3.6.3.7	4.5.6.b	SR: Demonstrate valve closure on CHP signal	Split STS SR into two. Specified actual signal since Palisades has no CIAS, but has separate, similar but not identical, isolation achieved by CHP or by CHR instead.
3.6.3.7	3.6.3.7	4.5.6.b	SR: Demonstrate valve closure on CHR signal	Split STS SR into two. Specified actual signal since Palisades has no CIAS, but has separate, similar but not identical, isolation achieved by CHP or by CHR instead.
Omitted	3.6.3.8	NA	SR: (Verify purge valves block)	Doesn't apply because purge valves are electrically locked closed in MODES 1, 2, 3, and 4 at Palisades.
Omitted	3.6.3.9	NA	SR: (Verify bypass leakage)	Doesn't apply because this configuration doesn't exist at Palisades.

RTS Number	STS Number	TS Number	RTS (STS) requirement Description	Explanation of Differences
3.6.4	3.6.4	3.6.2	LCO: Containment Pressure Limit; MODES 1, 2	PAL doesn't have a minimum pressure requirement. STS 3.6.4 provides a single containment upper pressure limit for MODES 1, 2, 3, and 4. RTS 3.6.4 provides one limit for MODES 1 and 2 while 3.6.5 provides a different limit for MODES 3 and 4. Containment temperature and pressure can increase quickly during plant startup and the PAL design limits the options available for relieving this pressure. PAL analyses do not currently support opening purge valves to relieve excessive containment pressure during MODES 1, 2, 3, or 4. Therefore, during plant startups with certain atmospheric conditions it can be difficult to maintain the pressure below the 1.0 psig limit provided in RTS 3.6.4. RTS LCO 3.6.5 provides a 1.5 psig pressure limit, but is applicable only to MODES 3 and 4. The two different containment pressure limits provided in RTS LCO 3.6.4 and 3.6.5 are supported by appropriate analyses.
3.6.4 A	3.6.4 A	3.0.3	COND: Pressure not w/in limit	Unchanged.
3.6.4 A.1	3.6.4 A.1	3.0.3	ACTN: Restore pressure; 8 hours	Revised to provide an 8 hour AOT. The containment pressure and temperature limits assigned in the RTS are those values assumed for the initial conditions in the accident analyses. The 8 hour time period was selected for pressure because it was used for temperature. The reason for entering the action statement in these LCOs is because the initial conditions assumed in the accident analyses have been violated. The values used are go/no go tests and once the values are exceeded an AOT (Allowed Outage Time) is entered. If either the initial pressure or temperature values are exceeded the result is the same, the accident analyses peak temperature/pressure values may be exceeded. STS allow the mini purge valves to be opened to reduce pressure therefore STS provide a 1 hour AOT. Palisades purge valves are not allowed to be open in Modes 1, 2, 3 or 4. The Palisades plant equipment utilized to reduce temperature (LCO 3.6.6), the containment air coolers, may also be used to reduce containment pressure. A small vent path through Clean Waste Receiver Tank T-64D and the containment vent header may also be used to reduce containment pressure.
3.6.4 B	3.6.4 B	3.0.3	COND: Required Action Not Met	Unchanged.
3.6.4 B.1	3.6.4 B.1	3.0.3	ACTN: MODE 3; 6 hours	Unchanged.

RTS Number	STS Number	TS Number	RTS (STS) requirement Description	Explanation of Differences
Omitted	3.6.4 B.2	3.0.3	ACTN: (MODE 5; 36 hours)	STS action to enter MODE 5 was omitted to reflect RTS MODES 1 and 2 Applicability. STS 3.6.4 provides a single containment upper pressure limit for MODES 1, 2, 3, and 4. RTS 3.6.4 provides one limit for MODES 1 and 2 while 3.6.5 provides a different limit for MODES 3 and 4. Containment temperature and pressure can increase quickly during plant startup and the PAL design limits the options available for relieving this pressure. PAL analyses do not currently support opening purge valves to relieve excessive containment pressure during MODES 1, 2, 3, or 4. Therefore, during plant startups with certain atmospheric conditions it can be difficult to maintain the pressure below the 1.0 psig limit provided in RTS 3.6.4. RTS LCO 3.6.5 provides a 1.5 psig pressure limit, but is applicable only to MODES 3 and 4. The two different containment pressure limits provided in RTS LCO 3.6.4 and 3.6.5 are supported by appropriate analyses.
3.6.4.1	3.6.4.1	New	SR: Verify Cont. pressure is within limit; 12 hours	Unchanged.
3.6.5	3.6.4	3.6.2	LCO: Containment Pressure Limit MODES 3 and 4	PAL doesn't have a minimum pressure requirement. STS 3.6.4 provides a single containment upper pressure limit for MODES 1, 2, 3, and 4. RTS 3.6.4 provides one limit for MODES 1 and 2 while 3.6.5 provides a different limit for MODES 3 and 4. Containment temperature and pressure can increase quickly during plant startup and the PAL design limits the options available for relieving this pressure. PAL analyses do not currently support opening purge valves to relieve excessive containment pressure during MODES 1, 2, 3, or 4. Therefore, during plant startups with certain atmospheric conditions it can be difficult to maintain the pressure below the 1.0 psig limit provided in RTS 3.6.4. RTS LCO 3.6.5 provides a 1.5 psig pressure limit, but is applicable only to MODES 3 and 4. The two different containment pressure limits provided in RTS LCO 3.6.4 and 3.6.5 are supported by appropriate analyses.
3.6.5 A	3.6.4 A	3.0.3	COND: Pressure not w/in limit.	Unchanged.

RTS Number	STS Number	TS Number	RTS (STS) requirement Description	Explanation of Differences
3.6.5 A.1	3.6.4 A.1	3.0.3	ACTN: Restore pressure; 8 hours	Revised to provide an 8 hour AOT. The containment pressure and temperature limits assigned in the RTS are those values assumed for the initial conditions in the accident analyses. The 8 hour time period was selected for pressure because it was used for temperature. The reason for entering the action statement in these LCOs is because the initial conditions assumed in the accident analyses have been violated. The values used are go/no go tests and once the values are exceeded an AOT (Allowed Outage Time) is entered. If either the initial pressure or temperature values are exceeded the result is the same, the accident analyses peak temperature/pressure values may be exceeded. STS allow the mini purge valves to be opened to reduce pressure therefore STS provide a 1 hour AOT. Palisades purge valves are not allowed to be open in Modes 1, 2, 3 or 4. The Palisades plant equipment utilized to reduce temperature (LCO 3.6.6), the containment air coolers, may also be used to reduce containment pressure. A small vent path through Clean Waste Receiver Tank T-64D and the containment vent header may also be used to reduce containment pressure.
3.6.5 B	3.6.4 B	3.0.3	COND: Required Action Not Met	Unchanged.
Omitted	3.6.4 B.1	3.0.3	ACTN: (MODE 3; 6 hours)	STS action to enter MODE 3 was omitted to reflect RTS MODES 3 and 4 Applicability. STS 3.6.4 provides a single containment upper pressure limit for MODES 1, 2, 3, and 4. RTS 3.6.4 provides one limit for MODES 1 and 2 while 3.6.5 provides a different limit for MODES 3 and 4. Containment temperature and pressure can increase quickly during plant startup and the PAL design limits the options available for relieving this pressure. PAL analyses do not currently support opening purge valves to relieve excessive containment pressure during MODES 1, 2, 3, or 4. Therefore, during plant startups with certain atmospheric conditions it can be difficult to maintain the pressure below the 1.0 psig limit provided in RTS 3.6.4. RTS LCO 3.6.5 provides a 1.5 psig pressure limit, but is applicable only to MODES 3 and 4. The two different containment pressure limits provided in RTS LCO 3.6.4 and 3.6.5 are supported by appropriate analyses.
3.6.5 B.1	3.6.4 B.2	3.0.3	ACTN: MODE 5; 30 hours	Changed AOT to reflect MODE 3 and 4 applicability.
3.6.5.1	3.6.4.1	New	SR: Verify Cont. pressure is within limit; 12 hours	Unchanged.
3.6.6	3.6.5	New	LCO: Containment Air Temp w/in limit; MODES 1, 2, 3, 4	Unchanged.
3.6.6 A	3.6.5 A	New	COND: Temp Exceeds Limit	Unchanged.

RTS Number	STS Number	TS Number	RTS (STS) requirement Description	Explanation of Differences
3.6.6 A.1	3.6.5 A.1	New	ACTN: Restore temperature; 8 hours	Unchanged.
3.6.6 B	3.6.5 B	New	COND: Required Action Not Met	Unchanged.
3.6.6 B.1	3.6.5 B.1	New	ACTN: MODE 3; 6 hours	Unchanged.
3.6.6 B.2	3.6.5 B.2	New	ACTN: MODE 5; 36 hours	Unchanged.
3.6.6.1	3.6.5.1	New	SR: Verify temperature is within limit	Unchanged.
3.6.7	3.6.6	3.4.1	LCO: Containment Spray & Cooling; 2 trains operable	Revised to reflect Palisades configuration. Palisades has two trains of equipment to cool and depressurize the containment. The integration of the components of the containment spray system and containment cooling system components into 2 trains is reflected in new equipment nomenclature ie containment spray and cooling trains. Because only 2 trains are available the more restrictive 72 hour AOT was selected in lieu of the longer 7 and 14 day requirements. The applicability for the LCO is limited to MODES 1, 2, & 3 ≥ 325°F since the spray system must be valved out to use the shutdown cooling system, which is used to remove decay heat in MODE 3 < 325°F, and in MODES 4, 5, & 6.
Omitted	3.6.6 A	NA	COND: One cont spray train inoperable	See discussion following LCO.
Omitted	3.6.6 A.1	NA	ACTN: Restore spray train; 7 days, etc.	See discussion following LCO.
Omitted	3.6.6 B	NA	COND: One cont cooling train inoperable	See discussion following LCO.
Omitted	3.6.6 B.1	NA	ACTN: Restore cont cooling train; 7 days, etc.	See discussion following LCO.
Omitted	3.6.6 C	NA	COND: Two cont spray trains inoperable	See discussion following LCO.
Omitted	3.6.6 C.1	NA	ACTN: Restore one cont spray train; 72 hrs	See discussion following LCO.
3.6.7 A	3.6.6 D	3.4.1/2/3	COND: 1 cont spray and cooling train inoperable	See discussion following LCO.
3.6.7 A.1	3.6.6 D.1	3.4.1/2/3	ACTN: Restore cont spray cooling train; 72 hrs	See discussion following LCO.
Omitted	3.6.6 D.2	NA	ACTN: Restore cont cooling train; 72 hrs	See discussion following LCO.
Omitted	3.6.6 E	NA	COND: 2 Cont spray trains inoperable	See discussion following LCO.
Omitted	3.6.6 E.1	NA	ACTN: Restore 1 cont cooling train; 72 hrs	See discussion following LCO.
3.6.7 B	3.6.6 F	3.4.1/2/3	COND: Required actions not met	See discussion following LCO.

RTS Number	STS Number	TS Number	RTS (STS) requirement Description	Explanation of Differences
3.6.7 B.1	3.6.6 F.1	3.4.2/3	ACTN: MODE 3; 6 hrs	Unchanged.
3.6.7 B.2	3.6.6 F.2	3.4.2/3	ACTN: < 325°F; 24 hours	See discussion following LCO.
Omitted	3.6.6 G	NA	COND: Any 3 or more trains inoperable	See discussion following LCO.
Omitted	3.6.6 G	NA	ACTN: LCO 3.0.3; immediately	See discussion following LCO.
3.6.7.1	3.6.6.1	New	SR: Verify CS valve lineup; 31 days	Unchanged.
3.6.7.2	3.6.6.2	4.6.5.6	SR: Exercise CAC's	Specified air coolers since all installed coolers are not used for accident conditions.
3.6.7.3	3.6.6.3	New	SR: CAC Cooling Water Flow Rate	Changed frequency from 31 days to 18 months. This is a new requirement for Palisades. Measurement of CAC flow is only meaningful with coolers aligned for accident conditions. Because of Palisades plant design, this surveillance can only be performed during cold shutdown conditions at a refueling outage frequency.
3.6.7.4	3.6.6.4	New	SR: CS Header Level verification	Unchanged.
3.6.7.5	3.6.6.5	4.0.5	SR: CS Pump Discharge Pressure	Reworded to provide Palisades specific criteria.
3.6.7.6	3.6.6.6	4.17.3.1	SR: Valve Act. on CHP	Specified signal name to be consistent with other RTS section SRs.
3.6.7.7	3.6.6.7	4.6.2.a	SR: CS Pumps Start on CHP with SIS	Specified signal name to be consistent with other RTS Section SRs.
3.6.7.8	3.6.6.8	4.6.5.a	SR: CAC Start on SIS signal	Specified signal name to be consistent with other RTS section SRs. Specified air coolers since all installed coolers are not required for accident conditions.
3.6.7.9	3.6.6.9	4.6.2.b	SR: Verify Spray Nozzle Clear	Unchanged.
Omitted	3.6.7	NA	LCO: (Iodine removal system operable; MODES 1, 2, 3)	Does not apply equipment does not exist at Palisades.
3.6.8	3.6.8	3.6.4	LCO: Two Hydrogen Recombiners operable; MODES 1 & 2	Unchanged.
3.6.8 A	3.6.8 A	3.6.4	COND: 1 Hydrogen Recombiners Inoperable	Unchanged.
3.6.8 A.1	3.6.8 A.1	3.6.4	ACTN: Restore recombiners; 30 days	Unchanged.
Omitted	3.6.8 B	NA	COND: (2 Hydrogen Recombiners Inoperable)	Doesn't apply because no other control function is available.

Palisades RTS Cross Reference to STS. (03/28/96).

RTS Number	STS Number	TS Number	RTS (STS) requirement Description	Explanation of Differences
Omitted	3.6.8 B.1	NA	ACTN: (Verify hydrogen control function; 1 hr, etc.)	Doesn't apply because no other control function is available.
Omitted	3.6.8 B.2	NA	ACTN: (Restore 1 hydrogen recombiner; 7 days)	Doesn't apply because no other control function is available.
3.6.8 B	3.6.8 C	3.6.4	COND: Required Action Not Met	Unchanged.
3.6.8 B.1	3.6.8 C.1	3.6.4	ACTN: MODE 3; 6 hours	Unchanged.
3.6.8.1	3.6.8.1	4.2.2.11a	SR: Functional Test H_2 recombiners; 18 months	Unchanged.
3.6.8.2	3.6.8.2	4.2.2.11.b2	SR: Visual exam of hydrogen recombiners; 18 months	Unchanged.
3.6.8.3	3.6.8.3	4.2.2.11.b.3	SR: Resistance to ground test; 18 months	Unchanged.
Omitted	3.6.9	NA	LCO: (Two hydrogen mixing trains OPERABLE)	Does not apply equipment doesn't exist at Palisades.
Omitted	3.6.10	NA	LCO: (Two Iodine cleanup trains OPERABLE)	Does not apply equipment does not exist at Palisades.
Omitted	3.6.11	NA	LCO: (Shield building shall be OPERABLE)	Does not apply equipment does not exist at Palisades.
Omitted	3.6.12	NA	LCO: (Two vacuum relief lines shall be OPERABLE)	Does not apply equipment does not exist at Palisades.
Omitted	3.6.13	NA	LCO: (Two SBEAC System trains shall be OPERABLE)	Does not apply equipment does not exist at Palisades.

RTS Number	STS Number	TS Number	RTS (STS) requirement Description	Explanation of Differences
3.7	3.7		PLANT SYSTEMS SECTION	
3.7.1	3.7.1	3.1.7.c	LCO: 23 MSSVs operable; Modes 1, 2, 3	Changed LCO to reflect Palisades hardware and analyses. Palisades has no correlation between number of MSSVs and Hi Power trip setpoint. Retained former (TS) LCO & actions; used STS applicability.
3.7.1 A	3.7.1 A	3.0.3	COND: Less than 23 MSSVs operable	Reworded condition to reflect reworded LCO.
3.7.1 A.1	3.7.1 A.2.1	3.0.3	ACTN: Restore 23 MSSVs to OPERABLE; 4 hours	Reworded condition to reflect reworded LCO.
3.7.1 B	3.7.1 B	3.0.3	COND: Required actions not met	Unchanged.
3.7.1 B.1	3.7.1 B.1	3.0.3	ACTN: Mode 3; 6 hours	Unchanged.
3.7.1 B.2	3.7.1 B.2	New	ACTN: Mode 4; 30 hours	Used palisades time to mode 4.
3.7.1.1	3.7.1.1	4.2.2.4	SR: Demonstrate MSSV setpoints; iaw ISI program	Unchanged.
Omitted	3.7.1-1	NA	Tabl: (Operable MSSVs vs power)	Palisades has no such analysis; 23 of 24 MSSVs are required to operate.
3.7.1-1	3.7.1-2	3.1.7.c	Tabl: MSSV setpoints	Unchanged.
3.7.2	3.7.2	3.5.1.f	LCO: Two MSIVs operable; Modes 1, 2, & 3	Unchanged except for deletion of bracketed "deactivated" which is unnecessary for the Palisades reverse acting check valve type MSIVs.
3.7.2 A	3.7.2 A	3.5.3	COND: One MSIV inoperable, MODE 1	Unchanged.
3.7.2 A.1	3.7.2 A.1	3.5.3	ACTN: Restore MSIV; 8 hours	Unchanged.
3.7.2 B	3.7.2 B	3.5.3	COND: Required Cond A Action not met	Unchanged.
3.7.2 B.1	3.7.2 B.1	3.5.3	ACTN: Mode 2; 6 hours	Unchanged.
3.7.2 C	3.7.2 C	New	COND: ≥ 1 MSIV inoperable in MODE 2 or 3	Unchanged.
3.7.2 C.1	3.7.2 C.1	New	ACTN: Close MSIV; 8 hours	Unchanged.
3.7.2 C.2	3.7.2 C.2	New	ACTN: Verify MSIV closed; each 7 days	Unchanged.
3.7.2 D	3.7.2 D	3.5.3	COND: Required Cond C action not met	Unchanged.
3.7.2 D.1	3.7.2 D.1	3.5.3	ACTN: Be in MODE 3; 6 hours	Unchanged.

RTS Number	STS Number	TS Number	RTS (STS) requirement Description	Explanation of Differences
3.7.2 D.2	3.7.2 D.2	3.5.3	ACTN: Mode 4; 30 hours	Used palisades time to Mode 4.
3.7.2.1	3.7.2.1	4.8	SR: Demonstrate MSIV closure time; 18 months	Deleted note which is unnecessary at Palisades, and is not in existing TS; added requirement to test under no-flow conditions from existing TS.
3.7.2.2	Added	New	SR: Demonstrate MSIV closure on CHP; 18 months	Not verified elsewhere & assumed in safety analyses.
3.7.2.3	Added	New	SR: Demonstrate MSIV closure on SGLP; 18 months	Not verified elsewhere & assumed in safety analyses.
3.7.3	3.7.3	New	LCO: Two MFRVs operable; Modes 1, 2, & 3	Unchanged.
3.7.3 A	3.7.3 A	New	COND: One MFRV or bypass inoperable	Unchanged.
3.7.3 A.1	3.7.3 A.1	New	ACTN: Close or isolate MFRV and bypass; 8 hours	Unchanged.
3.7.3 A.2	3.7.3 A.2	New	ACTN: Verify inoperable MFRV or bypass closed; each 7 days	Unchanged.
Omitted	3.7.3 B	NA	COND: (2 MFIVs per flow path inoperable)	Palisades does not have redundant feedwater isolation valves. This condition and associated actions are not applicable.
3.7.3 B	3.7.3 C	New	COND: Required action not met	Unchanged.
3.7.3 B.1	3.7.3 C.1	New	ACTN: Mode 3; 6 hours	Unchanged.
3.7.3 B.2	3.7.3 C.2	New	ACTN: Mode 4; 30 hours	Used Palisades time to Mode 4.
3.7.3.1	3.7.3.1	New	SR: Demonstrate MFRV & bypass closure time; 18 months	Unchanged.
3.7.3.2	Added	4.2.2.15a	SR: Demonstrate MFRV & bypass closure on CHP; 18 months	Not verified elsewhere & assumed in safety analyses.
3.7.3.3	Added	4.2.2.15b	SR: Demonstrate MFRV & bypass closure on SGLP; 18 months	Not verified elsewhere & assumed in safety analyses.
3.7.4	3.7.4	New	LCO: 2 ADV lines per SG operable; MODES 1, 2, 3, 4	Unchanged.
3.7.4 A	3.7.4 A	New	COND: One ADV inoperable	Unchanged.
3.7.4 A.1	3.7.4 A.1	New	ACTN: Restore ADV; 7 days	Unchanged.
3.7.4 B	3.7.4 B	New	COND: 2 ADVs inoperable	Unchanged.
3.7.4 B.1	3.7.4 B.1	New	ACTN: Restore 1 ADV; 24 hours	Unchanged.
3.7.4 C	3.7.11 C	New	COND: Required action not met	Unchanged.
3.7.4 C.1	3.7.11 C.1	New	ACTN: MODE 3; 6 hours	Unchanged.

RTS Number	STS Number	TS Number	RTS (STS) requirement Description	Explanation of Differences
3.7.4 C.2	3.7.11 C.2	New	ACTN: MODE 4; 30 hours	Used Palisades time to MODE 4.
3.7.4.1	3.7.11.1	New	SR: Cycle each ADV; 18 months	Unchanged.
3.7.4.2	3.7.11.2	New	SR: Cycle each block valve; 18 months	Unchanged.
3.7.5	3.7.5	3.5.1	LCO: Two AFW trains operable; MODEs 1, 2, 3, 4	The LCO was rewritten to reflect the specific design of Palisades. The requirements and actions remain effectively unchanged. Palisades has two distinct AFW trains, as described in the bases. This LCO is written to be structured like other LCOs for two train systems. Applicability is unchanged from RSTS.
3.7.5 N 1	3.7.5 N 1	3.5.1.a	NOTE: Only one pump required in MODE 4	Unchanged
3.7.5 N 2	Added	3.5.1.a	NOTE: Turbine driven AFW pump required in MODEs 1 and 2	This note was added to clarify the MODE requirements of the turbine driven AFW pump. This note is in existing Tech Specs (3.5.1.a)
3.7.5 N 3	Added	3.5.2.b	NOTE: Allows 2 pumps in MANUAL for SR Testing purposes	Palisades AFW pumps start in a timed sequence. Successful starting of any pump blocks the start of subsequent pumps. Two pumps must be placed in MANUAL (rather than in AUTO) to verify an automatic start of the third pump. Without the note, these two pumps would have to be considered inoperable, requiring a shutdown. The note is in existing Technical Specifications (3.5.2.b)
3.7.5 A	Added	New	COND: AFW pump P-8A or P-8B inoperable	Changed this CONDITION to reflect the built-in pump redundancy of the 'A/B' AFW train. Inoperability of one pump does not prevent the 'A/B' train from fulfilling its design function. Failure of one steam line, either manual or automatic, to P-8B is treated as rendering the pump inoperable. Thus, the condition described in the RSTS is part of the RTS CONDITION.
3.7.5 A.1	Added	New	ACTN: Restore pump to operable status; 7 days	This ACTION was changed to match CONDITION 3.7.5 A. It now requires the inoperable pump to be restored within the ACTION time. The ACTION time from RSTS was used. The 10 day completion time requirement comprises a new requirement for Palisades and is not proposed.
3.7.5 B	3.7.5 B	3.5.2.a	COND: One AFW train inoperable	Unchanged. Existing Technical Specifications address one AFW pump being inoperable.
3.7.5 B.1	3.7.5 B.1	3.5.2.a	ACTN: Restore AFW train to operable status; 72 hours	Unchanged. Existing Technical Specifications require restoration of an AFW pump.

RTS Number	STS Number	TS Number	RTS (STS) requirement Description	Explanation of Differences
3.7.5 C	3.7.5 C	3.5.3	COND: Required action not met or two trains inoperable	Exception added to exclude two trains inoperable for the reasons listed in CONDITION D. Basically, in CONDITION C, both AFW trains are inoperable but still capable of delivering some AFW flow to at least one steam generator.
3.7.5 C.1	3.7.5 C.1	3.5.3	ACTN: MODE 3; 6 hours	Unchanged.
3.7.5 C.2	3.7.5 C.2	3.5.3	ACTN: MODE 4; 30 hours	Used Palisades time to MODE 4.
3.7.5 D	3.7.5 D	3.5.4	COND: All AFW flow paths from both AFW trains inoperable	Changed from 'three train' to 'All AFW flow paths' because 1) Palisades has only two trains and 2) failure of all AFW flow paths represents the inability to feed any AFW to either S/G. This last is effectively the same as the CONDITION described in the RSTS.
3.7.5 D.1	3.7.5 D.1	3.5.4	ACTN: Initiate action to restore 1 AFW train; Immediately	Unchanged.
3.7.5 E	3.7.5 E	New	COND: Required AFW train inoperable in MODE 4	Unchanged.
3.7.5 E.1	3.7.5 E.1	New	COND: Initiate action to restore 1 AFW train; Immediately	Unchanged.
3.7.5.1	3.7.5.1	4.9.a.3	SR: Valve lineup check; 31 days	Unchanged.
3.7.5.2	3.7.5.2	4.9.a.1/.2	SR: AFW pump check; 31 days, staggered test basis	Unchanged.
3.7.5.3	3.7.5.3	4.9.b.1	SR: Demonstrate valve actuation; 18 months	Note specifying testing does not have to be performed on the turbine driven AFW pump until 24 hours after achieving a given steam pressure deleted because it is not needed given the MODE applicability applied to Palisades turbine driven AFW pump.
3.7.5.4	3.7.5.4	4.9.b.2	SR: Demonstrate pump start; 18 months	Note specifying testing does not have to be performed on the turbine driven AFW pump until 24 hours after achieving a given steam pressure deleted because it is not needed given the MODE applicability applied to Palisades turbine driven AFW pump.
3.7.5.5	3.7.5.5	New	SR: Demonstrate flow from CST to each S/G; 18 months	Unchanged.
3.7.6	3.7.6	3.5.1.e	LCO: Volume in CST & PMST > 100k gal; MODES 1, 2, 3 & 4	Reworded to reflect Palisades design and requirements.
3.7.6	Added	3.5.1.a	LCO: Fire Prot & SW backup supplies to AFW Operable; MODES 1-4	Added to reflect Palisades design and requirements. The requirement for a fire protection makeup supply is in the existing Technical Specifications (3.5.1.a). The requirement for the Service Water makeup supply is implied in the existing Technical Specifications (3.5.2.d).
3.7.6 A	3.7.6 A	3.5.3	COND: Available Condensate Inventory not within limit	Reworded to match Palisades requirement.

RTS Number	STS Number	TS Number	RTS (STS) requirement Description	Explanation of Differences
Omitted	3.7.6 A.1	NA	ACTN: (Verify backup water supply OPERABLE)	Omitted because Palisades design requires a restoration of the condensate inventory rather than a lengthy reliance on a backup water supply.
3.7.6 A.1	3.7.6 A.2	3.5.3	ACTN: Restore inventory to required volume; 4 hours	Reworded to reflect the LCO. Completion time changed from 7 days to 4 hours to reflect the absence of a long-term backup condensate supply.
3.7.6 B	Added	3.5.2.c/.d	COND: One condensate backup supply inoperable	Added this condition, which was previously in the AFW section of the existing Technical Specifications, to the Condensate Inventory section of the RTS to reflect Palisades design. Palisades has two backup condensate supplies: the Fire Protection System for the 'A/B' AFW train and the Service Water System for the 'C' AFW train. Both backup supplies provide lake water to the suctions of the AFW pumps. Each must be manually lined up before it can be used. Each can deliver essentially unlimited quantities of condensate. For these reasons, they are included in the Technical Specifications, even though they are not considered first-line condensate backup sources.
3.7.6 B.1	Added	3.5.2.c/.d	ACTN: Verify other condensate backup OPERABLE; 4 hours	Added to reflect existing requirements. Because the existing Technical Specifications do not specify a completion time for this action, a 4 hour time limit is imposed.
3.7.6 B.2	Added	3.5.2.c/.d	ACTN: Verify AFW train assoc w/OPERABLE backup is Operable; 4 hr	Added to reflect existing requirements. Because the existing Technical Specifications do not specify a completion time for this action, a 4 hour time limit is imposed.
3.7.6 B.3	Added	3.5.2.c/.d	ACTN: Restore inoperable condensate backup; 7 days	Added to reflect existing requirements. The 7 day completion time in the existing Technical Specifications is retained.
3.7.6 C	3.7.6 B	3.5.3	COND: Required Actions for CONDITIONS A or B not met	Reworded to reflect the existence of two CONDITIONS instead of one.
3.7.6 C.1	3.7.6 B.1	3.5.5	ACTN: MODE 3; 6 hours	Renumbered to reflect the new LCO.
3.7.6 C.2	3.7.6 B.2	3.5.3	ACTN: MODE 4; 30 hours	Used Palisades time to MODE 4.
3.7.6.1	3.7.6.1	New	SR: Verify avail condensate inventory >= 100,000 gal	Reworded to reflect reworded LCO.

RTS Number	STS Number	TS Number	RTS (STS) requirement Description	Explanation of Differences
3.7.7	3.7.7	3.4.1	LCO: Two CCW trains operable; MODES 1, 2, 3, & 4	Unchanged.
3.7.7 A	3.7.7 A	3.4.2	COND: One CCW train inoperable	Unchanged.
3.7.7 A.1	3.7.7 A.1	3.4.2	ACTN: restore CCW train; 72 hours	Unchanged.
3.7.7 B	3.7.7 B	3.4.2	COND: Required action not met	Unchanged.
3.7.7 B.1	3.7.7 B.1	3.4.2	ACTN: MODE 3; 6 hours	Unchanged.
3.7.7 B.2	3.7.7 B.2	New	ACTN: MODE 4; 30 hours	Eliminated requiring a plant to go to a Modes which depends on a single operable CCW train as the only means of decay heat removal. Specified staying in MODE 4, where the steam generators are able to back up the single CCW train, instead. It is not considered advisable to require placing the plant in MODE 5 where containment integrity, Steam Generators, Redundant AC power, etc is not required, when there are known difficulties with one train of equipment which provides decay heat removal. It should be noted that either train of Palisades CCW is capable of cooling all required equipment served by CCW, including Shutdown Cooling.
3.7.7.1	3.7.7.1	New	SR: Verify CCW Valve lineup; 31 days	Added exemption for valves located in containment or high rad areas.
3.7.7.2	Added	New	SR: Verify CCW valve lineup in containment or high rad areas; 92 days or MODE 5 to MODE 4.	SR added to verify lineup of valves located inside containment or in high rad areas.
3.7.7.3	3.7.7.2	4.17.2.1b	SR: Demonstrate CCW valve operation on SIS; 18 months	Specified actual signal name iaw other Palisades SRs.
3.7.7.4	3.7.7.3	4.17.2.1b	SR: Demonstrate CCW pump start on SIS w/o LOSP; 18 months	Specified pump start test when off-site power is available.
3.7.8	3.7.8	3.4.1	LCO: Two SWS trains operable; MODES 1, 2, 3, & 4	Unchanged.
3.7.8 A	3.7.8 A	3.4.2	COND: One SWS train inoperable	Unchanged.
3.7.8 A.1	3.7.8 A.1	3.4.2	ACTN: Restore SWS train; 72 hours	Unchanged.
3.7.8 B	3.7.8 B	3.4.2	COND: Required action not met	Unchanged.
3.7.8 B.1	3.7.8 B.1	3.4.2	ACTN: MODE 3; 6 hours	Unchanged.

* Although not in T.S., there is an NRC commitment which requires this function (Ref. MO-29).

RTS Number	STS Number	TS Number	RTS (STS) requirement Description	Explanation of Differences
3.7.8 B.2	3.7.8 B.2	3.4.2	ACTN: MODE 4; 30 hours	Eliminated requiring a plant to go to MODE 5 which depends on a single operable SWS train as the only means of decay heat removal. Specified staying in MODE 4, where the steam generators are able to back up the single SWS train, instead. It is not considered advisable to require placing the plant in MODE 5 where containment integrity, Steam Generators, Redundant AC power, etc is not required, when there are known difficulties with one train of equipment which provides decay heat removal. It should be noted that either train of Palisades SWS is capable of cooling all required equipment served by SWS, including both trains of CCW and shutdown cooling.
3.7.8.1	3.7.8.1	New	SR: Verify SWS Valve lineup; 31 days	Changed to provide exemption for items inside containment or high rad areas.
3.7.8.2	Added	New	SR: Verify SWS valve lineup; 92 days or MODE 5 to MODE 4.	SR added to verify lineup of valves located inside containment or high rad areas.
3.7.8.3	3.7.8.2	4.17.2.1.b	SR: Demonstrate SWS valve operation on SIS; 18 months	Specified actual signal name iaw other Palisades SRs.
3.7.8.4	3.7.8.2	4.17.2.2.b	SR: Demonstrate SWS valve operation on RAS; 18 months	Specified actual signal name iaw other Palisades SRs.
3.7.8.5	3.7.8.3	4.17.2.1.b	SR: Demonstrate SWS pump start on SIS w/o LOSP; 18 months	Specified pump start test when off-site power is available.
3.7.9	3.7.9	New	LCO: UHS operable; MODES 1, 2, 3, 4	Reworded to reflect Palisades usage.
Omitted	3.7.9 A	NA	COND: (Cooling tower fans inoperable)	Omitted since cooling tower fans are not part of Palisades UHS. Palisades cooling towers serve only condenser circulation water. the UHS is Lake Michigan, which is the supply for SWS.
3.7.9 A	3.7.9 B	New	COND: UHS inoperable	Used applicable parts of STS Condition.
3.7.9 A.1	3.7.9 B.1	New	ACTN: MODE 3; 6 hours	Unchanged.
3.7.9 A.2	3.7.9 B.2	New	ACTN: MODE 5; 36 hours	Unchanged.
3.7.9.1	3.7.9.1	New	SR: Verify Lake Michigan level w/in limit; 7 days	Changed SR wording to reflect Palisades requirements; changed frequency to reflect large size and consequent slow level variation of cooling pond.
3.7.9.2	3.7.9.2	New	SR: Verify Lake Michigan Temp w/in limit; 24 hours	Changed to reflect Palisades requirements.
Omitted	3.7.9.3	NA	SR: (Verify cooling tower fan operability)	Omitted, NA Palisades.

RTS Number	STS Number	TS Number	RTS (STS) requirement Description	Explanation of Differences
Omitted	3.7.10	NA	LCO: (Two ECW trains operable; MODES 1, 2, 3, 4)	This entire LCO was omitted; Palisades does not have an ECW system.
3.7.10	3.7.11	3.14.b	LCO: 2 Control Room Filter trains operable; MODES 1 - 4, +	Added cask movement to applicability since cask drop is an analyzed FSAR chapter 14 event.
3.7.10 A	3.7.11 A	New	COND: One Control Room Filter train inoperable	Unchanged.
3.7.10 A.1	3.7.11 A.1	New	ACTN: Restore Control Room filter train; 7 days	Unchanged.
3.7.10 B	3.7.11 B	3.14.b	COND: Required action not met; MODES 1, 2, 3, 4	Unchanged.
3.7.10 B.1	3.7.11 B.1	3.14.b	ACTN: MODE 3; 6 hours	Unchanged.
3.7.10 B.2	3.7.11 B.2	3.14.b	ACTN: MODE 5; 36 hours	Unchanged.
3.7.10 C	3.7.11 C	3.14.b	COND: Required action not met: other than MODES 1, 2, 3, 4	Unchanged other than addition of cask movement.
3.7.10 C.1	3.7.11 C.1	New	ACTN: Place CR Filter system in emergency mode; immediately	Unchanged.
3.7.10 C.2.1	3.7.11 C.2.1	New	ACTN: Suspend core alterations; immediately	Unchanged.
3.7.10 C.2.2	3.7.11 C.2.2	New	ACTN: Suspend positive reactivity addition; immediately	Unchanged.
3.7.10 C.2.3	Added	New	ACTN: Suspend fuel cask moves; immediately	Added to assure plant would be out of applicable conditions.
3.7.10 D	3.7.11 D	New	COND: Two CR Filter trains inoperable, other than MODES 1 - 4	Unchanged other than addition of cask movement.
3.7.10 D.1	3.7.11 D.1	New	ACTN: Suspend core alterations; immediately	Unchanged.
3.7.10 D.2	3.7.11 D.2	New	ACTN: Suspend positive reactivity addition; immediately	Unchanged.
3.7.10 D.3	Added	New	ACTN: Suspend fuel cask moves; immediately	Added to assure plant would be out of applicable conditions.
3.7.10 E	3.7.11 E	New	COND: Two CR Filter trains inoperable; MODES 1, 2, 3, 4	Unchanged.
3.7.10 E.1	3.7.11 E.1	New	ACTN: Enter 3.0.3; immediately	Unchanged.
3.7.10.1	3.7.11.1	4.2.3.a	SR: Operate CR Filter train for ≥ 10 hours; 31 days	Unchanged.
3.7.10.2	3.7.11.2	4.2.3	SR: Perform filter testing; iaw filter program	Unchanged.
3.7.10.3	3.7.11.3	4.17.3.1a	SR: Demonstrate CR HVAC actuation on CHP; 18 months	Specified actual signal name iaw other Palisades SRs.
3.7.10.4	3.7.11.3	4.17.3.2b	SR: Demonstrate CR HVAC actuation on CHR; 18 months	Specified actual signal name iaw other Palisades SRs.

RTS Number	STS Number	TS Number	RTS (STS) requirement Description	Explanation of Differences
3.7.10.5	3.7.11.4	4.3.2.c.1	SR: Demonstrate CR HVAC Δp capability; 18 months staggered	Reworded to reflect Palisades requirements. Effectively unchanged.
3.7.11	3.7.12	3.14.b	LCO: 2 CR Cooling trains operable; MODES 1, 2, 3, 4, +	Added cask movement to applicability since cask drop is an analyzed FSAR chapter 14 event.
3.7.11 A	3.7.12 A	New	COND: One Control Room Cooling train inoperable	Unchanged.
3.7.11 A.1	3.7.12 A.1	New	ACTN: Restore Control Room cooling train; 30 days	Unchanged.
3.7.11 B	3.7.12 B	3.14.b	COND: Required action not met; MODES 1, 2, 3, 4	Unchanged.
3.7.11 B.1	3.7.12 B.1	3.14.b	ACTN: MODE 3; 6 hours	Unchanged.
3.7.11 B.2	3.7.12 B.2	3.14.b	ACTN: MODE 5; 36 hours	Unchanged.
3.7.11 C	3.7.12 C	3.14.b	COND: Required action not met: other than MODES 1, 2, 3, 4	Unchanged other than addition of cask movement.
3.7.11 C.1	3.7.12 C.1	New	ACTN: Place CR Cooling system in emergency mode; immediately	Unchanged.
3.7.11 C.2.1	3.7.12 C.2.1	New	ACTN: Suspend core alterations; immediately	Unchanged.
3.7.11 C.2.2	3.7.12 C.2.2	New	ACTN: Suspend positive reactivity addition; immediately	Unchanged.
3.7.11 C.2.3	Added	New	ACTN: Suspend fuel cask moves; immediately	Added to assure plant would be out of applicable conditions.
3.7.11 D	3.7.12 D	New	COND: Two CR Cooling trains inoperable, other than MODES 1 - 4	Unchanged other than addition of cask movement.
3.7.11 D.1	3.7.12 D.1	New	ACTN: Suspend core alterations; immediately	Unchanged.
3.7.11 D.2	3.7.12 D.2	New	ACTN: Suspend positive reactivity addition; immediately	Unchanged.
3.7.11 D.3	Added	New	ACTN: Suspend fuel cask moves; immediately	Added to assure plant would be out of applicable conditions.
3.7.11 E	3.7.12 E	New	COND: Two CR Cooling trains inoperable; MODES 1, 2, 3, 4	Unchanged.
3.7.11 E.1	3.7.12 E.1	New	ACTN: Enter 3.0.3; immediately	Unchanged.
3.7.11.1	3.7.12.1	New	SR: Verify CR Cooling heat removal capability; 18 months	Unchanged.
Omitted	3.7.13	NA	LCO: (Two ECCS PREACS Trains operable, MODES 1, 2, 3, 4)	Entire LCO omitted because Palisades does not have an ECCS Pump Room Exhaust Air Cleanup System.

RTS Number	STS Number	TS Number	RTS (STS) requirement Description	Explanation of Differences
3.7.12	3.7.14	New	LCO: SFP vent system operable, 1 fan operating; moving fuel	Wrote LCO which is applicable to Palisades. A single system with two fans is installed. STS LCO, conditions, and actions are inappropriate. Cask movement was added to applicability to reflect cask drop being an analyzed FSAR chapter 14 event.
Omitted	3.7.14 A	NA	COND: (1 Fuel building cleanup system inoperable)	Condition and associated actions omitted. Condition is inappropriate to Palisades (with only one system installed.)
3.7.12 A	Added	New	COND: No SFP fan operating	Condition covers Palisades specific requirement.
3.7.12 A.1	Added	New	ACTN: Start fan; immediately	Action corrects condition A.
Omitted	3.7.14 B	NA	COND: (Required action not met in MODES 1-4)	Condition and associated actions omitted. MODES 1-4 not part of Palisades applicability.
3.7.12 B	3.7.14 C	New	COND: Required action not met or SFP vent system inoperable	Condition covers Palisades specific requirement.
Omitted	3.7.14 C.1	NA	ACTN: (Place Operable train in operation)	Action omitted. Palisades has only one installed train.
3.7.12 B.1	3.7.14 C.2	New	ACTN: Suspend fuel movement; immediately	Action reduces need for operating SFP vent system.
3.7.12 B.2	Added	New	ACTN: Suspend cask movement; immediately	Added action associated with movement of cask.
Omitted	3.7.14 D	NA	COND: (2 Fuel building cleanup systems inoperable)	Condition and associated action omitted. Condition is inappropriate for Palisades.
3.7.12.1	3.7.14.1	4.2.3.a	SR: Verify Fuel Building vent fan operation; 31 days	Reworded to reflect Palisades LCO.
3.7.12.2	3.7.14.2	4.2.3	SR: Perform Fuel Building filter testing; iaw program	Unchanged.
Omitted	3.7.14.3	NA	SR: (Verify vent system auto actuation; 18 months)	Palisades system is not automatically actuated.
3.7.12.3	3.7.14.4	New	SR: Demonstrate Fuel Building vent train dp; 18 months	Reworded to reflect existing Palisades requirements.
3.7.12.4	Added	4.2.3.c.4	SR: Demonstrate bypass flow is w/in limits; 18 months	Added Palisades specific SR.
Omitted	3.7.14.5	NA	SR: (Demonstrate filter bypass can be opened; 18 months)	Omitted SR which is inappropriate to Palisades.
Omitted	3.7.15	NA	LCO: (Two PREACS shall be operable; MODES 1, 2, 3, 4)	Entire LCO section omitted. Palisades does not have a Penetration Room Exhaust Cleanup System.

RTS Number	STS Number	TS Number	RTS (STS) requirement Description	Explanation of Differences
3.7.13	3.7.16	New	LCO: SFP water level ≥ 23 ft above fuel racks; w. irrad fuel	Used Palisades specific pool level requirement and added cask movement requirements. Cask drop is an analyses FSAR chapter 14 event.
3.7.13 A	3.7.16 A	New	COND: SFP level not w/in limit	Unchanged.
3.7.13 A.1	3.7.16 A.1	New	ACTN: Suspend fuel movement; immediately	Unchanged.
3.7.13 A.2	Added	New	ACTN: Suspend movement of cask; Immediately	Added action to address cask movement.
3.7.13.1	3.7.16.1	New	SR: Verify SFP level w/in limit; 7 days	Unchanged.
3.7.14	3.7.17	5.4.2f	LCO: SFP boron ≥ 1720 ppm; fuel stored in pool	Unchanged.
3.7.14 A	3.7.17 A	New	COND: SFP boron not w/in limit	Unchanged.
3.7.14 A.1	3.7.17 A.1	New	ACTN: Suspend fuel movement in SFP; immediately	Unchanged.
3.7.14 A.2.1	3.7.17 A.2.1	New	ACTN: Initiate action to restore boron; Immediately	Unchanged.
3.7.14 A.2.2	3.7.17 A.2.2	New	ACTN: Verify fuel storage is correct; immediately	Unchanged.
3.7.14.1	3.7.17.1	5.4.2f	SR: Verify SFP boron; 7 days	Unchanged.
3.7.15	3.7.18	5.4.2	LCO: Fuel storage requirements; when fuel stored in pool	Unchanged.
3.7.15 A	3.7.18 A	New	COND: Fuel storage requirements not met	Unchanged.
3.7.15 A.1	3.7.18 A.1	New	ACTN: Initiate action to comply w. requirements; immediately	Unchanged.
3.7.15.1	3.7.18.1	New	SR: Verify fuel storage meets requirements; B4 storing fuel	Unchanged.
3.7.16	3.7.19	New	LCO: Secondary activity w/in limit; MODES 1,2,3,4	Unchanged.
3.7.16 A	3.7.19 A	New	COND: Secondary DE I-131 not w/in limit	Unchanged.
3.7.16 A.1	3.7.19 A.1	New	ACTN: MODE 3; 6 hours	Unchanged.
3.7.16 A.2	3.7.19 A.2	New	ACTN: MODE 5; 36 hours	Unchanged.
3.7.16.1	3.7.19.1	4.2.1.7	SR: Demonstrate secondary activity w/in limit; 31 days	Unchanged.

RTS Number	STS Number	TS Number	RTS (STS) requirement Description	Explanation of Differences
3.8	3.8	3.7/4.7	ELECTRICAL POWER DISTRIBUTION	
3.8.1.a	3.8.1.a	3.7.1.a&b	LCO: Two off-site circuits OPERABLE, MODES 1-4	Unchanged.
3.8.1.b	3.8.1.b	3.7.1.i	LCO: Two DGs OPERABLE, MODES 1-4	Unchanged.
Omitted	3.8.1.c	3.17.2#4	LCO: Two sequencers operable, MODES 1-4	Omitted this part of the LCO iaw reviewers note. Palisades sequencers affect only DG loading. Proposed Condition F (sequencer inoperable) requires declaring DG inoperable, immediately.
3.8.1 A	3.8.1 A	3.7.2.a&b	COND: one off-site circuit inoperable	Unchanged.
3.8.1 A.1	3.8.1 A.1	New	ACTN: Perform SR 3.8.1.1	Unchanged.
Omitted	3.8.1 A.2	NA	ACTN: (Declare features inoperable; 24 hrs)	Each Palisades offsite circuit is capable of supplying both trains of Class 1E power distribution. Therefore, the loss of only one offsite circuit cannot result in the loss of offsite power to either train.
3.8.1 A.2	3.8.1 A.3	3.7.2.a&b	ACTN: Restore offsite circuit to OPERABLE; 72 hrs	Completion time of "AND 6 days etc" omitted. This completion time is intended to limit the time (to the sum of the AOTs for conditions A and B) when the LCO was not met and avoid repetitious entries into conditions A and B. The Palisades AOT (an existing license condition) for having a required DG inoperable is "7 days per month, total for both". This AOT not only makes the omitted 6 day AOT inappropriate, but, by itself, accomplishes the prohibition of repetitious entries into conditions A and B.
3.8.1 B	3.8.1 B	3.7.2.i	COND: One DG inoperable	Unchanged.
3.8.1 B.1	3.8.1 B.1	3.7.2.i	ACTN: Perform SR 3.8.1.1; 1 hr	Unchanged
3.8.1 B.2	3.8.1 B.2	New	ACTN: Declare supported features inoperable; 4 hrs	Unchanged.
3.8.1 B.3.1	3.8.1 B.3.1	New	ACTN: Check for common cause; 24 hrs	Unchanged.
3.8.1 B.3.2	3.8.1 B.3.2	3.7.2.i	ACTN: Perform SR 3.8.1.2; 24 hrs	Unchanged.
3.8.1 B.4	3.8.1 B.4	3.7.2.i	ACTN: Restore DG to OPERABLE, 7 days/ mo (both)	Retained DG AOT from existing license in lieu of the STS 72 hours; omitted Completion time of "AND 6 days etc". See discussion for Action 3.8.1 A.2, above.
3.8.1 C	3.8.1 C	3.0.3	COND: Two offsite circuits inoperable	Unchanged

RTS Number	STS Number	TS Number	RTS (STS) requirement Description	Explanation of Differences
3.8.1 C.1	3.8.1 C.1	New	ACTN: Declare supplied features inoperable, 12 hours	Unchanged
3.8.1 C.2	3.8.1 C.2	3.0.3	ACTN: Restore one offsite circuit, 24 hours	Unchanged
3.8.1 D	3.8.1 D	3.0.3	COND: one DG & one off-site circuit inoperable	Unchanged.
Omitted	3.8.1 D	NA	NOTE: (Enter LCO 3.8.9)	See discussion following STS action 3.8.1 A.2, above.
3.8.1 D.1	3.8.1 D.1	3.0.3	ACTN: Restore offsite circuit, 12 hours	Unchanged.
3.8.1 D.2	3.8.1 D.2	3.0.3	ACTN: Restore DG, 12 hours	Unchanged.
3.8.1 E	3.8.1 D	3.0.3	COND: two DGs inoperable	Unchanged.
3.8.1 E.1	3.8.1 E.1	3.0.3	ACTN: Restore 1 DG, 2 hours	Unchanged.
3.8.1 F	3.8.1 F	3.17.2.5	COND: Sequencer inoperable	Changed to "one or both"; modified action accordingly. This condition is retained from existing license to assure that it is understood that the sequencer is necessary to support DG operability during MODES 1 - 4.
3.8.1 F.1	3.8.1 F.1	3.17.2.5.a	ACTN: Declare associated DG inoperable, immediately	Palisades sequencers affect only DG loading. They do not affect starting of ESS equipment when offsite power is available. Rather than delete Condition F, as reviewers note would allow, The existing TS action to immediately declare the DG inoperable was moved here.
3.8.1 G	Added	New	COND: P-18A inoperable	Added new condition to address Palisades unique DG fuel transfer system
3.8.1 G.1	Added	New	ACTN: Declare DG 1-2 inoperable, 24 hours	DG 1-2 cannot power fuel transfer pump P-18B; therefore, with P-18A inoperable, DG 1-2 is not independent and does not meet LCO 3.8.1.b.
3.8.1 H	Added	New	COND: P-18B inoperable	Added new condition to address Palisades unique DG fuel transfer system
3.8.1 H.1	Added	New	ACTN: Restore P-18B; 7 Days	With P-18B inoperable, either DG can power the remaining pump, P-18A. Since having only one fuel oil transfer pump operable would not meet the single failure criterion, continued operation must be limited by a specified completion time. The condition is less severe than an inoperable DG, for which 7 days is allowed, so 7 days was chosen as a proposed completion time.

RTS Number	STS Number	TS Number	RTS (STS) requirement Description	Explanation of Differences
3.8.1 I	Added	New	COND: Both Fuel Oil pumps inoperable	Added new condition to address Palisades unique DG fuel transfer system
3.8.1 I.1	Added	New	ACTN: Restore 1 Fuel Oil pump; 8 hours	With two fuel oil transfer pumps inoperable, both DGs are limited in their ability to meet a demand. However since each DG has 2500 gallons in its day tank (more than 15 hours at full load) the condition is not as severe as having both DGs completely inoperable, where two hours are allowed.
3.8.1.J	3.8.1 G	3.7.2	COND: required actions not met in time;	Unchanged.
3.8.1 J.1	3.8.1 G.1	3.7.2	ACTN: Be in MODE 3; 6 hours	Unchanged.
3.8.1 J.2	3.8.1 G.2	3.7.2	ACTN: Be in MODE 5; 36 hours	Unchanged.
3.8.1 K	3.8.1 H	3.0.3	COND: 3 AC sources inoperable	Unchanged.
3.8.1 K.1	3.8.1 H.1	3.0.3	ACTN: Enter 3.0.3, immediately	Unchanged.
3.8.1.1	3.8.1.1	New	SR: offsite circuit lineup check	Reworded to reflect Palisades configuration. Palisades offsite sources are fed directly from a main switchyard bus through motor operated disconnect switches; no circuit breakers are involved. Installed instrumentation is available for voltage, but not for available power.
3.8.1.2	3.8.1.2&7	4.7.1.a	SR: DG starting & timing check	Combined SRs 3.8.1.2 & 3.8.1.7 since Palisades does not have any capability for other than a normal "fast start". No modified starting is used for any testing. The SR wording and Frequency were changed to retain monthly testing as is in the existing license. Retained existing wording regarding starting time requirement. Therefore, notes 1 and 3 were omitted. Note 2 was also omitted since Palisades engines have a continuous prelube and preheat.

RTS Number	STS Number	TS Number	RTS (STS) requirement Description	Explanation of Differences
3.8.1.3	3.8.1.3	4.7.1.a	SR: DG loading test	Portions of the maximum expected DG accident loading, when including potential operator connected loads as well as automatically connected loads, exceed the continuous DG rating of 2500 kw. Therefore, a short period of loading above the analyzed accident loading was added to the monthly test to assure that the DG can produce the necessary power. Longer duration loading is proposed in the 18 month 24 hour loading SR. The Frequency was changed to retain monthly testing as is in the existing license. Notes were omitted; Note 1 simply provides permission for gradual loading which is not prohibited by any requirement, and is common practice. Note 2 is included in the introduction to the 3.8.1 SRs. Note 3 is unnecessary since, at Palisades, a DG is considered inoperable when it is paralleled to the grid for loading; both DGs would not be voluntarily made inoperable. Note 4 is unnecessary because it is physically necessary to meet the acceptance criteria of STS SR 3.8.1.2 before a DG could be paralleled and loaded.
3.8.1.4	3.8.3.4	New	SR: DG starting air pressure check; 31 days	Moved air system requirements to LCO 3.8.1 from LCO 3.8.3 because Palisades DG design does not include the 5 start requirement. With below normal pressure, no specific number of starts can be assured and the DG must be assumed to be inoperable.
3.8.1.5	3.8.1.4	New	SR: DG day tank level check; 31 days	Bracketed reference to engine mounted tank omitted, otherwise unchanged. Required fuel inventory applies only to day tank; engine mounted tank gravity fills.
Omitted	3.8.1.5	NA	SR: (DG day tank water check)	This SR is not part of the existing Palisades licensing basis. The DG day tanks have had no history of difficulty with accumulated water. Tank construction is flat bottomed and does not provide a sump for water collection or removal.
3.8.1.6	3.8.1.6	4.7.1.e	SR: DG fuel transfer system test	Reworded SR to address controls as well as pumps since Palisades has asymmetric, shared, DG fuel oil transfer system. Pump testing alone would not necessarily verify operability of automatic and manual controls.
3.8.1.2	3.8.1.7	4.7.1.a	SR: DG timed start	This STS SR combined with STS SR 3.8.7.2 because all DG starts at Palisades are "fast starts". See 3.8.1.2, above.
3.8.1.7	3.8.1.8	New	SR: Automatic transfer of off-site supplies	Reworded for Palisades configuration.
3.8.1.8	3.8.1.9	New	SR: DG largest load rejection test; 18 mo.	Unchanged.
3.8.1.9	3.8.1.10	New	SR: DG full load rejection test; 18 mo.	Unchanged.

RTS Number	STS Number	TS Number	RTS (STS) requirement Description	Explanation of Differences
3.8.1.10	3.8.1.11	4.17.2 4.b	SR: Simulated Loss of offsite Power; 18 mo.	Prelube note omitted; otherwise unchanged.
Omitted	3.8.1.12	NA	SR: (DG start on ESF signal; 18 Mo.)	This is not a feature of the Palisades design. Palisades DGs start only on low voltage or loss of voltage.
Omitted	3.8.1.13	NA	SR: (Verification of DG trip bypass; 18 mo.)	This is not a feature of the Palisades design. Palisades DGs do not have trips which are bypassed on an ESF.
3.8.1.11	3.8.1.14	New	SR: DG 24 hour load test; 18 Mo.	Reduced time above continuous load to avoid exceeding DG rating yet still meet the intent of the test. Palisades DGs have a continuous rating of 2500 kw and a 2 hour rating of 2750 kw. If the SR specifies 2 hours at a load above the continuous rating, a test duration of more than 2 hours would exceed the DG rating and a test duration of less than 2 hours would not satisfy the SR. 100 minutes was chosen to demonstrate that the DG is not degrading, yet to specify testing within the rating of the DG.
Omitted	3.8.1.15	NA	SR: (DG Hot Restart; 18 mo.)	This SR was not proposed. None of the accident analyses or design bases assume a hot restart of the DGs. This SR is not part of the existing licensing basis.
3.8.1.12	3.8.1.16	New	SR: Transfer of DG load to offsite; 18 mo.	Reworded SR to clarify intent. Requirements are unchanged.
Omitted	3.8.1.17	NA	SR: (DG auto reset to standby; 18 mo.)	This is not a feature of the Palisades design.
3.8.1.13	3.8.1.18	New	SR: Sequencer timing test; 18 mo.	SR reworded to verify timing of each load, rather than the intervening interval. The Palisades sequencers are solid state devices which are verified to be within 0.1 seconds of the programmed time. Plant testing is written to verify that the timing meets the accident analyses, and DG load studies allow for maximum allowable sequencer error.
3.8.1.14	3.8.1.19	4.7.1.b	SR: LOSP w/o SIS test	Omitted note inappropriate to Palisades; Palisades DGs have continuous prelube. Used Palisades designations and values.
Omitted	3.8.1.20	NA	SR: (DG simultaneous start)	This SR is not a part of the existing Licensing basis.
3.8.1.15	Added	4.7.1.d	SR: Verify DG load; 18 months	Retained existing SR. Palisades design automatically connected loads closely approach the continuous rating of the DG. Retention of this SR is intended to assure that the loading is verified at least each 18 months.

RTS Number	STS Number	TS Number	RTS (STS) requirement Description	Explanation of Differences
Omitted	3.8.1-1	NA	Tabl: (DG test schedule)	No change is proposed for the DG testing frequency. The existing license does not require increased testing frequencies if the number of failures is high. The table was omitted and the existing monthly test frequency retained.
3.8.2.a	3.8.2.a	3.7.3	LCO: One off-site circuit OPERABLE, MODES 5 & 6	Unchanged.
3.8.2.b	3.8.2.b	3.7.3	LCO: One DG OPERABLE, MODES 5 & 6	Unchanged.
3.8.2 A	3.8.2 A	3.7.3	COND: One required offsite source inoperable.	Unchanged.
3.8.2 A.1	3.8.2 A.1	New	ACTN: Declare affected equip inoperable; immediately	Unchanged.
3.8.2 A.2.1	3.8.2 A.2.1	3.7.3 A	ACTN: Suspend Core Alterations; immediately	Unchanged.
3.8.2 A.2.2	3.8.2 A.2.2	3.7.3 B	ACTN: stop fuel moves; immediately	Unchanged.
3.8.2 A.2.3	3.8.2 A.2.3	New	ACTN: Stop positive Rx addition; immediately	Unchanged.
3.8.2 A.2.4	3.8.2 A.2.4	3.7.3 E	ACTN: Initiate circuit restoration; immediately	Unchanged.
3.8.2 B	3.8.2 B	3.7.3	COND: One required DG inoperable.	Unchanged.
3.8.2 B.1	3.8.2 B.2.1	3.7.3 A	ACTN: Suspend Core Alterations; immediately	Unchanged.
3.8.2 B.2	3.8.2 B.2.2	3.7.3 B	ACTN: stop fuel moves; immediately	Unchanged.
3.8.2 B.3	3.8.2 B.2.3	New	ACTN: Stop positive Rx addition; immediately	Unchanged.
3.8.2 B.4	3.8.2 B.2.4	3.7.3 E	ACTN: initiate circuit restoration; immediately	Unchanged.
3.8.2	3.8.2.1	4.7.1	SR: Required SRs from LCO 3.8.1, for MODES 5 & 6	Specified those SRs which test features required in MODES 5 & 6 and which can be performed w/o making DG inoperable.
3.8.3	3.8.3	3.7.1	LCO: DG fuel oil & Lube oil; when DG required	Moved air system requirements to LCO 3.8.1 because Palisades DG design does not include the 5 start requirement. With below normal pressure, no specific number of starts can be assured. Revised LCO and Applicability wording to reflect Palisades shared fuel oil system.
3.8.3 A	3.8.3 A	New	COND: fuel < 23,700 gal and > 20,110 gal	Reworded to reflect Palisades shared fuel oil system.
3.8.3 A.1	3.8.3 A.1	New	ACTN: Restore fuel oil within 48 hrs	Unchanged.
3.8.3 B	3.8.3 B	New	COND: Lube oil < 7 and > 6 days supply	Reworded to reflect Palisades shared lube oil storage and to be consistent with wording of 3.7.3 A.

RTS Number	STS Number	TS Number	RTS (STS) requirement Description	Explanation of Differences
3.8.3 B.1	3.8.3 B.1	New	ACTN: Restore Lube oil w/in 48 hrs	Unchanged.
3.8.3 C	3.8.3 C	New	COND: Fuel viscosity, water, sediment not in limits	Rewrote condition to reflect Palisades fuel oil storage and usage conditions. Palisades has a single tank which stores fuel oil for both DGs, diesel fire pumps, heating boilers, and rad waste evaporators. Consequently, the residence time for fuel in storage is short. With a short storage time, particulate contamination is not limiting. New fuel is tested for viscosity, SG, and water and sediment prior to acceptance or addition to the tank. Stored fuel is sampled periodically.
3.8.3 C.1	3.8.3 C.1	New	ACTN: Restore fuel quality w/in 7 days	Reworded to agree with reworded condition statement.
3.8.3 D	3.8.3 D	New	COND: Fuel out of spec other than Cond C	Rewrote condition to complement Condition C.
3.8.3 D.1	3.8.3 D.1	New	ACTN: Restore fuel properties; 31 days	Changed Completion time from 30 to 31 days. 30 days is not standard usage within the STS project.
Omitted	3.8.3 E	NA	COND: (DG air receiver low pressure)	The condition, action & surveillance for DG air starting moved to LCO 3.8.1. The replacement SR is 3.8.1.4; The actions are those for an inoperable DG, 3.8.1 B.
3.8.3 E	3.8.3 F	New	COND: Required Action not met or . . .	Reworded to reflect Palisades shared fuel oil system.
3.8.3 E.1	3.8.3 F.1	New	ACTN: Declare both DGs inoperable	Reworded to reflect Palisades shared fuel oil system.
3.8.3.1	3.8.3.1	New	SR: Fuel oil level check; 24 hours	Reworded and retained shorter surveillance interval due to Palisades shared fuel oil system and continuous multi purpose usage.
3.8.3.2	3.8.3.2	New	SR: Lube oil inventory check; 31 days	Unchanged.
3.8.3.3	3.8.3.3	New	SR: Verify fuel oil properties; iaw program	Unchanged.
Omitted	3.8.3.4	NA	SR: (Verify starting air pressure; 31 days)	Moved to LCO 3.8.1
3.8.3.4	3.8.3.5	New	SR: Fuel Oil storage tank water check; 92 days	Added word "excess" due to difficulty in removing all water from Fuel Oil storage tank and the height of the suction pipe above the tank bottom.
Omitted	3.8.3.6	NA	SR: (Clean Fuel Oil storage tank; 10 years)	This SR would have been a new requirement for Palisades. It was deleted from the STS by change TSTF-2.
3.8.4	3.8.4	3.7.1.h	LCO: Two DC sources operable; MODES 1-4	Reworded to fit Palisades terminology and usage, and to specify that the cross-connected chargers are not, by themselves, adequate for continuous operation.

RTS Number	STS Number	TS Number	RTS (STS) requirement Description	Explanation of Differences
3.8.4 A	Added	New	COND: One required charger inoperable	This condition was added due to Palisades arrangement having redundant chargers for each battery, with one cross-connected to the opposite AC train. Addition of this condition allows limited continued operation if one of the required chargers becomes inoperable.
3.8.4 A.1	Added	New	ACTN: Place x-conn charger in service; immediately	This action is added to assure continued charging current is available to the battery during the time when a required charger is out of service. This action is implicit in the existing LCO which requires one of the two chargers to be operable.
3.8.4 A.2	Added	New	ACTN: Restore required charger to OPERABLE status; 7 days	This action was added to assure the restoration of the required charger. The 7 day completion time is that currently allowed for a DG out of service, which is more limiting. The 7 days should allow for trouble shooting, location of parts, and repair.
3.8.4 B	3.8.4 A	3.7.2.h	COND: One battery inoperable	The actions for an inoperable DC source have been separated into two conditions, that for the charger (3.8.4 A) and that for the battery. The condition, associated actions, and completion times are retained from the existing Tech Specs.
3.8.4 B.1	Added	3.7.2.h	ACTN: Place both chargers in service; immediately	This action, taken from the existing Tech Specs, was retained to assure that sufficient DC power was available for the affected train. It also assures that DC power for that train would be restored, following a loss of off-site power, as soon as either AC train was re-energized.
3.8.4 B.2	3.8.4 A.1	3.7.2.h	ACTN: Restore battery; 24 hours	Retained Completion Time from existing Tech Specs.
3.8.4 C	3.8.4 B	3.7.2	COND: Required action and completion time not met	Unchanged.
3.8.4 C.1	3.8.4 B.1	3.7.2	ACTN: Be in MODE 3; 6 hours	Unchanged.
3.8.4 C.2	3.8.4 B.2	3.7.2	ACTN: Be in MODE 5; 36 hours	Unchanged.
3.8.4.1	3.8.4.1	New	SR: Verify battery float voltage; 7 days	Unchanged.
3.8.4.2	3.8.4.2	New	SR: Verify no corrosion; 92 days	Reworded to limit connection resistance to 120% of installation value, in agreement with manufacturers specifications and with reviewer's note in STS bases.

RTS Number	STS Number	TS Number	RTS (STS) requirement Description	Explanation of Differences
3.8.4.3	3.8.4.3	New	SR: Battery inspection; 18 mo.	Specified that inspection be performed rather than to verify no damage. Changed wording avoids declaring the battery to be inoperable for observed damage which does not affect operability.
3.8.4.4	3.8.4.4	New	SR: Remove corrosion; 18 mo.	Unchanged.
3.8.4.5	3.8.4.5	New	SR: Verify connection resistance; 18 mo.	Reworded to limit connection resistance to 120% of installation value, in agreement with manufacturers specifications and with reviewer's note in STS bases.
3.8.4.6	3.8.4.6	New	SR: Verify charger performance; 18 months	Note restricting performance during operation was omitted. The availability of a redundant charger, at Palisades, allows performance of a charger test while the other charger is in service.
3.8.4.7	3.8.4.7	4.7.2.c	SR: Battery service test; 18 months	Unchanged.
3.8.4.8	3.8.4.8	4.7.2.d	SR: Battery performance test; 60 months	Unchanged.
3.8.5	3.8.5	New	LCO: DC sources to support LCO 3.8.10; MODES 5&6	Unchanged.
3.8.5 A	3.8.5 A	New	COND: One DC source inoperable	Unchanged.
3.8.5 A.1	3.8.5 A.1	New	ACTN: Declare affected equip inoperable; immediately	Unchanged.
3.8.5 A.2.1	3.8.5 A.2.1	New	ACTN: Suspend Core Alterations; immediately	Unchanged.
3.8.5 A.2.2	3.8.5 A.2.2	New	ACTN: Suspend fuel movement; immediately	Unchanged.
3.8.5 A.2.3	3.8.5 A.2.3	New	ACTN: Suspend positive Rx addition; immediately	Unchanged.
3.8.5 A.2.4	3.8.5 A.2.4	New	ACTN: Initiate DC source restoration; immediately	Unchanged.
3.8.5	3.8.5.1	New	SR: Perform SRs for operable DC source	Reworded for consistency with balance of proposed TS.
3.8.6	3.8.6	3.7.1.h	LCO: Battery cell parameters w/in limits	Added requirement for average temperature; Condition B and SR 3.8.6.4 each have requirements concerning battery cell temperature, but LCO does not require the battery to be within any temperature limits. Conditions are only entered is LCO is not met, and surveillance need to support a facet of the LCO.
3.8.6 A	3.8.6 A	3.7.2.h	COND: Battery cell parameter not w/in limits	Unchanged.
3.8.6 A.1	3.8.6 A.1	3.7.2.h	ACTN: Verify pilot cell level & voltage; 1 hour	Unchanged.

RTS Number	STS Number	TS Number	RTS (STS) requirement Description	Explanation of Differences
3.8.6 A.2	3.8.6 A.2	3.7.2.h	ACTN: Verify cells w/in Category C limits; 24 hours	Unchanged.
3.8.6 A.3	3.8.6 A.3	3.7.2.h	ACTN: Restore cells to Category A & B limits; 31 days	Unchanged.
3.8.6 B	3.8.6 B	3.7.2.h	ACTN: Required Action not met, etc	Unchanged.
3.8.8 B.1	3.8.6 B.1	3.7.2	ACTN: Declare battery inoperable; immediately	Unchanged.
3.8.6.1	3.8.6.1	4.7.2.a	SR: Verify pilot cell parameters; 31 days	Retained existing SR frequency.
3.8.6.2	3.8.6.3	4.7.2.a	SR: Verify cell temperature; 31 days	Retained existing SR frequency.
3.8.6.3	3.8.6.2	4.7.2.b	SR: Verify all cells w/in limits; 92 days	Omitted specific requirement to perform SR upon severe discharge or overcharge. These requirements are not requirements of the current Palisades license. With Palisades battery parameters, knowledge any severe discharge would comprise knowledge of failure to meet cell float voltage requirements of SRs 3.8.6.1 and 3.8.6.3. Failure to meet SR 3.8.6.1 or 3.8.6.3 would require entering Condition 3.8.6 A; Action 3.8.6 A.2 requires performance of the measurements of SR 3.8.6.3. With the type of batteries used at Palisades, a severe overcharge would result in a reduced electrolyte level rather than an excessive battery terminal voltage. Similarly to a reduced voltage caused by a severe discharge, a reduced level caused by a severe overcharge would invoke the requirement of Action 3.8.6 A.2 to perform the measurements required by SR 3.8.6.3 w/in 24 hours.
3.8.6-1	3.8.6-1	New	Tabl: Battery Cell limits	Unchanged.
3.8.7	3.8.7	New	LCO: Inverters shall be operable; MODES 1-4	Omitted note which is not applicable to Palisades.
3.8.7 A	3.8.7 A	New	COND: one inverter inoperable	Unchanged.
3.8.7 A.1	3.8.7 A Note	New	ACTN: Enter 3.7.9 if Preferred AC bus de-energized	Unchanged.
3.8.7 A.2	3.8.7 A.1	New	ACTN: Restore inverter; 24 hours	Unchanged.
3.8.7 B	3.8.7 B	New	COND: Required action not met, Etc	Unchanged.
3.8.7 B.1	3.8.7 B.1	New	ACTN: Be in MODE 3; 6 hours	Unchanged.
3.8.7 B.2	3.8.7 B.2	New	ACTN: Be in MODE 5; 36 hours	Unchanged.
3.8.7.1	3.8.7.1	New	SR: Verify inverter performance; 7 days	Unchanged.

RTS Number	STS Number	TS Number	RTS (STS) requirement Description	Explanation of Differences
3.8.8	3.8.8	New	LCO: Required inverters operable; MODES 5 & 6	Unchanged.
3.8.8 A	3.8.8 A	New	COND: One or more inverter inoperable	Unchanged.
3.8.8 A.1	3.8.8 A.1	New	ACTN: Declare affected equip inoperable; immediately	Unchanged.
3.8.8 A.2.1	3.8.8 A.2.1	New	ACTN: Suspend Core Alterations; immediately	Unchanged.
3.8.8 A.2.2	3.8.8 A.2.2	New	ACTN: Suspend fuel movement; immediately	Unchanged.
3.8.8 A.2.3	3.8.8 A.2.3	New	ACTN: Suspend positive Rx addition; immediately	Unchanged.
3.8.8 A.2.4	3.8.8 A.2.4	New	ACTN: Initiate DC source restoration; immediately	Unchanged.
3.8.8.1	3.8.8.1	New	SR: Verify inverter performance; 7 days	Unchanged.
3.8.9	3.8.9	3.7.1	LCO: Electrical Distribution buses operable; MODES 1-4	Unchanged.
3.8.9 A	3.8.9 A	3.7.2.c,d,e	COND: AC distribution inoperable	Unchanged.
3.8.9 A.1	3.8.9 A.1	3.7.2.c,d,e	ACTN: Restore AC distribution 8 hours	Retained existing action and completion tine.
3.8.9 B	3.8.9 B	3.7.2.g	COND: Preferred AC bus inoperable	Unchanged.
3.8.9 B.1	3.8.9 B.1	3.7.2.g	ACTN: Restore Preferred AC bus; 8 hours	Retained existing action and completion tine.
3.8.9 C	3.8.9 C	3.7.2.f	COND: DC bus inoperable	Unchanged.
3.8.9 C.1	3.8.9 C.1	3.7.2.f	ACTN: Restore DC bus; 8 hours	Retained existing action and completion tine.
3.8.9 D	3.8.9 D.	3.7.2	COND: Required action not met	Unchanged.
3.8.9 D.1	3.8.9 D.1	3.7.2	ACTN: Be in MODE 3; 6 hours	Unchanged.
3.8.9 D.2	3.8.9 D.2	3.7.2	ACTN: Be in MODE 5; 36 hours	Unchanged.
3.8.9 E	3.8.9 E	3.0.3	COND: Two or more distribution systems inoperable	Unchanged.
3.8.9 E.1	3.8.9 E.1	3.0.3	ACTN: Enter 3.0.3; immediately	Unchanged.
3.8.9.1	3.8.9.1	New	SR: Verify breaker alignments; 7 days	Unchanged.
3.8.10	3.8.10	New	LCO: Electrical distribution buses operable; MODES 5 & 6	Unchanged.
3.8.10 A	3.8.10 A	New	COND: One or more bus inoperable	Unchanged.

RTS Number	STS Number	TS Number	RTS (STS) requirement Description	Explanation of Differences
3.8.10 A.1	3.8.10 A.1	New	ACTN: Declare affected equip inoperable; immediately	Unchanged.
3.8.10 A.2.1	3.8.10 A.2.1	New	ACTN: Suspend Core Alterations; immediately	Unchanged.
3.8.10 A.2.2	3.8.10 A.2.2	New	ACTN: Suspend fuel movement; immediately	Unchanged.
3.8.10 A.2.3	3.8.10 A.2.3	New	ACTN: Suspend positive Rx addition; immediately	Unchanged.
3.8.10 A.2.4	3.8.10 A.2.4	New	ACTN: Initiate DC source restoration; immediately	Unchanged.
3.8.10 A.2.5	3.8.10 A.2.5	New	ACTN: Declare affected SDC inoperable; immediately	Unchanged.
3.8.10.1	3.8.10.1	New	SR: Verify breaker alignments; 7 days	Unchanged.

RTS Number	STS Number	TS Number	RTS (STS) requirement Description	Explanation of Differences
3.9	3.9		REFUELING	
3.9.1	3.9.1	3.8.1.g	LCO: PCS boron ≥ 1720; MODE 6	Unchanged.
3.9.1 A	3.9.1 A	3.8.2	COND: Boron < limit	Unchanged.
3.9.1 A.1	3.9.1 A.1	3.8.2	ACTN: Suspend CORE ALT; immediately	Unchanged.
3.9.1 A.2	3.9.1 A.2	3.8.2	ACTN: Suspend +Δk/k addition; immediately	Unchanged.
3.9.1 A.3	3.9.1 A.3	3.8.2	ACTN: Borate; immediately	Unchanged.
3.9.1.1	3.9.1.1	3.8.1.g	SR: Verify Boron; 72 hrs	Unchanged.
3.9.2	3.9.2	3.8.1.e	LCO: 2 SR monitors OPERABLE; MODE 6	Unchanged. Used Palisades terminology of source range channels throughout LCO.
3.9.2 A	3.9.2 A	3.8.2	COND: 1 SR monitor inoperable	Unchanged.
3.9.2 A.1	3.9.2 A.1	3.8.2	ACTN: Suspend core alterations; immediately	Unchanged.
3.9.2 A.2	3.9.2 A.2	3.8.2	ACTN: Suspend + Δk/k addition; Immediately	Unchanged.
3.9.2 B	3.9.2 B	3.8.2	COND: 2 SR monitors inoperable	Unchanged.
3.9.2 B.1	3.9.2 B.1	3.8.2	ACTN: Initiate action to fix SR monitor; immediately	Unchanged.
3.9.2 B.2	3.9.2 B.2	3.8.1.g	ACTN: Perform SR 3.9.1.1; 4 hrs & every 12 hrs	Unchanged.
3.9.2.1	3.9.2.1	4.17.6#1	SR: channel check; 12 hours	Added "on each source range channel" for consistency with section 3.3 SRs
3.9.2.2	3.9.2.2	4.17.6#1	SR: channel calibration; 18 months	Added "on each source range channel" for consistency with section 3.3 SRs; deleted note since that allowance is contained in Palisades Chnl Cal definition.
3.9.3	3.9.3	3.8.1.a	LCO: Containment penetration status; core alts & fuel moves.	Unchanged.
3.9.3 a	3.9.3 a	3.8.1.a	LCO: (sub para) Air lock door closed or SFP vent system on	Retained allowance to refuel with equipment hatch open if SFP vent system is operating. This is retained from existing Tech Specs. Palisades equip hatch opens to the fuel pool area and is used for communication and containment access during refueling.
3.9.3 b	3.9.3 b	3.8.1.a	LCO: (sub para) 1 door in emergency airlock closed.	Limited requirement to emergency lock. personnel lock addressed in 3.9.3.a, above.

RTS Number	STS Number	TS Number	RTS (STS) requirement Description	Explanation of Differences
3.9.3 c	3.9.3 c	3.8.1.b,.c	LCO: (sub para) Penetration status	Added the word "other" since 3.9.3.a allows the equipment hatch and personnel airlock to be open.
3.9.3 c.1	3.9.3 c.2	3.8.1.b,.c	LCO: (sub para) Penetrations closed by isolation valve etc	Used Palisades signal name, otherwise unchanged.
3.9.3 c.2	3.9.3 c.2	3.8.1.b,.c	LCO: (sub para) Capable of being closed by valve, etc	Changed item c.2 to reflect Palisades configuration. Palisades has no separate CPIS signal, but uses a low range area monitor to initiate a "Containment High Radiation" closure of all containment isolation valves.
3.9.3 A	3.9.3 A	3.8.2	COND: Penetration not in required status	Unchanged.
3.9.3 A.1	3.9.3 A.1	3.8.2	ACTN: Suspend core alterations; Immediately	Unchanged.
3.9.3 A.2	3.9.3 A.2	3.8.2	ACTN: Suspend fuel movement; Immediately	Unchanged.
3.9.3 A.3	Added	3.8.2	ACTN: Suspend reactivity addition; immediately	Added requirement from existing license.
3.9.3.1	3.9.3.1	New	SR: Verify penetration status; 7 days	Added requirement to verify operation of SFP ventilation & filter system.
3.9.3.2	3.9.3.2	New	SR: Verify automatic penetration closure; 31 days	Reworded to reflect Palisades equipment.
3.9.4	3.9.4	3.1.9.3	LCO: SDC loop operating; MODE 6 ≥ 647' level	Retained existing TS level specification of 647' elevation, OPERABLE requirement for SDC train, and flow requirement. The flow is an assumption of the dilution analyses. Used Palisades terminology of "trains" and "reactor Cavity" throughout LCO.
3.9.4 A	Added	3.10.1.c.1	COND: Flow < 2810 gpm	Added condition equivalent to that of existing TS.
3.9.4 A.1	Added	3.10.1.c.1	ACTN: Suspend dilution operations; immediately	New action in support of dilution analysis assumptions.
3.9.4 A.2	Added	3.1.9.3	ACTN: Assure flow ≥ 1000 gpm; Immediately	Added action to assure adequate mixing flow as assumed in dilution analyses.
3.9.4 A.3	Added	3.10.1.c.1	ACTN: electrically disable 2 charging pumps; 1 hour	Retained existing action in support of dilution analysis.
3.9.4 A.4	Added	3.10.1.c.2	ACTN: verify SDM; 15 min	Retained existing action in support of dilution accident analysis.
3.9.4 B	3.9.4 A	3.1.9.3 1&2	COND: SDC requirements not met	Unchanged.
3.9.4 B.1	3.9.4 A.1	3.1.9.3 2.a	ACTN: Suspend dilution; Immediately	Unchanged.
3.9.4 B.2	3.9.4 A.2	New	ACTN: Suspend adding fuel to core; Immediately	Unchanged.

RTS Number	STS Number	TS Number	RTS (STS) requirement Description	Explanation of Differences
3.9.4 B.3	3.9.3 A.3	3.1.9.3 1.a 3.1.9.3 2.b	ACTN: Initiate SDC repair; immediately	Unchanged.
3.9.4 B.4	3.9.4 A.4	New	ACTN: Close penetrations; 4 hours	Unchanged.
3.9.4.1	Added	New	SR: Verify SDC Loop OPERABLE; 12 hrs	Added SR to support OPERABLE requirement of LCO.
3.9.4.2	3.9.4.1	4.2.2#14.c	SR: Verify SDC loop operating; 12 hrs	Unchanged.
3.9.5	3.9.5	3.1.9.3	LCO: 2 OPERABLE SDC; 1 operating; MODE 6 < 647' level	Retained existing TS level specification of 647; elevation. Used Palisades terminology of "trains" and "reactor Cavity" throughout LCO. Otherwise unchanged.
3.9.5 A	Added	3.10.1.c.1	COND: Flow < 2810 gpm	Added condition equivalent to that of existing TS.
3.9.5 A.1	Added	3.10.1.c.1	ACTN: Suspend dilution operations; immediately	New action in support of dilution analysis assumptions.
3.9.5 A.2	Added	3.1.9.3	ACTN: Assure flow ≥ 1000 gpm; Immediately	Added action to assure adequate mixing flow as assumed in dilution analyses.
3.9.5 A.3	Added	3.10.1.c.1	ACTN: electrically disable 2 charging pumps; 1 hour	Retained existing action in support of dilution analysis.
3.9.5 A.4	Added	3.10.1.c.2	ACTN: verify SDM; 15 min	Retained existing action in support of dilution accident analysis.
3.9.5 B	3.9.5 A	3.1.9.3 1&2	COND: 1 SDC loop inoperable	Unchanged.
3.9.5 B.1	3.9.5 A.1	3.1.9.3 1.a 3.1.9.3 2.b	ACTN: Initiate fix; immediately	Unchanged.
3.9.5 B.2	3.9.5 A.2	New	ACTN: Initiate pool fill; immediately	Unchanged.
3.9.5 C	3.9.5 B	3.1.9.3 1&2	COND: No SDC loop operating or OPERABLE	Unchanged.
3.9.5 C.1	3.9.5 B.1	3.1.9.3 2.a	ACTN: Suspend dilution; Immediately	Unchanged.
3.9.5 C.2	3.9.5 B.2.1	3.1.9.3 1.a 3.1.9.3 2.b	ACTN: Initiate fix; immediately	Unchanged.
3.9.5 C.3	3.9.5 B.3	New	ACTN: Close penetrations; 4 hours	Unchanged.
3.9.5.1	Added	New	SR: Verify SDC Loop OPERABLE; 12 hrs	Added SR to support OPERABLE requirement of LCO.
3.9.5.2	3.9.4.1	4.2.2#14.c	SR: Verify SDC loop operating; 12 hrs	Replaced with wording like that of SR 3.9.4.2 to require verification of required flow.

RTS Number	STS Number	TS Number	RTS (STS) requirement Description	Explanation of Differences
3.9.5.3	3.9.5.2	New	SR: Verify 2nd SDC loop OPERABLE; 7 days	Unchanged.
3.9.6	3.9.6	New	LCO: Water level ≥ 647; fuel movement in CB	Retained existing TS level specification of 647; elevation. Used Palisades terminology of "trains" and "reactor Cavity" throughout LCO. Otherwise unchanged.
3.9.6 A	3.9.6 A	New	COND: Level < limit	Unchanged.
3.9.6 A.1	3.9.6 A.1	New	ACTN: Suspend Core Alterations; Immediately	Unchanged.
3.9.6 A.2	3.9.6 A.2	New	ACTN: Fuel moves; Immediately	Unchanged.
Omitted	3.9.6 A.3	NA	ACTN: (Initiate Action to restore level; Immediately)	This Action was omitted because Actions A.1 and A.2 require plant to be out of applicable conditions. Action A.3, therefore would never be applicable. This change has been submitted as a change to the STS under the number TSTF-20.
3.9.6.1	3.9.6.1	New	SR: verify level; 24 hrs	Unchanged.

RTS Number	STS Number	TS Number	RTS (STS) requirement Description	Explanation of Differences
4.0	4.0	5.0	DESIGN FEATURES	
4.1	4.1	5.1	Desc: Description of plant site	Unchanged.
4.2.1	4.2	5.3.2a,b,c	Desc: Description of Reactor Core	Used existing description.
4.2.2	4.2.2	5.3.2.d	Desc: Description of Control Rods	Used existing description.
4.3.1.1	3.7.15, bases	5.4.2	Desc: Description of spent fuel storage	Moved description of spent fuel storage requirements and facilities to LCO 3.7.15 and its bases.
4.3.1.2	4.3.1	5.4.1	Desc: Description of new fuel storage facilities	Used existing description.
4.3.2	3.7.15, bases	New	Desc: Description of fuel storage drainage limitation	The drainage discussion is not applicable to the Palisades new fuel storage racks. This subject is discussed in the bases for LCO 3.7.15.
4.3.3	3.7.15, bases	New	Desc: Description of fuel storage capacity	This subject is discussed in the bases for LCO 3.7.15.

B 3.7 **PLANT SYSTEMS**

B 3.7.1 Main Steam Safety Valves (MSSVs)

BASES

BACKGROUND

The primary purpose of the MSSVs is to provide overpressure protection for the secondary system. The MSSVs also provide protection against overpressurizing the ~~Reactor Coolant Pressure Boundary (RCPB) by~~ Primary Coolant System providing a heat sink for the removal of energy from the ~~Reactor~~ Primary Coolant System (~~RCS~~ PCS) if ~~the preferred heat sink, provided by~~ the Condenser ~~and Circulating Water System,~~ and atmospheric dump valves are ~~is~~ not available.

~~Eight~~ Twelve MSSVs are located on each main steam header, outside containment, upstream of the main steam isolation valves~~, as described in the FSAR, Section [5.2], (Ref. 1)~~. The MSSV rated capacity passes the full steam flow at 102% RTP (100% + 2% for instrument error) with the valves full open. This meets the requirements of the ASME Code, Section III, (Ref. ~~2~~ 1). The MSSV design includes staggered setpoints, according to Table 3.7.1-1, ~~in the accompanying LCO,~~ so that only the number of valves needed will actuate. Staggered setpoints reduce the potential for valve chattering because of insufficient steam pressure~~ to fully open all valves following a turbine reactor trip~~.

APPLICABLE SAFETY ANALYSES

The design basis for the MSSVs comes from Reference ~~2~~ 1; its purpose is to limit secondary system pressure to ≤ 110% of design pressure when passing 100% of design steam flow. This design basis is sufficient to cope with any Anticipated Operational Occurrence (AOO) or accident considered in the Design Basis Accident (DBA) and transient analysis.

The events that challenge the MSSV relieving capacity, and thus ~~RCS~~ PCS pressure, are those characterized as decreased heat removal events, and are presented in the FSAR, ~~Section [15.2]~~Chapter 14. A complete loss of turbine generator load is the limiting transient for challenging the overpressure protection for the primary and secondary systems. The analysis performed to support these specifications assumed complete loss of turbine generator load, without simultaneous reactor trip or turbine trip, while operating above rated power.~~, (Ref. 3)~~.

~~Of these, the full power Loss Of Condenser Vacuum (LOCV) event is the limiting AOO. An LOCV isolates the turbine and condenser, and terminates normal feedwater flow to the steam generators. Before delivery of auxiliary feedwater to the steam generators, RCS pressure reaches ≤ 2630 psig. This peak pressure is < 110% of the design pressure of 2500 psig, but high enough to actuate the pressurizer safety valves. The maximum relieving rate during the LOCV event is 2.5 E6 lb/hour, which is less than the rated capacity of two MSSVs.~~

~~The limiting accident for peak RCS pressure is the full power Feedwater Line Break (FWLB), inside containment, with the failure of the backflow check valve in the feedwater line from the affected steam generator. Water from the affected steam generator is assumed to be lost through the break with minimal additional heat transfer from the RCS. With heat removal limited to the unaffected steam generator, the reduced heat transfer causes an increase in RCS temperature, and the resulting RCS fluid expansion causes an increase in pressure. The RCS pressure increases to ≤ 2730 psig, with the pressurizer safety valves providing relief capacity. The maximum relieving rate of the MSSVs during the FWLB event is ≤ 2.5 E6 lb/hour, which is less than the rated capacity of two MSSVs.~~

~~Using conservative analysis assumptions, a small range of FWLB sizes less than a full double ended guillotine break produce an RCS pressure of 2765 psig for a period of 20 seconds; exceeding 110% (2750 psig) of design pressure. This is considered acceptable as RCS pressure is still well below 120% of design pressure where deformation may occur. The probability of this event is in the range of 4 E 6/year.~~

~~The MSSVs satisfy Criterion 3 of the NRC Policy Statement.~~

LCO

This LCO requires ~~all~~ 23 MSSVs to be OPERABLE in compliance with Reference ~~2~~ 1, even though this is not a requirement of the DBA analysis. This is because operation with less than ~~the full number~~ 23 ~~of~~ MSSVs requires limitations on allowable THERMAL POWER ~~(to meet Reference 2 requirements), and adjustment to the Reactor Protection System trip setpoints. These limitations are according to those shown in Table 3.7.1 1, Required Action A.2, and Required Action A.3 in the accompanying LCO.~~ An MSSV is considered inoperable if it fails to open upon demand.

BASES

The OPERABILITY of the MSSVs is defined as the ability to open within the setpoint tolerances, relieve steam generator overpressure, and reseat when pressure has been reduced. The OPERABILITY of the MSSVs is determined by periodic surveillance testing in accordance with the Inservice Inspection Testing Program.

The lift settings, according to Table 3.7.1-~~2~~1 in the accompanying LCO, correspond to ambient conditions of the valve at nominal operating temperature and pressure.

This LCO provides assurance that the MSSVs will perform their designed safety function to mitigate the consequences of accidents that could result in a challenge to the ~~RCPB~~ PCS integrity.

APPLICABILITY

In MODES 1, ~~a minimum of two~~ 2 and 3 MSSVs ~~per steam generator~~ are required to be OPERABLE~~, according to Table 3.7.1 1 in the accompanying LCO, which is limiting and bounds all lower MODES~~. ~~In MODES 2 and 3, both the ASME Code and the accident analysis require only one MSSV per steam generator to provide overpressure protection.~~

In MODES 4 and 5, there are no credible transients requiring the MSSVs.

The steam generators are not normally used for heat removal in MODES 5 and 6, and thus cannot be overpressurized; there is no requirement for the MSSVs to be OPERABLE in these MODES.

ACTIONS

~~The ACTIONS table is modified by a Note indicating that separate Condition entry is allowed for each MSSV.~~

~~A.1 and A.2~~

~~An alternative to restoring the inoperable MSSV(s) to OPERABLE status is to reduce power so that the available MSSV relieving capacity meets Code requirements for the power level. Operation may continue provided the allowable THERMAL POWER is equal to the product of: 1) the ratio of the number of MSSVs available per steam generator to the total number of MSSVs per steam generator, and 2) the ratio of the available relieving capacity to total steam flow, multiplied by 100%.~~

~~Allowable THERMAL POWER = (8 N) x 109.2 / 8~~

BASES

~~With one or more MSSVs inoperable, the ceiling on the variable overpower trip is reduced to an amount over the allowable THERMAL POWER equal to the band given for this trip, according to Table 3.7.1-1 in the accompanying LCO.~~

~~SP = Allowable THERMAL POWER + 9.8~~

~~where:~~

~~SP = Reduced reactor trip setpoint in percent RTP. This is a ratio of the available relieving capacity over the total steam flow at rated power.~~

~~8 = Total number of MSSVs per steam generator.~~

~~N = Number of inoperable MSSVs on the steam generator with the greatest number of inoperable valves.~~

~~109.2 = Ratio of MSSV relieving capacity at 110% steam generator design pressure to calculated steam flow rate at 100% RTP + 2% instrument uncertainty expressed as a percentage (see text above).~~

~~9.8 = Band between the maximum THERMAL POWER and the variable overpower trip setpoint ceiling (Table 3.7.1-1).~~

~~The operator should limit the maximum steady state power level to some value slightly below this setpoint to avoid an inadvertent overpower trip.~~

~~The 4 hour Completion Time for Required Action A.2 is consistent with A.1. An additional 8 hours is allowed to reduce the setpoints in recognition of the difficulty of resetting all channels of this trip function within a period of 8 hours. The Completion Time of 12 hours for Required Action A.3 is based on operating experience in resetting all channels of a protective function and on the low probability of the occurrence of a transient that could result in steam generator overpressure during this period.~~

A.1

This action allows time to address documentation concerns that may create an administrative inoperability. A valve that has obviously become inoperable will usually require a reduction in system pressure with its associated power reductions.

B.1 and B.2

If the MSSVs cannot be restored to OPERABLE status in the associated Completion Time, ~~or if one or more steam generators have less than two MSSVs OPERABLE~~, the ~~unit~~ plant must be placed in a MODE in which the LCO does not apply. To achieve this status, the ~~unit~~ plant must be placed in at least MODE 3 within 6 hours, and in MODE 4 within ~~[12]~~30 hours. The allowed Completion Times are reasonable, based on operating experience, to reach the required ~~unit~~ plant conditions from full power conditions in an orderly manner and without challenging ~~unit~~ plant systems.

SURVEILLANCE REQUIREMENTS

SR 3.7.1.1

This SR verifies the OPERABILITY of the MSSVs by the verification of each MSSV lift setpoints in accordance with the Inservice Testing Program. The ASME Code, Section XI, (Ref. ~~4~~3), requires that safety and relief valve tests be performed in accordance with ANSI/ASME OM-1-1987, (Ref. ~~5~~4). According to Reference ~~5~~4, the following tests are required for MSSVs:

a. Visual examination;

b. Seat tightness determination;

c. Setpoint pressure determination (lift setting).

~~d. Compliance with owner's seat tightness criteria; and~~.

~~e. Verification of the balancing device integrity on balanced valves.~~

The ANSI/ASME Standard requires that all valves be tested every 5 years, and a minimum of 20% of the valves tested every 24 months. The ASME Code specifies the activities and frequencies necessary to satisfy the requirements.

Table 3.7.1-~~2~~1 allows a ± ~~[~~3~~]~~% setpoint tolerance for OPERABILITY; however, the valves are reset to ± 1% during the Surveillance to allow for drift.

BASES

~~This SR is modified by a Note that allows entry into and operation in MODE 3 prior to performing the SR. This is to allow testing of the MSSVs at hot conditions. The MSSVs may be either bench tested or tested in situ at hot conditions using an assist device to simulate lift pressure. If the MSSVs are not tested at hot conditions, the lift setting pressure shall be corrected to ambient conditions of the valve at operating temperature and pressure.~~

If the MSSVs are bench tested, the lift setting pressure must be corrected to ambient conditions of the valve at operating temperature and pressure.

REFERENCES

~~1. FSAR, Section [5.2]~~

~~2~~1. ASME, Boiler and Pressure Vessel Code, Section III, Article NC-7000, Class 2 Components

~~3~~2. FSAR, ~~Section [15.2]~~Chapter 14

~~4~~3. ASME, Boiler and Pressure Vessel Code, Section XI, ~~Article IWV 3500~~

~~5~~4. ANSI/ASME OM-1-1987~~ and OMa 1988 Addenda~~

MSIVs
B 3.7.2

B 3.7 **PLANT SYSTEMS**

B 3.7.2 Main Steam Isolation Valves (MSIVs)

BASES

BACKGROUND

The MSIVs isolate steam flow from the secondary side of the steam generators following a High Energy Line Break (HELB). MSIV closure terminates flow from the unaffected (intact) steam generator.

One MSIV is located in each main steam line outside, but close to, containment. The MSIVs are downstream from the Main Steam Safety Valves (MSSVs), atmospheric dump valves, and auxiliary feedwater pump turbine steam supplies to prevent their being isolated from the steam generators by MSIV closure. ~~Closing the MSIVs isolates each steam generator from the other, and isolates the turbine, Steam Bypass System, and other auxiliary steam supplies from the steam generators.~~

The MSIVs close on ~~a main steam~~ isolation signal generated by either, low steam generator pressure, or high containment pressure. The same isolation signals also actuate the Main Feedwater Regulating Valves (MFRVs) to close. ~~The MSIVs fail closed on loss of control or actuation power. The MSIS also actuates the Main Feedwater Isolation Valves (MFIVs) to close.~~ The MSIVs may also be actuated manually.

A description of the MSIVs is found in the FSAR, Section [10.23], (Ref. 1).

APPLICABLE SAFETY ANALYSES

The design basis of the MSIVs is ~~established by the containment analysis for the large Steam Line Break (SLB) inside containment, as~~ discussed in the FSAR, Section ~~[6.2]~~10.2, (Ref. 21). It is also influenced by the accident analysis of the Main Steam Line Break (MSLB) events presented in the FSAR, Section ~~[15.1.5]~~14.14, (Ref. 32). ~~The design precludes the blowdown of more than one steam generator, assuming a single active component failure (e.g., the failure of one MSIV to close on demand).~~

BASES

The limiting case for the containment analysis is the ~~hot zero power~~ MSLB inside containment ~~with a loss of off site power following turbine trip, and failure~~ maintaining off-site power following turbine trip with the loss of relay 5-P7 (starts 2 containment spray pumps), and inability of the MSIV on the affected steam generator to close. At zero power, the steam generator inventory and temperature are at their maximum, maximizing the analyzed ~~mass and energy release to~~ pressure in the containment. Because of increased size and flow restrictors of the steam generators, a MSLB at 102% power produces the highest containment temperature. Due to reverse flow, failure of the MSIV to close contributes to the total release of the additional mass and energy in the steam headers, which are downstream of the other MSIV. ~~With the most reactive rod cluster control assembly assumed stuck in the fully withdrawn position, there is an increased possibility that the core will become critical and return to power. The core is ultimately shut down by the borated water injection delivered by the Emergency Core Cooling System. Other failures considered are the failure of an MFIV to close, and failure of an emergency diesel generator to start.~~

~~The accident analysis compares several different SLB events against different acceptance criteria. The large SLB outside containment upstream of the MSIV is limiting for offsite dose, although a break in this short section of main steam header has a very low probability. The large SLB inside containment at hot zero power is the limiting case for a post trip return to power. The analysis includes scenarios with offsite power available and with a loss of offsite power following turbine trip.~~

With off-site power available, the ~~reactor~~primary coolant pumps continue to circulate coolant through the steam generators, maximizing the ~~Reactor~~ Primary Coolant System (~~RCS~~ PCS) cooldown. ~~With a loss of offsite power, the response of mitigating systems, such as the High Pressure Safety Injection (HPSI) pumps, is delayed. Significant single failures considered include: f~~Failure of a MSIV to close with off-site power available is considered ~~a~~ significant~~ failure.~~~~, failure of an emergency diesel generator, and failure of a HPSI pump.~~

The MSIVs ~~serve only a safety function and~~ remain open during power operation. These valves operate under the following situations:

BASES

a. An HELB inside containment. ~~In order to maximize the mass and energy release into the containment, the analysis assumes that the MSIV in the affected steam generator remains open. For this accident scenario, steam is discharged into containment from both steam generators until closure of the MSIV in the intact steam generator occurs. After MSIV closure, steam is discharged into containment only from the affected steam generator, and from the residual steam in the main steam header downstream of the closed MSIV in the intact loop.~~

b. A break outside of containment and upstream from the MSIVs. This scenario is not a containment pressurization concern. The uncontrolled blowdown of more than one steam generator must be prevented to limit the potential for uncontrolled RCS cooldown and positive reactivity addition. ~~Closure of the MSIVs isolates the break, and limits the blowdown to a single steam generator.~~

c. A break downstream of the MSIVs. This type of break will be isolated by the closure of the MSIVs. Events such as increased steam flow through the turbine or the ~~steam~~ turbine bypass valve~~s~~ will also terminate on closure of the MSIVs.

~~d. A steam generator tube rupture. For this scenario, closure of the MSIVs isolates the affected steam generator from the intact steam generator. In addition to minimizing radiological releases, this enables the operator to maintain the pressure of the steam generator with the ruptured tube below the MSSV set points, a necessary step toward isolating the flow through the rupture~~.

~~e. The MSIVs are also utilized during other events such as a feedwater line break. These events are less limiting so far as MSIV OPERABILITY is concerned.~~

~~The MSIVs satisfy Criterion 3 of the NRC Policy Statement.~~

LCO

This LCO requires that the MSIV in each of the ~~[~~two~~]~~ steam lines be OPERABLE. The MSIVs are considered OPERABLE when the isolation times are within limits, and they close on an isolation actuation signal.

BASES

This LCO provides assurance that the MSIVs will perform their design safety function to mitigate the consequences of accidents that could result in off-site exposures comparable to the 10 CFR 100, (Ref. ~~4~~3) limits or the NRC staff approved licensing basis.

APPLICABILITY

The MSIVs must be OPERABLE in ~~MODE 1 and in~~ MODES 1, 2 and 3 ~~except~~ when ~~all MSIVs are closed and [deactivated] when~~ there is significant mass and energy in the ~~RCS~~ PCS and steam generators. When the MSIVs are closed, they are already performing their safety function.

In MODE 4, the steam generator energy is low; therefore, the MSIVs are not required to be OPERABLE.

In MODES 5 and 6, the steam generators do not contain much energy because their temperature is below the boiling point of water; therefore, the MSIVs are not required for isolation of potential high energy secondary system pipe breaks in these MODES.

ACTIONS

A.1

With one MSIV inoperable in MODE 1, time is allowed to restore the component to OPERABLE status. Some repairs can be made to the MSIV with the ~~unit~~ plant hot. The ~~[~~8~~]~~ hour Completion Time is reasonable, considering the probability of an accident occurring during the time period that would require closure of the MSIVs.

The ~~[~~8~~]~~ hour Completion Time is greater than that normally allowed for containment isolation valves because the MSIVs are valves that isolate a closed system penetrating containment. These valves differ from other containment isolation valves in that the closed system provides an additional means for containment isolation.

B.1

If the MSIV cannot be restored to OPERABLE status within ~~[~~8~~]~~ hours, the ~~unit~~ plant must be placed in a MODE in which the LCO does not apply. To achieve this status, the ~~unit~~ plant must be placed in MODE 2 within 6 hours and Condition C would be entered. The Completion Time is reasonable, based on operating experience, to reach MODE 2, and close the MSIVs in an orderly manner and without challenging ~~unit~~ plant systems.

BASES

C.1~~, and~~ C.2~~.1, and C.2.2~~

Condition C is modified by a Note indicating that separate Condition entry is allowed for each MSIV.

Since the MSIVs are required to be OPERABLE in MODES 2 and 3, the inoperable MSIVs may either be restored to OPERABLE status or closed. When closed, the MSIVs are already in the position required by the assumptions in the safety analysis.

The ~~[8]~~ hour Completion Time is consistent with that allowed in Condition A.

Inoperable MSIVs that cannot be restored to OPERABLE status within the specified Completion Time, but are closed, must be verified on a periodic basis to be closed. This is necessary to ensure that the assumptions in the safety analysis remain valid. ~~The 7 day Completion Time is reasonable, based on engineering judgment, MSIV status indications available in the control room, and other administrative controls, to ensure these valves are in the closed position.~~

D.1 and D.2

If the MSIVs cannot be restored to OPERABLE status, or closed, within the associated Completion Time, the unit must be placed in a MODE or condition in which the LCO does not apply. To achieve this status, the unit must be placed in at least MODE 3 within 6 hours, and in MODE 4 within [12] hours. The allowed Completion Times are reasonable, based on operating experience, to reach the required unit conditions from MODE 2 conditions in an orderly manner and without challenging unit systems.

SURVEILLANCE REQUIREMENTS

SR 3.7.2.1

This SR verifies that the closure time of each MSIV is ≤ ~~[4.6]~~5.0 seconds on an actual or simulated actuation signal. The signal may be simulated with a manual control switch. The MSIV closure time is assumed in the accident and containment analyses. ~~This SR is normally performed upon returning the unit to operation following a refueling outage. The MSIVs should not be tested at power since even a part stroke exercise increases the risk of a valve closure with the unit generating power.~~ The MSIVs cannot be tested at power, and must be tested at no flow conditions. As the MSIVs ~~are~~ cannot be tested at power, they are exempt from the ASME Code, Section XI, ~~(Ref. 5),~~ requirements during operation in MODES 1 and 2.

BASES

The Frequency for this SR is in accordance with the ~~[~~Inservice Testing Program or ~~[18] months]~~ 92 days in MODES 5 and 6. This ~~[18] month~~ 92 days Frequency demonstrates the valve closure time at least once per refueling cycle. Operating experience has shown that these components usually pass the SR when performed at the ~~[18] month~~ 92 days during cold shutdown Frequency. Therefore, the Frequency is acceptable from a reliability standpoint.

This test is conducted in ~~MODE 3~~ MODES 5 and 6, with the ~~unit~~ plant at ~~operating temperature and pressure, as discussed in the Reference 5 exercising requirements.~~ cold shutdown conditions. This SR is modified by a Note ~~that allows entry into and operation in MODE 3 prior to performing the SR. This allows a delay of testing until MODE 3, in order to establish conditions consistent with those under which the acceptance criterion was generated~~ to point out that the plant does not enter these MODES for the purpose of performing this test.

REFERENCES

1. FSAR, Section ~~[10.3]~~10.2

~~2. FSAR, Section [6.2]~~

~~3~~2. FSAR, Section ~~[15.1.5]~~14.14

~~4~~3. 10 CFR 100.11

~~5~~4. ASME, Boiler and Pressure Vessel Code, Section XI, ~~Inservice Inspection, Article IWV 3400~~

B 3.7 **PLANT SYSTEMS**

B 3.7.3 Main Feedwater ~~Isolation~~ Regulating Valves (~~MFIVs~~ MFRVs) ~~[and [MFIV] Bypass Valves]~~

BASES

BACKGROUND

The MFRVs dual purpose is to control feedwater during normal plant operation and to ~~The MFIVs~~ isolate ~~m~~Main ~~f~~Feedwater (MFW) flow to the secondary side of the steam generators following a ~~h~~High ~~e~~Energy ~~l~~Line ~~b~~Break (HELB). Closure of the ~~MFIVs~~ MFRVs and the bypass valves terminates flow to both steam generators. ~~, terminating the event for feedwater line breaks (FWLBs) occurring upstream of the MFIVs.~~ The consequences of events occurring in the main steam lines or in the MFW lines downstream of the ~~MFIVs~~ MFRVs will be mitigated by their closure. Closure of the ~~MFIVs~~ MFRVs and bypass valves effectively terminates the addition of feedwater to an affected steam generator, limiting the mass and energy release for ~~s~~Steam ~~l~~Line ~~b~~Breaks (SLBs) or Feedwater Line Breaks (FWLBs) inside containment, and reducing the cooldown effects for MSLBs.

~~The MFIVs and bypass valves isolate the nonsafety related portions from the safety related portion of the system.~~ In the event of a secondary side pipe rupture inside containment, the valves limit the quantity of high energy fluid that enters containment through the break~~,~~. ~~and provide a pressure boundary for the~~ ~~c~~Controlled addition of ~~a~~Auxiliary ~~f~~Feedwater (AFW) to the intact loop is provided by a separate piping system.

~~One MFIV is located on each AFW line, outside, but close to, containment. The MFIVs are located upstream of the AFW injection point so that AFW may be supplied to a steam generator following MFIV closure. The piping volume from the valve to the steam generator must be accounted for in calculating mass and energy releases, and refilled prior to AFW reaching the steam generator following either an SLB or FWLB.~~

The ~~MFIVs~~ MFRVs and ~~its~~ their bypass valves close on receipt of a ~~main steam~~ isolation signal ~~(MSIS)~~ generated by either low steam generator pressure or high containment pressure. ~~The MSIS also actuates the main steam isolation valves (MSIVs) to close.~~ The ~~MFIVs~~ MFRVs and bypass valves may also be actuated manually. ~~In addition to the MFIVs and the bypass valves, a check valve inside containment is available to isolate the feedwater line penetrating containment, and to ensure that the consequences of events do not exceed the capacity of the containment heat removal systems.~~

A description of the ~~MFIVs~~ MFRVs is found in the FSAR~~,~~.

BASES

APPLICABLE SAFETY ANALYSES

The design basis of the ~~MFIVs~~ MFRVs' isolation function is established by the analysis for the ~~large~~ MSLB. ~~It is also influenced by the accident analysis for the large FWLB.~~ Closure of the ~~MFIVs~~ MFRVs and their bypass valves may also be relied on to terminate feedwater during a steam break for core response analysis. ~~and or an excess feedwater flow event upon receipt of a MSIS on high steam generator level.~~

Failure of an ~~MFIV~~ MFRV ~~and~~or the bypass valve to close following an MSLB~~, FWLB, or excess feedwater flow event~~ can result in additional mass ~~and energy~~ to the steam generators contributing to cooldown. This failure also results in additional mass and energy releases following an MSLB ~~or FWLB event~~.

~~The MFIVs satisfy Criterion 3 of the NRC Policy Statement.~~

LCO

This LCO ensures that the ~~MFIVs~~ MFRVs and the bypass valves will isolate MFW flow to the steam generators. ~~Following an FWLB or SLB, these valves will also isolate the nonsafety related portions from the safety related portions of the system.~~ This LCO requires that ~~[two] MFIVs~~ MFRVs ~~[~~and ~~[MFIV]~~ MFRV bypass valves~~]~~ in each feedwater line be OPERABLE. The ~~MFIVs~~ MFRVs and the bypass valves are considered OPERABLE when the isolation times are within limits, and are able to close~~d~~ on an isolation actuation signal.

~~Failure to meet the LCO requirements can result in additional mass and energy being released to containment following an SLB or FWLB inside containment. If an MSIS on high steam generator level is relied on to terminate an excess feedwater flow event, failure to meet the LCO may result in the introduction of water into the main steam lines.~~

APPLICABILITY

The ~~MFIVs~~ MFRVs and the bypass valves must be OPERABLE whenever there is significant mass and energy in the ~~Reactor~~ Primary Coolant System and steam generators. This ensures that, in the event of an HELB, a single failure in the main feedwater cannot result in the blowdown of more than one steam generator.

In MODES 1, 2, and 3, the ~~MFIV [or [MFIV]~~ MFRV or MFRV bypass valves~~]~~ are required to be OPERABLE, except when they are closed and deactivated or isolated ~~by a closed manual valve~~, in order to limit the amount of available fluid that could be added to containment in the case of a secondary system pipe break inside containment. When the valves are closed and deactivated or isolated ~~by a closed manual valve~~, they are already performing their safety function.

BASES

In MODES 4, 5, and 6, steam generator energy is low. Therefore, the ~~MFIVs~~ MFRV and the bypass valves are ~~normally closed since MFW is~~ not required.

ACTIONS

~~The ACTIONS table is modified by a Note indicating that separate Condition entry is allowed for each value.~~

A.1 and A.2

With one or more ~~MFIV~~ MFRV or ~~the~~ MFRV bypass valve inoperable, action must be taken to close and deactivate, or isolate the inoperable valves within ~~[~~8 ~~or 72]~~ hours. When these valves are closed and deactivated, or isolated, they are performing their required safety function (e.g., to isolate the line).

~~For units with only one MFIV per feedwater line:~~ The ~~[~~8~~]~~ hour Completion Time is reasonable to close the MF~~I~~RV or its bypass valve, which includes performing a controlled ~~unit~~ plant shutdown to MODE 2.

~~The [72] hour Completion Time takes into account the redundancy afforded by the remaining OPERABLE valves, and the low probability of an event occurring during this time period that would require isolation of the MFW flow paths.~~

B.1 and B.2

~~If more than one MFIV or [MFIV] bypass valve in the same flow path cannot be restored to OPERABLE status, then there may be no redundant system to operate automatically and perform the required safety function. Although the containment can be isolated with the failure of two valves in parallel in the same flow path, the double failure can be an indication of a common mode failure in the valves of this flow path, and as such is treated the same as a loss of the isolation capability of this flow path. Under these conditions, valves in each flow path must be restored to OPERABLE status, closed, or the flow path isolated within 8 hours. This action returns the system to the condition where at least one valve in each flow path is performing the required safety function. The 8 hour Completion Time is reasonable to close the MFIV or its bypass valve, or otherwise isolate the affected flow path.~~

~~Inoperable MFIVs and [MFIV] bypass valves that cannot be restored to OPERABLE status within the Completion Time, but are closed or isolated, must be verified on a periodic basis that they are closed or isolated. This is necessary to ensure that the assumptions in the safety analysis remain valid. The 7 day Completion Time is reasonable, based on engineering judgment, in view of valve status indications available in the control room, and other administrative controls to ensure that these valves are closed or isolated.~~

~~C.1 and C.2~~

If the ~~MFIVs~~ MFRVs and their bypass valves cannot be restored to OPERABLE status, closed, or isolated in the associated Completion Time, the ~~unit~~ plant must be placed in a MODE or condition in which the LCO does not apply. To achieve this status, the ~~unit~~ plant must be placed in at least MODE 3 within 6 hours, and in MODE 4 within ~~[12]~~30 hours. The allowed Completion Times are reasonable, based on operating experience, to reach the required ~~unit~~ plant conditions from full power conditions in an orderly manner and without challenging ~~unit~~ plant systems.

SURVEILLANCE REQUIREMENTS

SR 3.7.3.1

This SR ensures the verification of each ~~MFIV [and [MFIV]~~ MFRV ~~bypass valve]~~ is ≤ ~~[7]~~22.0 seconds Ref. 3. ~~on an actual or simulated actuation signal~~. The ~~MFIV~~ MFRV closure time is assumed in the accident and containment analyses. ~~This Surveillance is normally performed upon returning the unit to operation following a refueling outage. The MFIVs should not be tested at power since even a part stroke exercise increases the risk of a valve closure with the unit generating power.~~ As these valves are not tested at power, they are exempt from the ASME Code, Section XI, (Ref. 2) requirements during operation in MODES 1 and 2.

The Frequency is in accordance with the ~~[~~Inservice Testing Program or ~~[18] months]~~ 92 days is MODES 5 and 6. The ~~[18] month~~ 92 day Frequency demonstrates ~~for~~ the valve closure time ~~is based on the~~ at least once per refueling cycle. ~~Operating experience has shown that these components usually pass the SR when performed at the [18] month Frequency.~~

This test is conducted in MODES 5 or 6, with the plant in cold shutdown conditions. This SR is modified by a Note to point out that the plant does not enter these MODES for the purpose of performing this test.

BASES

SR 3.7.3.2 and SR 3.7.3.3

This SR demonstrates that the valves respond to and close on the appropriate signals.

REFERENCES

1. FSAR, Section ~~[~~10.~~4.7]~~2.3.3
2. ASME, Boiler and Pressure Vessel Code, Section XI~~, Inservice Inspection, Article IWV 3400~~
3. FSAR, Section 14.18

B 3.7 PLANT SYSTEMS

B 3.7.4 Atmospheric Dump Valves (ADVs)

BASES

BACKGROUND

The ADVs provide a ~~safety grade~~ method for cooling the ~~unit~~ plant to Shutdown Cooling (SDC) System entry conditions~~, should the preferred heat sink via the Steam Bypass System to the condenser not be available, as discussed in the FSAR, Section [10.3], (Ref. 1)~~. This is done in conjunction with the Auxiliary Feedwater System providing cooling water from the ~~c~~Condensate ~~s~~Storage ~~t~~Tank (CST). The ADVs may also be required to meet the design cooldown rate during a normal cooldown when steam pressure drops too low for maintenance of a vacuum in the condenser to permit use of the ~~Steam Bypass System~~ turbine bypass valve.

Four ADV lines are provided. Each ADV line ~~consists of~~ has one ADV ~~and an associated block valve. Two ADV lines per steam generator are required to meet single failure assumptions following an event rendering one steam generator unavailable for Reactor Coolant System (RCS) heat removal.~~ and a manual isolation valve. The ADVs are equipped with pneumatic controllers to permit control of the cooldown rate.

~~The ADVs are provided with upstream block valves to permit their being tested at power, and to provide an alternate means of isolation.~~ The ADVs are equipped with pneumatic controllers to permit control of the cooldown rate.

The ADVs are ~~usually~~ provided with a pressurized gas supply of ~~bottled~~ nitrogen that, on a loss of pressure in the normal instrument air supply, automatically supplies nitrogen to operate the ADVs. The nitrogen supply is sized to provide sufficient pressurized gas to operate the ADVs for the time required ~~for RCS cooldown to the SDC System entry conditions~~ during station blackout. The nitrogen supply is not required for OPERABILITY of the ADVs.

A description of the ADVs is found in Reference 1. ~~The ADVs are OPERABLE with only a DC power source available. In addition, hand wheels are provided for local manual operation.~~

BASES

APPLICABLE SAFETY ANALYSES

~~The design basis of the ADVs is established by the capability to cool the unit to SDC System entry conditions. A cooldown rate of 75°F per hour is obtainable by one or both steam generators. This design is adequate to cool the unit to SDC System entry conditions with only one ADV and one steam generator, utilizing the cooling water supply available in the CST.~~ The ADVs (steam dump) are designed to prevent opening of the main steam safety valves following a turbine trip at rated thermal power.

In the accident analysis presented in the FSAR, (Ref. 2) the ADVs are assumed to be used by the operator to cool down the ~~unit~~ plant to SDC System entry conditions for accidents accompanied by a loss of offsite power. Prior to the operator action, the ~~m~~Main ~~s~~Steam ~~s~~Safety ~~v~~Valves (MSSVs) are used to maintain steam generator pressure and temperature at the MSSV setpoint. This is typically 30 minutes following the initiation of an event. ~~(This may be less for a steam generator tube rupture (SGTR) event.)~~ The limiting events are those that render one steam generator unavailable for ~~RCS~~ PCS heat removal, with a coincident loss of offsite power~~; this results from a turbine trip and the single failure of one ADV on the unaffected steam generator. Typical initiating events falling into this category are a main steam line break upstream of the main steam isolation valves, a feedwater line break, and an SGTR event (although the ADVs on the affected steam generator may still be available following a SGTR event)~~.

The design must accommodate the single failure of one ADV to open on demand; thus, each steam generator must have at least two ADVs. The ADVs are equipped with ~~block~~ manual isolation valves in the event an ADV spuriously opens, or fails to close during use.

~~The ADVs satisfy Criterion 3 of the NRC Policy Statement.~~

LCO

~~[~~Two~~]~~ ADV lines are required to be OPERABLE on each steam generator to ensure that at least one ADV is OPERABLE to conduct a ~~unit~~ plant cooldown following an event in which one steam generator becomes unavailable. ~~, accompanied by a single active failure of one ADV line on the unaffected steam generator. The block valves must be OPERABLE to isolate a failed open ADV. A closed block valve does not render it or its ADV line inoperable if operator action time to open the block valve is supported in the accident analysis.~~ The manual isolation valves must be OPERABLE to isolate a failed open ADV. A closed manual isolation valve does not render it or its ADV line inoperable; the operator has 30 minutes to open the valve to put the ADV in service.

BASES

Failure to meet the LCO can result in the inability to cool the ~~unit~~ plant to SDC System entry conditions following an event in which the condenser is unavailable for use with the ~~Steam Bypass System~~ turbine bypass valve.

An ADV is considered OPERABLE when it is capable of providing a controlled relief of the main steam flow, and is capable of fully opening and closing on demand.

APPLICABILITY

In MODES 1, 2, and 3, [and in MODE 4, when steam generator is being relied upon for heat removal,] the ADVs are required to be OPERABLE.

In MODES 5 and 6, ~~an SGTR is not a credible event.~~ the ADVs do not provide any function and are not required.

ACTIONS

A.1

~~Required Action A.1 is modified by a Note indicating that LCO 3.0.4 does not apply.~~

With one required ADV line inoperable, action must be taken to restore the OPERABLE status within 7 days. The 7 day Completion Time takes into account the redundant capability afforded by the remaining OPERABLE ADV lines, and ~~a nonsafety grade~~ backup ~~in~~ by the ~~Steam Bypass System~~ turbine bypass valve and MSSVs.

B.1

With ~~[~~two~~] or more [~~required~~]~~ ADV lines inoperable, action must be taken to restore ~~[~~one~~]~~ of the ADV lines to OPERABLE status. ~~As the block valve can be closed to isolate an ADV, some repairs may be possible with the unit at power.~~ The 24 hour Completion Time is reasonable to repair inoperable ADV lines, based on the availability of the ~~Steam Bypass System~~ turbine bypass valve and MSSVs, and the low probability of an event occurring during this period that requires the ADV lines.

BASES

C.1 and C.2

If the ADV lines cannot be restored to OPERABLE status within the associated Completion Time, the ~~unit~~ plant must be placed in a MODE in which the LCO does not apply. To achieve this status, the ~~unit~~ plant must be placed in at least MODE 3 within 6 hours, and in MODE 4, without reliance upon the steam generator for heat removal, within ~~[12]~~30 hours. The allowed Completion Times are reasonable, based on operating experience, to reach the required ~~unit~~ plant conditions from full power conditions in an orderly manner and without challenging ~~unit~~ plant systems.

SURVEILLANCE REQUIREMENTS

SR 3.7.4.1

To perform a controlled cooldown of the ~~RCS~~ PCS, the ADVs must be able to be opened and throttled through their full range. This SR ensures the ADVs are tested through a full control cycle at least once per fuel cycle. Performance of inservice testing or use of an ADV during a ~~unit~~ plant cooldown may satisfy this requirement. Operating experience has shown that these components usually pass the SR when performed at the ~~[~~18~~]~~ month Frequency. Therefore, the Frequency is acceptable from a reliability standpoint.

SR 3.7.4.2

The function of the ADV ~~block~~ manual isolation valve is to isolate a failed open ADV. Cycling the ~~block~~ manual isoaltion valve closed and open demonstrates its capability to perform this function. Performance of ~~inservice~~ periodic testing or use of the ~~block~~ manual isolation valve during unit cooldown may satisfy this requirement. Operating experience has shown that these components usually pass the SR when performed at the [18] month Frequency. Therefore, the Frequency is acceptable from a reliability standpoint.

~~Performance of inservice testing or use of the block valve during unit plant cooldown may satisfy this requirement. Operating experience has shown that these components usually pass the SR when performed at the [18] month Frequency. Therefore, the Frequency is acceptable from a reliability standpoint.~~

BASES

REFERENCES

1. FSAR, Section ~~[10.3]~~ 2.1

2. FSAR, Section 14.15

B 3.7 **PLANT SYSTEMS**

B 3.7.5 Auxiliary Feedwater (AFW) System

BASES

BACKGROUND

The AFW System automatically supplies feedwater to the steam generators to remove decay heat from the ~~Reactor~~ Primary Coolant System upon the loss of normal feedwater supply. The AFW ~~pumps~~ trains take suction ~~through separate and independent suction lines~~ from the ~~c~~Condensate ~~s~~Storage ~~t~~Tank (CST) (LCO 3.7.6, "Condensate Storage Tank (CST)") and pump to the steam generator secondary side via separate and independent ~~connections~~ flow paths to ~~the main feedwater (MFW) piping outside containment~~ common steam generator nozzles. The steam generators function as a heat sink for core decay heat. The heat load is dissipated by releasing steam to the atmosphere from the steam generators via the ~~m~~Main ~~s~~Steam ~~s~~Safety ~~v~~Valves (MSSVs) (LCO 3.7.1, "Main Steam Safety Valves (MSSVs)") or ~~a~~Atmospheric ~~d~~Dump ~~v~~Valves (ADVs) (LCO 3.7.4, "Atmospheric Dump Valves (ADVs)"). If the main condenser is available, steam may be released via the ~~steam~~ turbine bypass valve~~s~~ and recirculated to the CST.

~~The AFW System consists of [two] motor driven AFW pumps and one steam turbine driven pump configured into three trains. Each motor driven pump provides 100% of AFW flow capacity; the turbine driven pump provides 100% of the required capacity to the steam generators as assumed in the accident analysis. The pumps are equipped with independent recirculation lines to prevent pump operation against a closed system.~~

The AFW system consists of two trains. The A/B train contains one motor driven pump and one steam turbine driven pump in parallel. The C train contains one motor driven pump. Each of the three pumps can provide 100% of the required AFW flow capacity. Both trains are equipped with recirculation lines to prevent pump operation against a closed system. Each train normally feeds both steam generators.

A flow path consists of a pump and the piping, valving, instrumentation, etc. necessary to get water from the condensate storage tank or backup supply to a steam generator. Each AFW pump supplies two flow paths. A flow path can be inoperable due to failure of the pump, the flow control valve, piping, instrumentation, or other component. Some components can disable two flow paths simultaneously.

Each motor driven AFW pump is powered from an independent Class 1E power supply~~, and feeds one steam generator, although each pump has the capability to be realigned from the control room to feed the other steam generator~~.

The steam turbine driven AFW pump receives steam from either main steam header upstream of the ~~m~~Main ~~s~~Steam ~~i~~Isolation ~~v~~Valve (MSIV). Each of the steam feed lines will supply 100% of the requirements of the turbine driven AFW pump. ~~The turbine driven AFW pump supplies a common header capable of feeding both steam generators, with DC powered control valves actuated to the appropriate steam generator by the Emergency Feedwater Actuation System (EFAS).~~ The steam line from Steam Generator E-50A is the automatic steam supply. The other steam line, from Steam Generator E-50B, is a manual backup steam supply.

One pump at full flow is sufficient to remove decay heat and cool the ~~unit~~ plant to Shutdown Cooling (SDC) System entry conditions.

The AFW System supplies feedwater to the steam generators during normal ~~unit~~ plant startup, shutdown, and hot standby conditions.

The AFW System is designed to supply sufficient water to the steam generator(s) to remove decay heat with steam generator pressure at the setpoint of the MSSVs. Subsequently, the AFW System supplies sufficient water to cool the ~~unit~~ plant to SDC entry conditions, and steam is released through the ADVs.

~~The AFW System actuates automatically on low steam generator level by the EFAS as described in LCO 3.3.2, "Engineered Safety Feature Actuation System (ESFAS) Instrumentation." The EFAS logic is designed to feed either or both steam generators with low levels, but will isolate the AFW System from a steam generator having a significantly lower steam pressure than the other steam generator. The EFAS automatically actuates the AFW turbine driven pump and associated DC operated valves and controls when required, to ensure an adequate feedwater supply to the steam generators. DC operated valves are provided for each AFW line to control the AFW flow to each steam generator.~~

The AFW system is designed so that an Auxiliary Feedwater Actuation System (AFAS) signal is generated to the AFW pumps upon low secondary side steam generator level. Upon low secondary side steam generator level, AFW Pump P-8A would be the first AFW pump to receive an AFAS signal. If P-8A failed to start or establish flow within a specified period of time, AFW Pump P-8C would receive an AFAS signal. If both pump P-8A and pump P-8C failed to start or establish flow within each pump's specified period of time, AFW pump P-8B would receive an AFAS signal. The AFAS signals also open the flow control valves in the flow paths for each AFW pump.

The AFW System is discussed in the FSAR, Section ~~[10.4.9]~~9.7, (Ref. 1).

APPLICABLE SAFETY ANALYSES

The AFW System mitigates the consequences of any event with a loss of normal feedwater.

The design basis of the AFW System ~~is~~ it to supply water to the steam generators to remove decay heat ~~and other residual heat,~~ by delivering at least the minimum required flow rate to the steam generators at pressures corresponding to the lowest MSSV set pressure plus 3%.

The limiting Design Basis Accident~~s~~ (DBA~~s~~) ~~and transients~~ for the AFW System ~~are as follows:~~ is the Loss Of Normal Feedwater (LOFW) event.

~~a. Feedwater Line Break (FWLB); and~~

~~b. Loss of normal feedwater.~~

In addition, the minimum available AFW flow and system characteristics are serious considerations in the analysis of a small break loss of coolant accident.

The AFW system design is such that it can perform its function following a LOFW. The Auxiliary Feedwater Actuation System (AFAS) will start each AFW pump in sequence until the specified flow is delivered to at least one steam generator.

~~The AFW System design is such that it can perform its function following an FWLB between the MFW isolation valve and containment, combined with a loss of offsite power following turbine trip, and a single active failure of the steam turbine driven AFW pump. In such a case, the EFAS logic might not detect the affected steam generator if the backflow check valve to the affected MFW header worked properly. One motor driven AFW pump would deliver to the broken MFW header at the pump runout flow until the problem was detected, and flow was terminated by the operator. Sufficient flow would be delivered to the intact steam generator by the redundant AFW pump.~~

~~The AFW System satisfies Criterion 3 of the NRC Policy Statement.~~

BASES

LCO

This LCO requires that ~~[three]~~ two AFW trains be OPERABLE to ensure that the AFW System will perform the design safety function to mitigate the consequences of accidents that could result in overpressurization of the reactor coolant pressure boundary. Three AFW pumps, in two diverse trains, ensure availability of residual heat removal capability for all events accompanied by a loss of offsite power and a single failure. This is accomplished by powering two pumps from independent emergency buses. The third AFW pump is powered by a steam driven turbine supplied with steam from a source not isolated by the closure of the MSIVs.

The AFW System is considered to be OPERABLE when the components and flow paths required to provide AFW flow to the steam generators are OPERABLE. This requires that the two motor driven AFW pumps be OPERABLE ~~in two diverse paths, each~~ and capable of supplying AFW to ~~a separate~~ both steam generators. When in MODE 1 or 2 the turbine driven AFW pump shall be OPERABLE with redundant steam supplies from each of the two main steam lines upstream of the MSIVs and capable of supplying AFW flow to ~~either~~ both of the ~~two~~ steam generators. The piping, valves, instrumentation, and controls in the required flow paths shall also be OPERABLE.

The LCO is modified by ~~a~~ three Notes. The first Note indicat~~inges~~ that only one AFW train, which includes a motor driven pump, is required to be OPERABLE in MODE 4. This is because of reduced heat removal requirements, the short period of time in MODE 4 during which AFW is required, and the insufficient steam supply available in MODE 4 to power the turbine driven AFW pump.

The second Note clarifies that the turbine drive AFW pump is required to be OPERABLE in MODES 1 and 2. This requirement allows the development of the steam supply necessary to support operation of the turbine driven AFW pump.

The third Note indicates that any two AFW pumps may be placed in MANUAL mode, for the purpose of testing, for not more than 4 hours. In this situation, the third AFW pump would retain the capability for automatic actuation in the event of a plant transient. The two pumps that are in MANUAL could be used at the discretion of the operators.

APPLICABILITY

In MODES 1, 2, and 3, the AFW System is required to be OPERABLE and to function in the event that the MFW is lost. In addition, the AFW System is required to supply enough makeup water to replace steam generator secondary inventory, lost as the ~~unit~~ plant cools to MODE 4 conditions.

BASES

In MODE 4, the AFW System may be used for heat removal via the steam generator.

In MODES 5 and 6, the steam generators are not normally used for decay heat removal, and the AFW System is not required.

ACTIONS ~~A.1~~

~~If one of the two steam supplies to the turbine driven AFW pumps is inoperable, action must be taken to restore OPERABLE status within 7 days. The 7 day Completion Time is reasonable based on the following reasons:~~

~~a. The redundant OPERABLE steam supply to the turbine driven AFW pump;~~

~~b. The availability of redundant OPERABLE motor driven AFW pumps; and~~

~~c. The low probability of an event requiring the inoperable steam supply to the turbine driven AFW pump.~~

~~The second Completion Time for Required Action A.1 establishes a limit on the maximum time allowed for any combination of Conditions to be inoperable during any continuous failure to meet this LCO.~~

~~The 10 day Completion Time provides a limitation time allowed in this 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 7 days and 10 days dictates that both Completion Times apply simultaneously, and the more restrictive must be met.~~

A.1

If one of the two AFW pumps in the A/B train is inoperable in MODES 1, 2, and 3, action must be taken to restore OPERABLE status within 7 days. The 7 day Completion Time is reasonable because the other pump in the train retains the capability to feed both steam generators. This condition includes the loss of one, or both, steam supplies to the turbine driven AFW pump.

~~With one of the required AFW trains (pump or flow path) inoperable, action must be taken to restore OPERABLE status within 72 hours. This Condition includes the loss of two steam supply lines to the turbine driven AFW pump. The 72 hour Completion Time is reasonable, based on the redundant capabilities afforded by the AFW System, the time needed for repairs, and the low probability of a DBA event occurring during this period. Two AFW pumps and flow paths remain to supply feedwater to the steam generators. The second Completion Time for Required Action B.1 establishes a limit on the maximum time allowed for any combination of Conditions to be inoperable during any continuous failure to meet this LCO.~~

~~The 10 day Completion Time provides a limitation time allowed in this 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 72 hours and 10 days dictates that both Completion Times apply simultaneously, and the more restrictive must be met.~~

B.1

With one AFW train inoperable in MODES 1, 2, and 3, action must be taken to restore OPERABLE status within 72 hours. An AFW train is inoperable if it cannot supply condensate to one, or both, steam generators. The 72 hour Completion Time is reasonable because the options to either feed one steam generator with twice the normal flow or feed both steam generators from the redundant train are available. The low probability of a DBA event occurring during the 72 hour period lends further support to the length of the Completion Time.

~~When either Required Action A.1 or B.1 cannot be completed within the required Completion Time, [or if two AFW trains are inoperable in MODES 1, 2, and 3], the unit must be placed in a MODE in which the LCO does not apply. To achieve this status, the unit must be placed in at least MODE 3 within 6 hours, and in MODE 4 within [18] hours.~~

~~C.1 and C.2~~

~~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.~~

~~In MODE 4, with [two AFW trains inoperable in MODES 1, 2, and 3], operation is allowed to continue because only one motor driven AFW pump is required in accordance with the Note that modifies the LCO. Although it is not required, the unit may continue to cool down and start the SDC.~~

C.1 and C.2

When either Required Action A.1 or B.1 cannot be completed within the required Completion Time, or if two AFW trains are inoperable in MODES 1, 2, and 3, the plant must be placed in a MODE in which the LCO does not apply. To achieve this status, the ~~unit~~ plant must be placed in at least MODE 3 within 6 hours, and in MODE 4 within 30 hours. This Condition excludes the case where all 4 AFW flow paths are inoperable.

Rapid plant shutdown is warranted in the case of multiple train failures. These failures place the plant in a condition where the AFW system would not be able to perform its design function without the assistance of manual operator actions.

The allowed Completion Times are reasonable, based on operating experience, to reach the required ~~unit~~ plant conditions from full power conditions in an orderly manner and without challenging ~~unit~~ plant systems.

~~Required Action D.1 is modified by a Note indicating that all required MODE changes or power reductions are suspended until one AFW train is restored to OPERABLE status.~~

~~With all [three] AFW trains inoperable in MODES 1, 2, and 3, the unit is in a seriously degraded condition with no safety related means for conducting a cooldown, and only limited means for conducting a cooldown with nonsafety grade equipment. In such a condition, the unit should not be perturbed by any action, including a power change, that might result in a trip. The seriousness of this condition requires that action be started immediately to restore one AFW train to OPERABLE status. LCO 3.0.3 is not applicable, as it could force the unit into a less safe condition.~~

D.1

~~Required Action E.1 is modified by a Note indicating that all required MODE changes or power reductions are suspended until one AFW train is restored to OPERABLE status.~~

~~With one AFW train inoperable, action must be taken to immediately restore the inoperable train to OPERABLE status or to immediately verify, by administrative means, the OPERABILITY of a second train. LCO 3.0.3 is not applicable, as it could force the unit into a less safe condition.~~

~~In MODE 4, either the reactor coolant pumps or the SDC loops can be used to provide forced circulation as discussed in LCO 3.4.6, "RCS Loops - MODE 4."~~

Required Action D.1 is modified by a Note indicating that all required MODE changes are suspended until one AFW train is restored to OPERABLE status. With all AFW flow paths to both steam generators inoperable in MODES 1, 2, and 3, the plant is in a seriously degraded condition with no safety related means for conducting a cooldown. In such a condition, the plant should not be perturbed by any action, including a power change, that might result in a trip. The seriousness of this condition requires that action be started immediately to restore one AFW flow path to OPERABLE status. LCO 3.0.3 is not applicable, as it could force the plant into a less safe condition.

E.1

Required Action E.1 is modified by a Note indicating that all required MODE changes or power reductions are suspended until one AFW train is restored to OPERABLE status.

With ~~one~~ the required AFW train inoperable, action must be taken to immediately restore ~~the inoperable~~ one train to OPERABLE ~~status or to immediately verify, by administrative means, the OPERABILITY of a second train~~. LCO 3.0.3 is not applicable, as it could force the ~~unit~~ plant into a less safe condition.

In MODE 4, either the ~~reactor~~ primary coolant pumps or the SDC loops can be used to provide forced circulation as discussed in LCO 3.4.6, "~~RCS~~ PCS Loops—MODE 4."

SURVEILLANCE REQUIREMENTS

SR 3.7.5.1

Verifying the correct alignment for manual, power operated, and automatic valves in the AFW water and steam supply flow paths provides assurance that the proper flow paths exist for AFW operation. This SR does not apply to valves that are locked, sealed, or otherwise secured in position, since these valves are verified to be in the correct position prior to locking, sealing, or securing. This SR also does not apply to valves that cannot be inadvertently misaligned, such as check valves. This Surveillance does not require any testing or valve manipulations; rather, it involves verification that those valves capable of ~~potentially~~ being mispositioned are in the correct position.

The 31 day Frequency is based on engineering judgment, is consistent with the procedural controls governing valve operation, and ensures correct valve positions.

SR 3.7.5.2

Verifying that each AFW pump's developed head at the flow test point is greater than or equal to ~~this~~ the required developed head ensures that AFW pump performance has not degraded during the cycle. Flow and differential head are normal tests of pump performance required by Section XI of the ASME Code, (Ref.2).~~ Because it is undesirable to introduce cold AFW into the steam generators while they are operating, this testing is performed on recirculation flow.~~ This test confirms one point on the pump design curve and is indicative of overall performance. Such inservice tests confirm component OPERABILITY, tre~~a~~nd performance, and detect incipient failures by indicating abnormal performance. Performance of inservice testing, discussed in the ASME Code, Section XI, (Ref. 2), at 3 month intervals satisfies this requirement. The ~~[~~31~~]~~ day Frequency on a STAGGERED TEST BASIS results in testing each pump once every 3 months, as required by Reference 2.

~~This SR is modified by a Note indicating that the SR should be deferred until suitable test conditions are established. This deferral is required because there is an insufficient steam pressure to perform the test.~~

SR 3.7.5.3

This SR ensures that AFW can be delivered to the appropriate steam generator, in the event of any accident or transient that generates an ~~E~~AFAS signal, by demonstrating that each automatic valve in the flow path actuates to its correct position on an actual or simulated actuation signal. This Surveillance is not required for valves that are locked, sealed, or otherwise secured in the required position under administrative controls. The ~~[~~18~~]~~ month Frequency is based on the need to perform this Surveillance under the conditions that apply during a ~~unit~~ plant outage and the potential for an unplanned transient if the Surveillance were performed with the reactor at power. The 18 month Frequency is acceptable, based on the design reliability and operating experience of the equipment.

~~This SR is modified by a Note indicating that the SR should be deferred until suitable test conditions have been established. This deferral is required because there is an insufficient steam pressure to perform the test.~~

Also, this SR is modified by a Note that states the SR is not required in MODE 4. In MODE 4, the required AFW train is already aligned and operating.

SR 3.7.5.4

This SR ensures that the AFW pumps will start in the event of any accident or transient that generates an ~~E~~AFAS signal by demonstrating that each AFW pump starts automatically on an actual or simulated actuation signal. The ~~[~~18~~]~~ month Frequency is based on the need to perform this Surveillance under the conditions that apply during a ~~unit~~ plant outage and the potential for an unplanned transient if the Surveillance were performed with the reactor at power. The 18 month Frequency is acceptable, based on the design reliability and operating experience of the equipment.

This SR is modified by ~~[~~a~~]~~ ~~[two]~~ Note~~[s]~~. ~~[Note 1 indicates that the SR be deferred until suitable test conditions are established. This deferral is required because there is insufficient steam pressure to perform the test.]~~ ~~[~~The~~]~~
Note ~~[2]~~ states that the SR is not required in MODE 4. ~~[~~In MODE 4, the required pump is already operating and the autostart function is not required.~~] [In MODE 4, the heat removal requirements would be less providing more time for operator action to manually start the required AFW pump.]~~

~~Reviewer's Note: Some plants may not routinely use the AFW for heat removal in MODE 4. The second justification is provided for plants that use a startup feedwater pump rather than AFW for startup and shutdown.~~

SR 3.7.5.5

This SR ensures that the AFW System is properly aligned by verifying the flow paths to each steam generator prior to entering MODE 2 operation, after 30 days in MODE 5 or 6. OPERABILITY of AFW flow paths must be verified before sufficient core heat is generated that would require the operation of the AFW System during a subsequent shutdown. The Frequency is reasonable, based on engineering judgment, and other administrative controls to ensure that flow paths remain OPERABLE. To further ensure AFW System alignment, the OPERABILITY of the flow paths is verified following extended outages to determine that no misalignment of valves has occurred. ~~This SR ensures that the flow path from the CST to the steam generators is properly aligned by requiring a verification of minimum flow capacity of 750 gpm at 1270 psi. (This SR is not required by those units that use AFW for normal startup and shutdown.)~~

BASES

REFERENCES

1. FSAR, Section ~~[10.4.9]~~9.7

2. ASME, Boiler and Pressure Vessel Code, Section XI, ~~Inservice Inspection, Article IWV 3400~~

B 3.7 **PLANT SYSTEMS**

B 3.7.6 Condensate Storage Tank (CST)

BASES

BACKGROUND

The Condensate Storage Tank (CST) and the Primary Makeup Storage Tank (PMST) provide~~s~~ a safety grade source of water to the steam generators for removing decay and sensible heat from the ~~Reactor~~ Primary Coolant System (~~RCS~~ PCS). The CST and PMST provide~~s~~ a passive flow of water, by gravity, to the Auxiliary Feedwater (AFW) System (LCO 3.7.4, "Auxiliary Feedwater (AFW) System"). ~~The steam produced is released to the atmosphere by the main steam safety valves (MSSVs) or the atmospheric dump valves. The AFW pumps operate with a continuous recirculation to the CST.~~ All three AFW pumps take suction from a common nozzle in the CST. The PMST provides makeup to the CST. The limiting makeup path is via gravity feed to the CST. This makeup path does not allow the entire contents of the PMST to transfer to the CST before the CST is emptied by the AFW pumps.

When the main steam isolation valves are open, the preferred means of heat removal is to discharge steam to the condenser by the nonsafety grade path of the ~~steam~~ turbine bypass valve~~s~~. ~~The condensed steam is returned to the CST by the condensate transfer pump.~~ This has the advantage of conserving condensate while minimizing releases to the environment.

Because the CST is a principal component in removing residual heat from the ~~RCS~~ PCS, it is designed to withstand earthquakes ~~and other natural phenomena~~. The CST is designed to Seismic Category I requirements to ensure availability of the feedwater supply. The PMST is not designed to Seismic Category I requirements. Feedwater is also available from ~~an~~ alternate sources. The backup sources for condensate are the fire protection system (for the A/B AFW train) and the service water system (for the C AFW train). Each backup condensate supply is isolated from the AFW pump suction piping by 2 locked closed valves in series.

~~A description of the CST is found in the FSAR, Section [9.2.6], (Ref. 1).~~

BASES

~~APPLICABLE SAFETY ANALYSES~~

~~The CST provides cooling water to remove decay heat and to cool down the unit following all events in the accident analysis, discussed in the FSAR, Chapters [6] and [15], (Refs. 2 and 3, respectively). For anticipated operational occurrences and accidents which do not affect the OPERABILITY of the steam generators, the analysis assumption is generally [30] minutes at MODE 3, steaming through the MSSVs followed by a cooldown to shutdown cooling (SDC) entry conditions at the design cooldown rate.~~

~~The limiting event for the condensate volume is the large feedwater line break with a coincident loss of offsite power. Single failures that also affect this event include the following:~~

~~a. The failure of the diesel generator powering the motor driven AFW pump to the unaffected steam generator (requiring additional steam to drive the remaining AFW pump turbine); and~~

~~b. The failure of the steam driven AFW pump (requiring a longer time for cooldown using only one motor driven AFW pump).~~

~~These are not usually the limiting failures in terms of consequences for these events.~~

~~A nonlimiting event considered in CST inventory determinations is a break either in the main feedwater, or AFW line near where the two join. This break has the potential for dumping condensate until terminated by operator action, as the Emergency Feedwater Actuation System would not detect a difference in pressure between the steam generators for this break location. This loss of condensate inventory is partially compensated by the retaining of steam generator inventory.~~

~~The CST satisfies Criterion 3 of the NRC Policy Statement.~~

APPLICABLE SAFETY ANALYSES

The minimum total available condensate inventory stored in the CST and PMST was initially the quantity necessary for 8 hours of decay heat removal. This volume was later used in other plant safety analyses (SGTR, Long Term Cooling, etc.) and has become the licensing basis for the plant. This was confirmed during the Systematic Evaluation Program at Palisades, (Refs. 1 and 2).

If the minimum total available condensate inventory is exhausted or unavailable, the AFW pumps can be supplied with lake water via the fire protection system or the service water system.

BASES

LCO

To satisfy accident analysis assumptions, the CST and PMST must contain sufficient cooling water to remove decay heat for ~~[30 minutes]~~ 4 hours following a reactor trip from 102% RTP, and then cool down the ~~R~~PCS to SDC entry conditions, assuming a coincident loss of offsite power and the most adverse single failure. In doing this ~~it~~ the tanks must retain sufficient water to ensure adequate net positive suction head for the AFW pumps during the cooldown, ~~as well as to~~ ensure that unacceptable vortexing and air entrainment do not occur, and account for any losses from the steam driven AFW pump turbine~~, or before isolating AFW to a broken line~~.

The CST and PMST ~~level~~ total available condensate inventory required is a usable volume of ~~<~~≥ ~~[350,000~~ 100,000~~]~~ gallons, which is based on holding the ~~unit~~ plant in MODE 3 for ~~[~~4~~]~~ hours, followed by a cooldown to SDC entry conditions at ~~75~~100°F per hour. This basis ~~i~~ was established by the ~~NRC Standard Review Plan Branch Technical Position, Reactor Systems Branch 5-1, (Ref. 4) and exceeds the volume required by the accident analysis~~ Systematic Evaluation Program at Palisades, (Refs. 1 and 2).

OPERABILITY of the CST and PMST is determined by maintaining the ~~tank level~~ total available condensate inventory at or above the minimum required ~~level~~ volume.

APPLICABILITY

In MODES 1, 2, and 3, ~~[~~and in MODE 4, when steam generator is being relied upon for heat removal,~~]~~ the CST and PMST is required to be OPERABLE.

In MODES 5 and 6, the CST and PMST is not required because the AFW System is not required.

ACTIONS

A.1 ~~and A.2~~

If the ~~CST level~~ available condensate inventory is ~~not within the limit~~ less than required, the ~~OPERABILITY of the backup water supply~~ CST and PMST must be ~~verified by administrative means~~ restored to OPERABLE status within 4 hours.

~~OPERABILITY of the backup feedwater supply must include verification of the OPERABILITY of flow paths from the backup supply to the AFW pumps, and availability of the required volume of water in the backup supply. The CST level must be returned to OPERABLE status within 7 days, as the backup supply may be performing this function in addition to its normal functions. The 4 hour Completion Time is reasonable, based on operating experience, to verify the OPERABILITY of the backup water supply. The 7 day Completion Time is reasonable, based on an OPERABLE backup water supply being available, and the low probability of an event requiring the use of the water from the CST occurring during this period.~~

Rapid restoration of the CST and PMST is required due to the importance of the AFW system at Palisades. The existence of several replenishment options supports the 4 hour Completion Time.

B.1, ~~and~~ B.2 and B.3

If one of the backup condensate supplies is inoperable, the OPERABILITY of the other backup condensate supply must be verified by administrative means within 4 hours. The OPERABILITY of the AFW train served by the other backup condensate supply must be verified by administrative means within 4 hours. OPERABILITY of the backup condensate supply must include verification of the OPERABILITY of the flow path from the backup water supply (fire protection system or service water system) to the AFW pumps and the OPERABILITY of the backup water supply itself. Based on operating experience, the 4 hour Completion Time is reasonable.

OPERABILITY of the AFW train served by the other backup condensate supply is per LCO 3.7.45 "Auxiliary Feedwater (AFW) System." The 4 hour Completion Time for this Action is also based on operating experience.

The inoperable backup condensate supply must be returned to OPERABLE status within 7 days. This Completion Time is reasonable based on the existence of the minimum total available condensate inventory, the OPERABLE status of the other backup condensate supply, and the low probability of an event requiring the use of water from the inoperable backup condensate supply during the 7 day period.

C.1 and C.2

If the ~~CST~~ available condensate inventory or the inoperable backup condensate supply cannot be restored to OPERABLE status within the associated Completion Time, the ~~unit~~ plant must be placed in a MODE in which the LCO does not apply. To achieve this status, the ~~unit~~ plant must be placed in at least MODE 3 within 6 hours, and in MODE 4, without reliance on steam generator for heat removal, within ~~[18]~~ 30 hours. The allowed Completion Times are reasonable, based on operating experience, to reach the required ~~unit~~ plant conditions from full power conditions in an orderly manner and without challenging ~~unit~~ plant systems.

SURVEILLANCE REQUIREMENTS

SR 3.7.6.1

This SR verifies that the CST and PMST contains the required volume of cooling water. (This ~~level~~ volume ≥ ~~[350,000~~ 100,000~~]~~ gallons.) The 12 hour Frequency is based on operating experience, and the need for operator awareness of ~~unit~~ plant evolutions that may affect the CST inventory between checks. The 12 hour Frequency is considered adequate in view of other indications in the control room, including alarms, to alert the operator to abnormal CST level deviations.

REFERENCES

1. ~~FSAR, Section [9.2.6].~~ NUREG-0820

2. ~~FSAR, Chapter [6].~~ NRC letter of 10/27/81

~~3. FSAR, Chapter [15]~~

~~4. NRC Standard Review Plan Branch Technical Position (BTP) RSB 5-1~~

B 3.7 **PLANT SYSTEMS**

B 3.7.7 Component Cooling Water (CCW) System

BASES

BACKGROUND

The CCW System provides a heat sink for the removal of process and operating heat from safety related components during a Design Basis Accident (DBA) or transient. During normal operation, the CCW System also provides this function for various nonessential components, as well as the spent fuel pool. The CCW System serves as a barrier to the release of radioactive byproducts between potentially radioactive systems and the Service Water System, and thus to the environment.

~~The CCW System is arranged as two independent full capacity cooling loops, and has isolatable nonsafety related components. Each safety related train includes a full capacity pump, surge tank, heat exchanger, piping, valves, and instrumentation. Each safety related train is powered from a separate bus. An open surge tank in the system provides pump trip protective functions to ensure sufficient net positive suction head is available. The pump in each train is automatically started on receipt of a safety injection actuation signal, and all nonessential components are isolated.~~

The CCW system consists of three pumps connected in parallel to common suction and discharge headers. The discharge header splits into two parallel heat exchangers then combines again into a common distribution header to various heat loads. Nonsafety related loads are isolatable. A train of CCW shall be that equipment electrically connected to a common safety bus necessary to remove heat to the SWS system. The CCW train associated with the Left Safeguards Electrical Distribution Train (described in Table B 3.8.9-1) consists of CCW Pumps P-52A and P-52C, both CCW Heat Exchangers (E-54A, E-54B), the CCW Surge Tank T-3 and appropriate piping valves and controls for the equipment to perform its function. The CCW train associated with the Right Safeguards Electrical Distribution Train (described in Table B 3.8.9-1) consists of P-52B, both CCWHXs (E-54A, E-54B), the CCW Surge Tank T-3 and appropriate piping, valves, and controls for the equipment to perform its function.

BASES

Additional information on the design and operation of the system, along with a list of the components served, is presented in the FSAR, Section [~~9.2.2~~ 9.3~~]~~, Reference 1. The principal safety related function of the CCW System is the ~~removal~~ transfer of decay heat from the ~~reactor~~ primary system via the Shutdown Cooling (SDC) System heat exchanger. This may utilize the SDC ~~SCS~~ heat exchanger, during a normal or post accident cooldown and shutdown, or the Containment Spray System during the recirculation phase following a ~~l~~Loss ~~o~~Of ~~c~~Coolant ~~a~~Accident (LOCA).

APPLICABLE SAFETY ANALYSES

The design basis of the CCW System is for one CCW train in conjunction with a 100% capacity Containment Cooling System (containment spray, containment coolers, or a combination) removing core decay heat following RAS ~~20 minutes~~ after a design basis LOCA. This prevents the containment sump fluid from increasing in temperature during the recirculation phase following a LOCA, and provides a gradual reduction in the temperature of this fluid as it is supplied to the ~~Reactor~~ Primary Coolant System (~~RCS~~ PCS) by the safety injection pumps.

The CCW System is designed to perform its function with a single failure of any active component, ~~assuming~~ coincident with a loss of offsite power.

The CCW System also functions to cool the ~~unit~~ plant from SDC entry conditions ($T_{\cancel{cold}\ ave}$ < ~~[350~~ 300~~]~~°F) to MODE 5 ($T_{\cancel{cold}\ ave}$ < ~~[~~200~~]~~°F) during normal and post accident operations. The time required to cool from ~~[350~~ 300~~]~~°F to ~~[~~200~~]~~°F is a function of the number of CCW and SDC trains operating as well as Lake Michigan temperature. One CCW train is sufficient to remove decay heat during subsequent operations with $T_{\cancel{cold}\ ave}$ < ~~[~~200~~]~~°F. This assumes that a maximum ~~seawater~~ Lake Michigan temperature of ~~76~~ 81.5°F occurs simultaneously with the maximum heat loads on the system.

~~The CCW System satisfies Criterion 3 of the NRC Policy Statement.~~

LCO

The CCW trains are independent of each other to the degree that each has separate controls and power supplies and the operation of one does not depend on the other. In the event of a DBA, one CCW train is required to provide the minimum heat removal capability assumed in the safety analysis for the systems to which it supplies cooling water. To ensure this requirement is met, two CCW trains must be OPERABLE. At least one CCW train will operate assuming the worst single active failure occurs coincident with the loss of offsite power.

BASES

NOTE: Inoperabiltiy of either CCW Heat Exchanger (E-54A or E-54B) affects operability of both CCW trains discussed below.

The CCW train associated with the Left Safeguards Electrical Distribution Train ~~A CCW train~~ is considered OPERABLE when the following:

a. CCW Pumps P-52A and P-52C are Operable; and

b~~a~~. The ~~associated pump and~~ surge tank ~~T-3 are~~ is OPERABLE; and

c. Both Component Cooling Water Heat Exchangers E-54A and E-54B are OPERABLE; and

d~~b~~. The associated piping, valves, ~~heat exchanger~~ and instrumentation and controls required to perform the safety related function are OPERABLE.

The CCW train associated with the Right Safeguards Electrical Distribution Train is considered OPERABLE when the following:

a. CCW Pump P-52B is Operable; and

b. The CCW surge tank T-3 is OPERABLE; and

c. Both Component Cooling Water Heat Exchangers E-54A and E-54B are OPERABLE; and

d. The associated piping, valves, and instrumentation and controls required to perform the safety related function are OPERABLE.

The isolation of CCW from other components or systems not required for safety may render those components or systems inoperable, but does not affect the OPERABILITY of the CCW System.

APPLICABILITY

In MODES 1, 2, 3, and 4, the CCW System is a normally operating system that must be prepared to perform its post accident safety functions, primarily RCS heat removal by cooling the SDC heat exchanger.

In MODES 5 and 6, the OPERABILITY requirements of the CCW System are determined by the systems it supports.

BASES

ACTIONS

A.1

~~Required Action A.1 is modified by a Note indicating the requirement of entry into the applicable Conditions and Required Actions of LCO 3.4.6, "RCS Loops - MODE 4," for SDC made inoperable by CCW. This is an exception to LCO 3.0.6 and ensures the proper actions are taken for these components.~~

With one CCW train inoperable, action must be taken to restore OPERABLE status within 72 hours. In this Condition, the remaining OPERABLE CCW train is adequate to perform the heat removal function. The 72 hour Completion Time is based on the redundant capabilities afforded by the OPERABLE train, and the low probability of a DBA occurring during this period.

B.1 and B.2

If the CCW train cannot be restored to OPERABLE status within the associated Completion Time, the ~~unit~~ plant must be placed in the mode which represents the least risk. In the case of the loss of a CCW train, this would be MODE 4 which provides the combination of lowest PCS energy and most available heat removal paths. Going on to MODE 5 would result in the only heat removal paths being CCW with one of those trains already degraded. ~~a MODE in which the LCO does not apply.~~ To achieve this status, the ~~unit~~ plant must be placed in at least MODE 3 within 6 hours and in MODE ~~5~~ 4 within ~~36~~ 30 hours.

The allowed Completion Times are reasonable, based on operating experience, to reach the required ~~unit~~ plant conditions from full power conditions in an orderly manner and without challenging ~~unit~~ plant systems.

SURVEILLANCE REQUIREMENTS

SR 3.7.7.1

Verifying the correct alignment for manual, power operated, and automatic valves in the CCW flow path provides assurance that the proper flow paths exist for CCW operation. This SR does not apply to valves that are locked, sealed, or otherwise secured in position, since these valves are verified to be in the correct position prior to locking, sealing, or securing. This SR also does not apply to valves that cannot be inadvertently misaligned, such as check valves. This Surveillance requirement applies only to valves which are located outside the Containment building and not in High Radiation areas. This Surveillance does not require any testing or valve manipulation; rather, it involves verification that those valves capable of potentially being mispositioned are in their correct position.

This SR is modified by a Note indicating that the isolation of the CCW components or systems may render those components inoperable but does not affect the OPERABILITY of the CCW System.

The 31 day Frequency is based on engineering judgment~~,~~ and is consistent with the procedural controls governing valve operation~~, and ensures correct valve positions~~.

SR 3.7.7.2

Verifying the correct alignment for manual, power operated, and automatic valves in the CCW flow path provides assurance that the proper flow paths exist for CCW operation. This SR does not apply to valves that are locked, sealed, or otherwise secured in position, since these valves are verified to be in the correct position prior to locking, sealing, or securing. This SR also does not apply to valves that cannot be inadvertently misaligned, such as check valves. This Surveillance requirement applies only to valves which are located inside the Containment building or in High Radiation areas. This Surveillance does not require any testing or valve manipulation; rather, it involves verification that those valves capable of potentially being mispositioned are in their correct position.

This SR is modified by a Note indicating that the isolation of the CCW components or systems may render those components inoperable but does not affect the OPERABILITY of the CCW System.

The 92 day or MODE change Frequency is based on engineering judgment and is consistent with the procedural controls governing valve operation.

SR 3.7.7.~~2~~ 3

This SR verifies proper automatic operation of the CCW valves on an actual or simulated ~~actuation~~ Safety Injection signal. Operation of valves resulting from other actuation signals are specified in other SRs. The CCW System is a normally operating system that cannot be fully actuated as part of routine testing during normal operation. This Surveillance is not required for valves that are locked, sealed, or otherwise secured in the required position under administrative controls. The ~~[~~18~~]~~ month Frequency is based on the need to perform this Surveillance under the conditions that apply during a ~~unit~~ plant outage and the potential for an unplanned transient if the Surveillance were performed with the reactor at power. Operating experience has shown that these components usually pass the Surveillance when performed at the ~~[~~18~~]~~ month Frequency. Therefore, the Frequency is acceptable from a reliability standpoint.

BASES

SR 3.7.7.~~3~~ 4

This SR verifies proper automatic operation of the CCW pumps on an actual or simulated ~~actuation~~ Safety Injection signal. The CCW System is a normally operating system that cannot be fully actuated as part of routine testing during normal operation. The ~~[~~18~~]~~ month Frequency is based on the need to perform this Surveillance under the conditions that apply during a ~~unit~~ plant outage and the potential for an unplanned transient if the Surveillance were performed with the reactor at power. Operating experience has shown these components usually pass the Surveillance when performed at the ~~[~~18~~]~~ month Frequency. Therefore, the Frequency is acceptable from a reliability standpoint.

REFERENCES 1. FSAR, Section ~~[9.2.2~~ 9.3~~]~~

B 3.7 **PLANT SYSTEMS**

B 3.7.8 Service Water System (SWS)

BASES

BACKGROUND

The SWS provides a heat sink for the removal of process and operating heat from safety related components during a Design Basis Accident (DBA) or transient. During normal operation or a normal shutdown, the SWS also provides this function for various safety related and nonsafety related components. The safety related function is covered by this LCO.

~~The SWS consists of two separate, 100% capacity safety related cooling water trains. Each train consists of two 100% capacity pumps, one component cooling water (CCW) heat exchanger, piping, valves, instrumentation, and two cyclone separators. The pumps and valves are remote manually aligned, except in the unlikely event of a loss of coolant accident (LOCA). The pumps aligned to the critical loops are automatically started upon receipt of a safety injection actuation signal and all essential valves are aligned to their post accident positions. The SWS also provides emergency makeup to the spent fuel pool and CCW System [and is the backup water supply to the Auxiliary Feedwater System].~~

The SWS consists of three pumps connected in parallel taking suction from a common intake structure supplied from Lake Michigan. The discharge of the pumps go into a common header before splitting into two critical headers for safety-related equipment and a single non-critical header for non safety-related equipment. A SWS train will vary in actual component configuration but it shall always be powered by a common Safeguards Electrical Train and be capable of accomplishing the objective of transferring heat from the SWS connected heat loads to Lake Michigan as the ultimate heat sink.

Additional information about the design and operation of the SWS, along with a list of the components served, is presented in the FSAR, Section ~~[~~9.~~2.~~1~~]~~, (Ref. 1). The principal safety related function of the SWS is the removal of decay heat from the reactor via the ~~[~~CCW ~~System~~ and Containment Cooling Systems~~]~~.

BASES

APPLICABLE SAFETY ANALYSES

The design basis of the SWS is for one SWS train, in conjunction with the CCW System and a 100% capacity containment cooling system (containment spray, containment coolers, or a combination), removing core decay heat following RAS after ~~20 minutes following~~ a design basis LOCA.~~, as discussed in the FSAR, Section [6.2], (Ref. 2)~~. This prevents the containment sump fluid from increasing in temperature during the recirculation phase following a LOCA and provides for a gradual reduction in the temperature of this fluid as it is supplied to the ~~Reactor~~Primary Coolant System by the safety injection pumps. The SWS is designed to perform its function with a single failure of any active component, assuming the loss of offsite power. The SWS, in conjunction with the CCW System, also cools the ~~unit~~ plant from ~~s~~Shutdown ~~c~~Cooling (SDC)~~, as discussed in the FSAR, Section [5.4.7] , (Ref. 3)~~ entry conditions to MODE 5 during normal and post accident operations. The time required for this evolution is a function of the number of CCW and SDC System trains that are operating as well as the temperature of Lake Michigan. One SWS train is sufficient to remove decay heat during subsequent operations in MODES 5 and 6. This assumes that a maximum Lake Michigan temperature of 81.5 ~~SWS temperature of 95~~°F occurring simultaneously with maximum heat loads on the system.

~~The SWS satisfies Criterion 3 of the NRC Policy Statement.~~

LCO

Two SWS trains are required to be OPERABLE to provide the required redundancy to ensure that the system functions to remove post accident heat loads, assuming the worst single active failure occurs coincident with the loss of offsite power.

The ~~An~~ SWS train associated with the Left Safeguards Electrical Distribution Train (described in table B 3.8.9-1) is considered OPERABLE when:

a. Service Water Pump P-7B ~~The associated pump~~ is OPERABLE; and

b. The associated piping, valves, instrumentation, ~~heat exchanger,~~ and instrumentation and controls required to perform the safety related function are OPERABLE.

The SWS train associated with the Right Safeguards Electrical Distribution Train (described in table B 3.8.9-1) is considered OPERABLE when:

a. Service Water Pumps P-7A and P-7C are OPERABLE; and

b. The associated piping, valves, and instrumentation and controls required to perform the safety related function are

OPERABLE.

The isolation of SWS from other components or systems not required for safety may render those components or systems inoperable, but does not affect the operability of the SWS System.

APPLICABILITY

In MODES 1, 2, 3, and 4, the SWS System is a normally operating system, which is required to support the OPERABILITY of the equipment serviced by the SWS and required to be OPERABLE in these MODES.

In MODES 5 and 6, the OPERABILITY requirements of the SWS are determined by the systems it supports.

ACTIONS

A.1

With one ~~SSW~~ SW train inoperable, action must be taken to restore OPERABLE status within 72 hours. In this Condition, the remaining OPERABLE SWS train is adequate to perform the heat removal function. However, the overall reliability is reduced because a single failure in the SWS train could result in loss of SWS function. ~~Required Action A.1 is modified by two Notes. The first Note indicates that the applicable Conditions of LCO 3.8.1, "AC Sources - Operating," should be entered if the inoperable SWS train results in an inoperable emergency diesel generator. The second Note indicates that the applicable Conditions and Required Actions of LCO 3.4.6, "RCS Loops - MODE 4," should be entered if an inoperable SWS train results in an inoperable SDC.~~ The 72 hour Completion Time is based on the redundant capabilities afforded by the OPERABLE train, and the low probability of a DBA occurring during this time period.

B.1 and B.2

If the SWS train cannot be restored to OPERABLE status within the associated Completion Time, the ~~unit~~ plant must be placed in the MODE which represents the least risk. In the case of the loss of a SWS train, This would be MODE 4 which provides the combination of lowest PCS energy and the most available heat removal paths. ~~a MODE in which the LCO does not apply.~~ To achieve this status, the ~~unit~~ plant must be placed in at least MODE 3 within 6 hours, and in MODE 4 within ~~[12~~ 30~~]~~ hours. ~~, and in MODE 5 within 36 hours.~~

The allowed Completion Times are reasonable, based on operating experience, to reach the required ~~unit~~ plant conditions from full power conditions in an orderly manner and without challenging ~~unit~~ plant systems.

SURVEILLANCE REQUIREMENTS

SR 3.7.8.1

Verifying the correct alignment for manual, power operated, and automatic valves in the SWS flow path ensures that the proper flow paths exist for SWS operation. This SR applies only to valves which are located outside the containment building and not in high radiation areas. This SR does not apply to valves that are locked, sealed, or otherwise secured in position, since they are verified to be in the correct position prior to locking, sealing, or securing. This SR also does not apply to valves that cannot be inadvertently misaligned, such as check valves. This Surveillance does not require any testing or valve manipulation; rather, it involves verification that those valves capable of potentially being mispositioned are in the correct position. This SR is modified by a Note indicating that the isolation of the SWS components or systems may render those components inoperable but does not affect the OPERABILITY of the SWS.

The 31 day Frequency is based on engineering judgment~~,~~ and is consistent with the procedural controls governing valve operation~~, and ensures correct valve positions~~.

SR 3.7.8.2

Verifying the correct alignment for manual, power operated, and automatic valves in the SWS flow path ensures that the proper flow paths exist for SWS operation. This SR applies only to valves which are located inside the containment building or in high radiation areas. This SR does not apply to valves that are locked, sealed, or otherwise secured in position, since they are verified to be in the correct position prior to locking, sealing, or securing. This SR also does not apply to valves that cannot be inadvertently misaligned, such as check valves. This Surveillance does not require any testing or valve manipulation; rather, it involves verification that those valves capable of potentially being mispositioned are in the correct position. This SR is modified by a Note indicating that the isolation of the SWS components or systems may render those components inoperable but does not affect the OPERABILITY of the SWS.

The 92 day or MODE change Frequency is based on engineering judgment, the principles of ALARA and is consistent with the procedural controls governing valve operation.

SR 3.7.8.3~~2~~

This SR verifies proper automatic operation of the SWS valves on an actual or simulated safety injection ~~actuation~~ signal. The SWS is a normally operating system that cannot be fully actuated as part of the normal testing. This Surveillance is not required for valves that are locked, sealed, or otherwise secured in the required position under administrative controls. The [18] month Frequency is based on the need to perform this Surveillance under the conditions that apply during a ~~unit~~ plant outage and the potential for an unplanned transient if the Surveillance were performed with the reactor at power. Operating experience has shown that these components usually pass the Surveillance when performed at the [18] month Frequency. Therefore, the Frequency is acceptable from a reliability standpoint.

SR 3.7.8.4

This SR verifies proper automatic operation of the SWS valves on an actual or simulated RAS signal. The SWS is a normally operating system that cannot be fully actuated as part of the normal testing. This Surveillance is not required for valves that are locked, sealed, or otherwise secured in the required position under administrative controls. The 18 month Frequency is based on the need to perform this Surveillance under the conditions that apply during a unit outage and the potential for an unplanned transient if the Surveillance were performed with the reactor at power. Operating experience has shown that these components usually pass the Surveillance when performed at the [18] month Frequency. Therefore, the Frequency is acceptable from a reliability standpoint.

SR 3.7.8.5~~3~~

The SR verifies proper automatic operation of the SWS pumps on an actual or simulated actuation signal. The SWS is a normally operating system that cannot be fully actuated as part of the normal testing during normal operation. The [18] month Frequency is based on the need to perform this Surveillance under the conditions that apply during a ~~unit~~ plant outage and the potential for an unplanned transient if the Surveillance were performed with the reactor at power. Operating experience has shown that these components usually pass the Surveillance when performed at the [18] month Frequency. Therefore, the Frequency is acceptable from a reliability standpoint.

BASES

REFERENCE

1. FSAR, Section ~~[~~9.~~2.~~1~~]~~

~~2. FSAR, Section [6.2]~~

~~3. FSAR, Section [5.4.7]~~

B 3.7 **PLANT SYSTEMS**

B 3.7.9 Ultimate Heat Sink (UHS)

BASES

BACKGROUND

The UHS provides a heat sink for process and operating heat from safety related components during a Design Basis Accident (DBA) or transient, as well as during normal operation. This is done utilizing the Service Water System.

The UHS for the Palisades Plant is Lake Michigan. ~~has been defined as that complex of water sources, including necessary retaining structures (e.g., a pond with its dam, or a river with its dam), and the canals or conduits connecting the sources with, but not including, the cooling water system intake structures as, discussed in the FSAR, Section [9.2.5] (Ref. 1). If cooling towers or portions thereof are required to accomplish the UHS safety functions, they should meet the same requirements as the sink.~~ The two principal functions of the UHS are the dissipation of residual heat after reactor shutdown, and dissipation of residual heat after an accident.

~~A variety of complexes is used to meet the requirements for a UHS. A lake or an ocean may qualify as a single source. If the complex includes a water source contained by a structure, it is likely that a second source will be required.~~

The basic performance requirements are that lake level be above that assumed for support of Safety Analyses, ~~a 30 day supply of water be available~~ and that the design basis temperatures of safety related equipment not be exceeded. ~~Basins of cooling towers generally include less than a 30 day supply of water, typically 7 days or less. A 30 day supply would be dependent on another source(s) and a makeup system(s) for replenishing the source in the cooling tower basin. For smaller basin sources, which may be as small as a 1 day supply, the systems for replenishing the basin and the backup source(s) become of sufficient importance that the makeup system itself may be required to meet the same design criteria as an Engineered Safety Feature (e.g., single failure considerations, and multiple makeup water sources may be required).~~

~~It follows that the many variations in the UHS configurations will result in many unit to unit variations in OPERABILITY determinations and SRs. The ACTIONS and SRs are illustrative of a cooling tower UHS without a makeup requirement.~~

BASES

Additional information on the design and operation of the system along with a list of components served can be found in References 1, 3 and 4.

APPLICABLE SAFETY ANALYSES

The UHS is the sink for heat removed from the reactor core following all accidents and anticipated operational occurrences in which the ~~unit~~ plant is cooled down and placed on shutdown cooling. ~~For those units using it as the normal heat sink for condenser cooling via the Circulating Water System, unit operation at full power is its maximum heat load. Its~~ The maximum post accident heat load occurs approximately 20 minutes after a design basis ~~l~~Loss ~~o~~Of ~~c~~Coolant ~~a~~Accident (LOCA)~~. Near this time,~~ when the ~~unit~~ plant switches from injection to recirculation, and the containment cooling systems are required to remove the core decay heat.

The operating limits are based on conservative heat transfer analyses for the worst case LOCA. References 1, 3, and 4 provide~~s~~ the details of the assumptions used in the analysis. The assumptions include: worst expected meteorological conditions, conservative uncertainties when calculating decay heat, and the worst case failure (e.g., single failure of a manmade structure). The UHS is designed in accordance with Regulatory Guide 1.27 (Ref. 2), which requires a 30 day supply of cooling water in the UHS.

~~The UHS satisfies Criterion 3 of the NRC Policy Statement.~~

LCO

The UHS is required to be OPERABLE. The UHS is considered OPERABLE if ~~it contains a sufficient volume of water~~ the water level is sufficiently high and is at or below the maximum temperature that would allow the SWS to operate ~~for at least 30 days following the design basis LOCA~~ without the loss of ~~n~~Net ~~p~~Positive ~~s~~Suction ~~h~~Head (NPSH), and without exceeding the maximum ~~design~~ allowed temperature of the equipment served by the SWS. To meet this condition, the UHS temperature should not exceed ~~[90~~81.5~~]~~°F, (Ref. 3) and the level should not fall below ~~[562~~ 576.9 ft mean sea level], (Refs. 3 and 4) during normal ~~unit~~ plant operation.

APPLICABILITY

In MODES 1, 2, 3, and 4, the UHS is a normally operating system that is required to support the OPERABILITY of the equipment serviced by the UHS and required to be OPERABLE in these MODES.

BASES

In MODES 5 and 6, the OPERABILITY requirements of the UHS are determined by the systems it supports.

ACTIONS

~~A.1~~

~~If one or more cooling towers have one fan inoperable (i.e., up to one fan per cooling tower inoperable), action must be taken to restored the inoperable cooling tower fan(s) to OPERABLE status within 7 days.~~

~~The 7 day Completion Time is reasonable, based on the low probability of an accident occurring during the 7 days that one cooling tower fan is inoperable, the number of available systems, and the time required to complete the action.~~

~~B~~A.1 and ~~B~~A.2

If ~~[the cooling tower fan cannot be restored to OPERABLE status within the associated Completion Time, or if]~~ the UHS is inoperable ~~[for reasons other than Condition A]~~, the ~~unit~~ plant must be placed in a MODE in which the LCO does not apply. To achieve this status, the ~~unit~~ plant must be placed in at least MODE 3 within 6 hours and in MODE 5 within 36 hours. The allowed Completion Times are reasonable, based on operating experience, to reach the required ~~unit~~ plant conditions from full power conditions in an orderly manner and without challenging ~~unit~~ plant systems.

SURVEILLANCE REQUIREMENTS

SR 3.7.9.1

This SR verifies ~~adequate long term (30 days) cooling can be maintained~~ that lake level is above that assumed in safety analyses and their supporting analyses. The level specified also ensures sufficient NPSH is available for operating the SWS pumps. The ~~24 hour~~ 7 day Frequency is based ~~on operating experience related to the trending of the parameter variations during the applicable MODES.~~ the large area of the lake and the resultant very slow changes in lake level. This SR is not intended to detect sudden, temporary variations in lake level, such as a seiche. These temporaty lake level variations are infrequent and of short duration. This SR verifies that the UHS water level is ≥ ~~[562~~576.9~~]~~ ft [mean sea level] as measured in the Service Water Bay.

BASES

SR 3.7.9.2

This SR verifies that the UHS temperature will provide adequate heat removal capabilities during worst case accident conditions. ~~SWS is available to cool the CCW System to at least its maximum design temperature within the maximum accident or normal design heat loads for 30 days following a DBA~~. The 24 hour Frequency is based on operating experience related to the trending of the parameter variations during the applicable MODES. This SR verifies that the UHS water temperature is ≤ ~~[92~~81.5~~]~~°F as measured in the Service Water Intake.

~~SR 3.7.9.3~~

~~Operating each cooling tower fan for ≥ [15] minutes verifies that all fans are OPERABLE and that all associated controls are functioning properly. It also ensures that fan or motor failure, or excessive vibration can be detected for corrective action. The 31 day Frequency is based on operating experience, the known reliability of the fan units, the redundancy available, and the low probability of significant degradation of the UHS cooling tower fans occurring between surveillances.~~

REFERENCES

1. FSAR, Section ~~[~~9.1~~2.5]~~
2. Regulatory Guide 1.27
3. EA-D-PAL-93-272E-01, Rev 2
4. F-CG-90-090

B 3.7 **PLANT SYSTEMS**

B 3.7.10 Control Room Ventilation Filtration ~~Emergency Air Cleanup~~ System (~~CREACS~~ CRHVAC-Filtration)

BASES

BACKGROUND

The ~~CREACS~~ CRHVAC-Filtration provides a protected environment from which operators can control the ~~unit~~ plant following an uncontrolled release of radioactivity.~~[, chemicals, or toxic gas].~~

The ~~CREACS~~ CRHVAC-Filtration consists of two independent, redundant trains that recirculate and filter the control room air. Each train consists of a prefilter ~~and demister~~, a heater, a ~~h~~High ~~e~~Efficiency ~~p~~Particulate ~~a~~Air (HEPA) filter, ~~an~~ two banks of activated charcoal adsorbers ~~section~~ for removal of gaseous activity (principally iodine), a second HEPA Filter, and a fan. Ductwork, valves or dampers, and instrumentation also form part of the system~~, as do demisters that remove water droplets from the air stream~~. A second bank of HEPA filters follows the adsorber section to collect carbon fines, and to back up the main HEPA filter bank if it fails.

The ~~CREACS~~ CRHVAC-Filtration is an emergency system, part of which may also operate during normal ~~unit~~ plant operations in the standby mode of operation. Upon receipt of a Containment High Pressure or Containment High Radiation Signal ~~the actuating signal(s)~~, normal air supply to the control room is isolated, and the stream of ventilation air is recirculated through the filter trains of the system. The prefilters ~~and demisters~~ remove any large particles in the air.~~, and any entrained water droplets present to prevent excessive loading of the HEPA filters and charcoal adsorbers.~~ Continuous operation of each train for at least 10 hours per month with the heaters on reduces moisture buildup on the HEPA filters and adsorbers. ~~Both the demister and~~ The electric heater ~~are~~ is important to the effectiveness of the charcoal adsorbers.

~~Actuation of the CREACS CRHVAC-Filtration places the system into either of two separate states of the emergency mode of operation, depending on the initiation signal.~~ Actuation of the system ~~to the~~ emergency ~~radiation state of the emergency~~ mode of operation closes the normal unfiltered outside air intake and unfiltered exhaust dampers, opens the emergency air intake, and aligns the system for recirculation of control room air through the redundant trains of HEPA and charcoal filters. The emergency ~~radiation state~~ mode initiates pressurization and filtered ventilation of the air supply to the control room.

BASES

Outside air is filtered~~, [diluted with building air from the electrical equipment and cable spreading rooms,]~~ and then added to the air being recirculated from the control room. Pressurization of the control room prevents infiltration of unfiltered air from the surrounding areas of the building. ~~The actions taken in the toxic gas isolation state are the same, except that the signal switches control room ventilation to an isolation mode, preventing outside air from entering the control room.~~

~~The air entering the control room is continuously monitored by radiation and toxic gas detectors. One detector output above the setpoint will cause actuation of the emergency radiation state or toxic gas isolation state as required. The actions of the toxic gas isolation state are more restrictive, and will override the actions of the emergency radiation state.~~

A single train will pressurize the control room to ~~about~~ at least ~~[~~0.125~~]~~ inches water gauge relative to the south hallway outside the Control Room Viewing Gallery, and provides an air exchange rate in excess of 25% per hour. The ~~CREACS~~ CRHVAC-Filtration operation in maintaining the control room habitable is discussed in the FSAR, Section ~~[~~9.8~~4]~~, (Ref. 1).

Redundant supply and recirculation trains provide the required filtration should an excessive pressure drop develop across the other filter train. Normally open isolation dampers are arranged in series pairs so that the failure of one damper to shut will not result in a breach of isolation. The ~~CREACS~~ CRHVAC-Filtration is designed in accordance with Seismic Category I requirements.

The ~~CREACS~~ CRHVAC-Filtration is designed to maintain the control room environment for 30 days of continuous occupancy after a Design Basis Accident (DBA) without exceeding a 5 rem whole body dose or its equivalent to any part of the body.

APPLICABLE SAFETY ANALYSES

The ~~CREACS~~ CRHVAC-Filtration components are arranged in redundant safety related ventilation trains. The location of components and ducting within the control room envelope ensures an adequate supply of filtered air to all areas requiring access.

The ~~CREACS~~ CRHVAC-Filtration provides airborne radiological protection for the control room operators, as demonstrated by the control room accident dose analyses for the most limiting design basis loss of coolant accident fission product release presented in the FSAR, Chapter ~~[15]~~14.24, (Ref. 2).

BASES

~~The analysis of toxic gas releases demonstrates that the toxicity limits are not exceeded in the control room following a toxic chemical release, as presented in Reference 1.~~

The worst case single active failure of a component of the ~~CREACS~~ CRHVAC-Filtration, assuming a loss of offsite power, does not impair the ability of the system to perform its design function.

~~The CREACS satisfies Criterion 3 of the NRC Policy Statement.~~

LCO

Two independent and redundant trains of the ~~CREACS~~ CRHVAC-Filtration are required to be OPERABLE to ensure that at least one is available, assuming that a single failure disables the other train. Total system failure could result in a control room operator receiving a dose in excess of 5 rem in the event of a large radioactive release.

The ~~CREACS~~ CRHVAC-Filtration is considered OPERABLE when the individual components necessary to control operator exposure are OPERABLE in both trains. A ~~CREACS~~ CRHVAC-Filtration train is considered OPERABLE when the associated:

a. Main Recirculation Fan and Emergency Filter Fan are ~~is~~ OPERABLE;

b. HEPA filters and charcoal adsorber are not excessively restricting flow, and are capable of performing their filtration functions; and

c. Heater, ~~demister,~~ ductwork, valves, and dampers are OPERABLE, and air circulation can be maintained.

In addition, the control room boundary must be maintained, including the integrity of the walls, floors, ceilings, ductwork, and access doors.

APPLICABILITY

In MODES 1, 2, 3, and 4, the ~~CREACS~~ CRHVAC-Filtration must be OPERABLE to limit operator exposure during and following a DBA.

~~In MODES [5 and 6], the CREACS is required to cope with the release from a rupture of an outside waste gas tank.~~

BASES

During movement of irradiated fuel assemblies, movement of fuel storage casks in or over the SFP, ~~[~~and CORE ALTERATIONS~~]~~, the ~~CREACS~~ CRHVAC-Filtration must be OPERABLE to cope with the release from a fuel handling accident.

ACTIONS

A.1

With one ~~CREACS~~ CRHVAC-Filtration train inoperable, action must be taken to restore OPERABLE status within 7 days. In this Condition, the remaining OPERABLE ~~CREACS~~ CRHVAC-Filtration subsystem is adequate to perform control room radiation protection function. However, the overall reliability is reduced because a single failure in the OPERABLE ~~CREACS~~ CRHVAC-Filtration train could result in loss of ~~CREACS~~ CRHVAC-Filtration function. The 7 day Completion Time is based on the low probability of a DBA occurring during this time period, and the ability of the remaining train to provide the required capability.

B.1 and B.2

If the inoperable ~~CREACS~~ CRHVAC-Filtration cannot be restored to OPERABLE status within the required Completion Time in MODE 1, 2, 3, or 4, the ~~unit~~ plant must be placed in a MODE that minimizes the accident risk. To achieve this status, the ~~unit~~ plant must be placed in at least MODE 3 within 6 hours, and in MODE 5 within 36 hours. The allowed Completion Times are reasonable, based on operating experience, to reach the required ~~unit~~ plant conditions from full power conditions in an orderly manner and without challenging ~~unit~~ plant systems.

C.1, C.2.1, ~~and~~ C.2.2 and C.2.3

~~Required Action C.1 is modified by a Note indicating to place the system in the emergency radiation protection mode if the automatic transfer to emergency mode is inoperable.~~

In MODE 5 or 6, or during movement of irradiated fuel assemblies ~~[~~, or during CORE ALTERATIONS~~]~~, or during movement of spent fuel storage casks in or over the SFP if Required Action A.1 cannot be completed within the required Completion Time, the OPERABLE ~~CREACS~~ CRHVAC-Filtration train must be immediately placed in the emergency mode of operation. This action ensures that the remaining train is OPERABLE, that no failures preventing automatic actuation will occur, and that any active failure will be readily detected.

BASES

An alternative to Required Action C.1 is to immediately suspend activities that could result in a release of radioactivity that might require isolation of the control room. This places the ~~unit~~ plant in a condition that minimizes the accident risk. This does not preclude the movement of fuel assemblies to a safe position.

D.1 and D.2

When ~~[in MODES 5 and 6, or]~~ during movement of irradiated fuel assemblies ~~[, or during CORE ALTERATIONS]~~, or during movement of fuel storage casks in or over the SFP with two ~~CREACS~~ CRHVAC-Filtration trains inoperable, action must be taken immediately to suspend activities that could result in a release of radioactivity that might enter the control room. This places the ~~unit~~ plant in a condition that minimizes the accident risk. This does not preclude the movement of fuel to a safe position.

E.1

If both ~~CREACS~~ CRHVAC-Filtration trains are inoperable in MODE 1, 2, 3, or 4, the ~~CREACS~~ CRHVAC-Filtration may not be capable of performing the intended function and the ~~unit~~ plant is in a condition outside the accident analyses. Therefore, LCO 3.0.3 must be entered immediately.

SURVEILLANCE REQUIREMENTS

SR 3.7.10.1

Standby systems should be checked periodically to ensure that they function properly. Since the environment and normal operating conditions on this system are not severe, testing each train once every month provides an adequate check on this system.

Monthly heater operations dry out any moisture accumulated in the charcoal from humidity in the ambient air. ~~[Systems with heaters must be operated for ≥ 10 continuous hours with the heaters energized. Systems without heaters need only be operated for ≥ 15 minutes to demonstrate the function of the system.]~~ The 31 day Frequency is based on the known reliability of the equipment, and the two train redundancy available.

SR 3.7.10.2

This SR verifies that the required ~~CREACS~~ CRHVAC-Filtration testing is performed in accordance with the [Ventilation Filter Testing Program (VFTP)]. ~~The CREACS filter tests are in accordance with Regulatory Guide 1.52, (Ref. 3).~~ The [VFTP] includes testing HEPA filter performance, charcoal adsorber efficiency, minimum system flow rate, and the physical properties of the activated charcoal (general use and following specific operations). Specific test frequencies and additional information are discussed in detail in the [VFTP].

SR 3.7.10.3

This SR verifies each ~~CREACS~~ CRHVAC-Filtration train starts and operates on an actual or simulated Containment High Pressure actuation signal. The Frequency of [18] months is consistent with that specified in Reference 3.

SR 3.7.10.4

This SR verifies each CRHVAC-Filtration train starts and operates on an actual or simulated Containment High Radiation actuation signal. The Frequency of 18 months is consistent with that specified in Reference 3.

SR 3.7.10.54

This SR verifies the integrity of the control room enclosure and the assumed inleakage rates of potentially contaminated air. The control room positive pressure, with respect to potentially contaminated adjacent areas, is periodically tested to verify proper function of the ~~CREACS~~ CRHVAC-Filtration. During the emergency ~~radiation state of the emergency~~ mode of operation, the ~~CREACS~~ CRHVAC-Filtration is designed to pressurize the control room ≥ [0.125] inches water gauge positive pressure with respect to the south hallway outside the viewing gallery ~~adjacent areas in~~ order to prevent unfiltered inleakage. The ~~CREACS~~ CRHVAC-Filtration is designed to maintain this positive pressure with one train at an outside air flow rate ~~emergency ventilation flow rate~~ of 1000~~[3000]~~ cfm. The Frequency of [18] months on a STAGGERED TEST BASIS is consistent with the guidance provided in NUREG-0800, Section 6.4, (Ref. 4).

BASES

REFERENCES

1. FSAR, Section ~~[9.84]~~
2. FSAR, Chapter ~~[15]~~14.24
3. Regulatory Guide 1.52, (Rev. 2)
4. NUREG-0800, Section 6.4, Rev. 2, July 1981

B 3.7 **PLANT SYSTEMS**

B 3.7.~~12~~11 Control Room Ventilation Cooling System (CRHVAC-Cooling)

BASES

BACKGROUND

The CRHVAC-Cooling provides temperature control for the control room following isolation of the control room.

The CRHVAC-Cooling consists of two independent, redundant trains that provide cooling and heating of recirculated control room air. Each train consists of heating coils, cooling coils, instrumentation, and controls to provide for control room temperature control. The CRHVAC-Cooling is a subsystem providing air temperature control for the control room.

The CRHVAC-Cooling is an emergency system, parts of which may also operate during normal ~~unit~~ plant operations. A single train will provide the required temperature control to maintain the control room ~~between 75°F and 120°F~~less than 90°F following an accident. The CRHVAC-Cooling operation to maintain the control room temperature is discussed in the FSAR, Section 9.8, (Ref. 1).

APPLICABLE SAFETY ANALYSES

The design basis of the CRHVAC-Cooling is to maintain temperature of the control room environment throughout 30 days of continuous occupancy.

The CRHVAC-Cooling components are arranged in redundant safety related trains. During emergency operation, the CRHVAC-Cooling maintains the temperature ~~between 75°F and 120~~ less than 90°F. A single active failure of a component of the CRHVAC-Cooling, ~~assuming~~ coincident with a loss of offsite power, does not impair the ability of the system to perform its design function. Redundant detectors and controls are provided for control room temperature control. The CRHVAC-Cooling is designed in accordance with Seismic Category I requirements. The CRHVAC-Cooling is capable of removing sensible and latent heat loads from the control room, considering equipment heat loads and personnel occupancy requirements, to ensure equipment OPERABILITY.

~~The CRHVAC Cooling satisfies Criterion 3 of the NRC Policy Statement.~~

BASES

LCO

Two independent and redundant trains of the CRHVAC-Cooling are required to be OPERABLE to ensure that at least one train is available, assuming a single failure disables the other train. Total system failure could result in the equipment operating temperature exceeding limits in the event of an accident.

The CRHVAC-Cooling is considered OPERABLE when the individual components that are necessary to maintain the control room temperature are OPERABLE in both trains. These components include the ~~cooling coils~~ condensing units, fans, and associated temperature control instrumentation. In addition, the CRHVAC-Cooling must be OPERABLE to the extent that air circulation can be maintained.

APPLICABILITY

In MODES 1, 2, 3, 4, ~~and in MODES 5, and 6,~~ during movement of irradiated fuel assemblies, or [and CORE ALTERATIONS], or during cask movement in or over the SFP the CRHVAC-Cooling must be OPERABLE to ensure that the control room temperature will not exceed equipment OPERABILITY requirements following isolation of the control room.

~~In MODES 5 and 6, CRHVAC Cooling may not be required for those facilities which do not require automatic control room isolation.~~

ACTIONS

A.1

With one CRHVAC-Cooling train inoperable, action must be taken to restore OPERABLE status within 30 days. In this Condition, the remaining OPERABLE CRHVAC-Cooling train is adequate to maintain the control room temperature within limits. The 30 day Completion Time is reasonable, based on the low probability of an event occurring requiring control room isolation, and consideration that the remaining train can provide the required capabilities~~, and the alternate safety or nonsafety related cooling means that are available~~.

B.1 and B.2

In MODE 1, 2, 3, or 4, when Required Action A.1 cannot be completed within the required Completion Time, the ~~unit~~ plant must be placed in a MODE that minimizes the accident risk. To achieve this status, the ~~unit~~ plant must be placed in at least MODE 3 within 6 hours, and in MODE 5 within 36 hours. The allowed Completion Times are reasonable, based on operating experience, to reach the required ~~unit~~ plant conditions from full power conditions in an orderly manner and without challenging ~~unit~~ plant systems.

C.1, C.2.1, ~~and~~ C.2.2 and C.2.3

In MODE 5 or 6, during movement of irradiated fuel assemblies ~~[~~,or during CORE ALTERATIONS~~]~~, or during movement of fuel storage casks in or over the SFP when Required Action A.1 ~~C~~cannot be completed within the required Completion Time, the OPERABLE CRHVAC-Cooling train must be placed in operation immediately. This action ensures that the remaining train is OPERABLE, that no failures preventing automatic actuation will occur, and that any active failure will be readily detected.

An alternative to Required Action C.1 is to immediately suspend activities that could result in a release of radioactivity that might require isolation of the control room. This places the ~~unit~~ plant in a condition that minimizes the accident risk. This does not preclude the movement of fuel assemblies to a safe position.

D.1 and D.2

In MODE 5 or 6, during movement of irradiated fuel assemblies , or during CORE ALTERATIONS, or during movement of fuel storage casks in or over the SFP with two CRHVAC-Cooling trains inoperable, action must be taken immediately to suspend activities that could result in a release of radioactivity that might require isolation of the control room. This places the ~~unit~~ plant in a condition that minimizes the accident risk. This does not preclude the movement of fuel to a safe position.

E.1

If both CRHVAC-Cooling trains are inoperable in MODE 1, 2, 3, or 4, the CRHVAC-Cooling may not be capable of performing the intended function and the ~~unit~~ plant is in a condition outside the accident analysis. Therefore, LCO 3.0.3 must be entered immediately.

BASES

SURVEILLANCE REQUIREMENTS

SR 3.7.~~12~~11.1

This SR verifies that the heat removal capability of the system is sufficient to meet design requirements. This SR consists of a combination of testing and calculations. An ~~[~~18~~]~~ month Frequency is appropriate, since significant degradation of the CRHVAC-Cooling is slow and is not expected over this time period.

REFERENCE

1. FSAR, Section 9.8

B 3.7 **PLANT SYSTEMS**

B 3.7.~~14~~12 ~~Fuel Building Air Cleanup System (FBACS)~~ Fuel Handling Area Ventilation System

BASES

BACKGROUND

The Fuel Handling Area Ventilation System ~~FBACS~~ filters airborne radioactive particulates from the area of the Spent ~~f~~Fuel ~~p~~Pool (SFP) following a fuel handling accident ~~or loss of coolant accident~~ or a cask drop accident. The Fuel Handling Area Ventilation System ~~FBACS~~, in conjunction with other normally operating systems, also provides environmental control of temperature ~~and humidity~~ in the fuel pool area.

The Fuel Handling Area Ventilation System is described in Reference 1. This system maintains ventilation in the spent fuel pool equipment areas. This system also controls airborne radioactivity in the area during normal operation, anticipated operational transients and following a postulated fuel handling accident or cask drop accident. During normal operation, a supply fan and one or both of the exhaust fans run, as required, and draw air through a prefilter and a high-efficiency filter. In the event of a fuel handling accident or cask drop accident, the exhaust airflow is reduced to one-half by tripping the supply fan and closing the inlet damper and tripping one of the two exhaust fans. The exhaust air is diverted through a prefilter, HEPA filter and a charcoal absorbency bed. This filter train is parallel to the normal high-efficiency filters and is isolated from it by the positioning of an inlet damper.~~FBACS consists of two independent, redundant trains. Each train consists of a heater, a prefilter or demister, a high efficiency particulate air (HEPA) filter, an activated charcoal adsorber section for removal of gaseous activity (principally iodines), and a fan. Ductwork, valves or dampers, and instrumentation also form part of the system, as well as demisters, functioning to reduce the relative humidity of the air stream. A second bank of HEPA filters follows the adsorber section to collect carbon fines and provide backup in case of failure of the main HEPA filter bank. The downstream HEPA filter is not credited in the analysis, but serves to collect charcoal fines, and to back up the upstream HEPA filter should it develop a leak. The system initiates filtered ventilation of the fuel handling building following receipt of a high radiation signal.~~

~~The FBACS is a standby system, part of which may also be operated during normal unit operations. Upon receipt of the actuating signal, normal air discharges from the fuel handling building, the fuel handling building is isolated, and the stream of ventilation air discharges through the system filter trains. The prefilters or demisters remove any large particles in the air, and any entrained water droplets present, to prevent excessive loading of the HEPA filters and charcoal adsorbers.~~

BASES

~~The FBACS is discussed in the FSAR, Sections [6.5.1], [9.4.5], and [15.7.4], (Refs. 1, 2, and 3, respectively), because it may be used for normal, as well as post accident, atmospheric cleanup functions.~~

APPLICABLE SAFETY ANALYSES

The Fuel Handling Area Ventilation System ~~FBACS~~ is designed to mitigate the consequences of a fuel handling accident in which ~~[all]~~ rods in the fuel assembly are assumed to be damaged or a cask drop accident in which all the rods in the 73 fuel assemblies in a 7 by 11 fuel rack are assumed to be damaged. The analysis of the fuel handling accident is given in Reference ~~3~~2. The analysis of the cask drop accident is given in Reference 3. ~~The Design Basis Accident analysis of the fuel handling accident assumes that only one train of the FBACS is functional, due to a single failure that disables the other train. The accident analysis accounts for the reduction in airborne radioactive material provided by the remaining one train of this filtration system. The amount of fission products available for release from the fuel handling building is determined for a fuel handling accident. These assumptions and the analysis follow the guidance provided in Regulatory Guide 1.25, (Ref. 4).~~

~~The FBACS satisfies Criterion 3 of the NRC Policy Statement.~~

LCO

~~Two independent and redundant trains of the FBACS are required to be OPERABLE to ensure that at least one is available, assuming a single failure that disables the other train coincident with a loss of offsite power. Total system failure could result in the atmospheric release from the fuel building exceeding the 10 CFR 100 limits, (Ref. 5) in the event of a fuel handling accident.~~

The Fuel Handling Area Ventilation System ~~FBACS~~ is considered OPERABLE when the individual components necessary to control exposure in the fuel handling area ~~building~~ are OPERABLE. For all irradiated fuel movements and cask movements in or over the SFP, these components include the exhaust fans. During fuel movements where the fuel has decayed less than 30 days or during cask movements in or over the SFP when the fuel in the pool has decayed less than 90 days these components include the HEPA filter and the charcoal filter. Associated ductwork, valves and dampers are included as components.~~ in both trains. An FBACS train is considered OPERABLE when its associated:~~

~~a. Fan is OPERABLE;~~

~~b. HEPA filter and charcoal adsorber are not excessively~~

BASES

~~restricting flow, and are capable of performing their filtration functions; and~~

~~c. Heater, demister, ductwork, valves, and dampers are OPERABLE, and air circulation can be maintained.~~

APPLICABILITY ~~In MODES 1, 2, 3, and 4, the FBACS is required to be OPERABLE to provide fission product removal associated with ECCS leaks due to a LOCA (refer to LCO 3.7.13, "Emergency Core Cooling System (ECCS) Pump Room Exhaust Air Cleanup System (PREACS)") for units that use this system as part of their ECCS PREACS.~~

During movement of irradiated fuel assemblies or during movements of a cask in or over the SFP ~~in the fuel building~~, the Fuel Handling Area Ventilation System ~~FBACS~~ is required to be OPERABLE to mitigate the consequences of an ~~fuel handling~~ accident.

~~In MODES 5 and 6, the FBACS is not required to be OPERABLE, since the ECCS is not required to be OPERABLE.~~

ACTIONS A.1

If one Fuel Handling Area Ventilation System ~~FBACS train~~ exhaust fan is inoperable, action must be taken to immediately start the other exhaust fan. This action ensures that the accident analysis assumptions are valid.~~restore OPERABLE status within 7 days. During this time period, the remaining OPERABLE train is adequate to perform the FBACS function. The 7 day Completion Time is reasonable, based on the risk from an event occurring requiring the inoperable FBACS train, and ability of the remaining FBACS train to provide the required protection.~~

B.1 and B.2

~~In MODE 1, 2, 3, or 4, when~~ When Required Action A.1 cannot be completed~~within the Completion Time~~, or when the ~~both~~ Fuel Handling Area Ventilation System ~~FBACS trains are~~ is inoperable, the movement of irradiated fuel or the movement of a cask in or over the SFP must immediately cease. This does not preclude the movement of fuel to a safe position.~~the unit must be placed in a MODE in which the LCO does not apply. To achieve this status, the unit must be placed in MODE 3 within 6 hours, and in 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.~~

B 3.3 INSTRUMENTATION

B 3.3.4 Engineered Safety Features (ESF) Logic and Manual Initiation

BASES

BACKGROUND

The ESF Instrumentation initiates necessary safety systems, based upon the values of selected unit parameters, to protect against violating core design limits and the Primary Coolant System (PCS) pressure boundary and to mitigate accidents.

The ESF Instrumentation contains devices and circuitry that generate the following signals when the monitored variables reach levels that are indicative of conditions requiring protective action. Also listed are the inputs to each ESF Actuation Signal:

1. Safety Injection Actuation Signal (SIS);
   a. Containment High Pressure (CHP)
   b. Pressurizer Pressure-Low
2. Containment High pressure;
   a. Containment Pressure - High - Left Train
   b. Containment Pressure - High - Right Train
3. Containment High Radiation (CHR)
   a. Containment Area Radiation - Hi
4. Steam Generator Low Pressure (SGLP)
   a. "A" SG Pressure - Low
   b. "B" SG Pressure - Low
5. Auxiliary Feedwater Actuation (AFAS)
   a. "A" SG Level - Low
   b. "B" SG Level - Low
6. Recirculation Actuation Signal (RAS);
   a. Safety Injection Refueling Water Tank (SIRWT) Level - Low

BASES

BACKGROUND (continued)

In the above list of actuation signals, the CHP and SIRWT Level signals are derived from pressure and level switches, respectively.

Equipment actuated by each of the above signals is identified in the FSAR Section 7.3 (Ref. 1).

The ESF circuitry, with the exception of RAS, employs 2-out-of-4 logic. Four independent measurement channels are provided for each function used to generate ESF actuation signals. When any two channels of the same function reach their setpoint, actuating relays are energized which, in turn, initiate the protective actions. Two separate and redundant trains of actuating relays, each powered from separate power supplies, are utilized. These separate relay trains operate redundant trains of ESF equipment. The actuation relays are considered part of the actuation logic addressed by this LCO.

RAS logic consists of output contacts of the relays actuated by the SIRWT level switches arranged in a "1-out-of-2 taken twice" logic. The contacts are arranged so that at least one low level signal powered from each station battery is required to initiate RAS. Loss of a single battery, therefore, cannot either cause or prevent RAS initiation.

The sensor subsystem, including individual channel bistables, is addressed in LCO 3.3.3. This LCO addresses the actuation subsystem, consisting of the 2-out-of-4 logic, manual actuation, and downstream components used to actuate the individual ESF functions, as defined in the following section.

ESF Logic

Each of the six ESF actuating signals in Table 3.2.4-1 operates two trains of actuating relays. Each train is capable of initiating the safeguards equipment load groups to meet the minimum requirements to provide all functions necessary to operate the system associated with the plant's capability to cope with abnormal events.

The logic circuitry includes bypass provisions such that the SGLP function may be bypassed (blocked) if 3-out-of-4 SG pressure channels are below a bypass permissive setpoint. Similarly, the SIS on Pressurizer Pressure - Low may be bypassed when 3-out-of-4 channels are below a permissive setpoint. This bypassing is performed when these inputs are no longer required for protection. These bypasses are enabled manually when the enabling conditions are satisfied in three of the four sensor subsystem channels. The operating bypass circuitry employs four bistable channels in the sensor subsystems, sensing pressurizer pressure (for the SIS) and steam generator pressure (for the SGLP).

BASES

BACKGROUND (continued)

These bistables provide contact output to the 3-out-of-4 logic in the two actuation logic channels. When the logic is satisfied, manual bypassing is permitted. There are two manual bypass actuation controls for each Function, one per train.

All operating bypasses are automatically removed when enabling bypass conditions are no longer satisfied.

Failure of the bistable circuitry used to initiate the block permissive is considered a measurement channel or bistable channel failure and is addressed by LCO 3.3.3. Failure in the logic used to effect 2-out-of-4 bypass removal or failure of the manual bypass enable circuitry to remove the bypass is addressed by this LCO.

Testing of a major portion of the ESF circuits is accomplished while the plant is at power. More extensive sequence and load testing may be done with the reactor shut down. The test circuits are designed to test the redundant circuits separately such that the correct operation of each circuit may be verified by either equipment operation or by sequence lights.

FSAR Appendix 7A, Reference 3, explains ESF testing in detail.

Manual Initiation

Manual ESF initiation capability is provided to permit the operator to manually actuate an ESF System when necessary. Two control room mounted manual actuation switches are provided for the SIS and CHR Containment Isolation Signals. CHP and RAS may be initiated using individual component controls. In the case of SIS and CHR, each switch affects one actuation channel, which actuates one train of ESF equipment.

Main Steam Isolation Valves are provided with two closure switches in the control room. Either switch closes both MSIVs. Other SGLP actuated components must be manually operated using individual component controls.

RAS does not possess separate manual switches. To actuate a RAS manually, it is necessary to actuate the individual components from the control room or use the "test" switches, each of which actuates one train. Two channels of RAS manual actuation are shown in Table 3.3.4-1. Each channel may consist of either the individual component manual or "test" switches for one train.

BASES

APPLICABLE SAFETY ANALYSES

Each of the analyzed accidents can be detected by one or more ESF Functions. One of the ESF Functions is the primary actuation signal for that accident. An ESF Function may be the primary actuation signal for more than one type of accident. An ESF Function may also be a secondary, or backup, actuation signal for one or more other accidents. Functions such as Manual Initiation, not specifically credited in the accident analysis, serve as backups to Functions and are part of the NRC staff approved licensing basis for the plant.

ESF Logic and Manual Initiation Functions are required to be OPERABLE in MODES 1, 2, and 3, when the associated automatic initiation channels addressed by LCO 3.3.3 are required.

The manual initiation is not required by the accident analysis. The ESF logic must function in all situations where the ESF function is required.

LCO

The LCO requires that all components necessary to provide an ESF actuation be OPERABLE.

The Bases for the LCO on ESF automatic actuation Functions are addressed in LCO 3.3.3. Those associated with the Manual Initiation or Actuation Logic are addressed by this LCO.

ESF Logic and Manual Initiation Functions are required to be OPERABLE in MODES 1, 2, and 3, when the associated automatic initiation channels addressed by LCO 3.3.3 are required.

1. <u>Safety Injection Signal</u>

SIS is actuated by manual initiation, by a CHP signal, or by 2-out-of-4 Pressurizer Pressure channels decreasing below the setpoint. SIS initiates the following actions:

a. Start HPSI & LPSI pumps

b. Enable Containment Spray Pump Start on CHP

c. Initiate Safety Injection Valve operations

Each Manual Initiation channel consists of one pushbutton which directly starts the SIS actuation logic for the associated train.

BASES

LCO (continued)

The Low Pressurizer Pressure signal for each SIS train can be blocked when 3-out-of-4 channels indicate below 1700 psia. This block prevents undesired actuation of SIS during a normal plant cooldown. The block signal is automatically removed when 2-out-of-4 channels exceed the setpoint.

The pressurizer pressure instrument channels which provide input to SIS are the same channels which provide an input to the RPS. The RPS receives an analog signal from each Pressurizer Pressure channel; each SIS initiation logic train receives a binary signal from a group of four relays, each actuated by a bistable in one of the four instrument channels. These instrument channels are addressed by LCO 3.3.3. The contacts of these relays are wired into a 2-out-of-4 logic. It is the output of this pressurizer pressure 2-out-of-4 logic circuit that is blocked during plant cooldowns, and subject to this LCO. A similar arrangement of bistables and relays provide the pressurizer low pressure block permissive signal. The initiation and block circuits are illustrated in Reference 4.

Each SIS logic train is also actuated by a contact pair on one of the CHP initiation relays for the associated CHP train.

Each train of SIS actuation logic consists of a group of "SIS" relays which energize and seal in when the initiation logic is satisfied. These SIS relays actuate alarms and control functions. One of the control functions selects between an immediate actuation circuit, if offsite power is available, and a time sequenced actuation circuit, if only diesel power is available. These actuation circuits initiate motor operated valve opening and pump starting. The SIS actuation logic is illustrated in Reference 4.

a. Manual Initiation

This LCO requires two channels of SIS Manual Initiation to be OPERABLE.

b. Actuation Logic

This LCO requires two channels of SIS Actuation Logic to be OPERABLE.

Failures in the actuation subsystems, including the manual bypass switches, are Actuation Logic failures and are addressed in this LCO.

c. CHP Logic Trains

The CHP initiation relay input to the SIS logic is considered part of the SIS logic. Two channels, one per SIS train, must therefore be OPERABLE.

BASES

LCO (continued)

2. Containment High Pressure

CHP is actuated by 2-out-of-4 pressure switches for the associated train reaching their setpoints. CHP initiates the following actions:

a) Containment Spray

b) Safety Injection Signal

c) Main Feedwater Isolation

d) Main Steam Line Isolation

e) Control Room HVAC Emergency Mode

f) Close Containment Isolation Valves

Eight containment pressure channels are provided. Each channel consists of one pressure sensing bellows which actuates two micro-switches. Four of these sixteen micro-switches provide input to the RPS; the remainder are divided into two circuits of 2-out-of-4 logic for the CHP logic trains.

Each CHP logic train consists of an arrangement of six micro-switch contacts and a test relay which energize a group of "5P" relays when the 2-out-of-4 logic is satisfied. The CHP logic is illustrated in Reference 7. CHP may also be initiated manually by individual component actuation.

a. Manual Initiation

This LCO requires two channels of CHP Manual Initiation to be OPERABLE. There is no manual control which actuates the CHP logic circuits. The actuated components must be individually actuated using control room manual controls.

b. Actuation Logic

This LCO requires two channels of CHP Actuation Logic to be OPERABLE.

BASES

LCO (continued)

3. Containment High Radiation

CHR is actuated by manual action or, during normal operation, by 2-out-of-4 radiation monitors above their respective setpoints. During refueling operations the CHR actuation is manually switched to include an additional actuation on 1-of-2 low range radiation monitors at a much lower setpoint, as addressed by LCO 3.3.6. CHR initiates the following actions:

a) Control Room HVAC Emergency Mode

b) Close Containment Isolation Valves

c) Block automatic starting of ECCS pump room sump pumps

The containment area radiation monitors which actuate CHR each de-energize an output relay upon reaching their setpoint. The output contacts of these relays are arranged into two trains of 2-out-of-4 logic. Two manual controls each de-energize two of these relays, initiating both trains of CHR.

When either train of 2-out-of-4 logic is satisfied, a group of "5R" relays energize to initiate CHR actions. The CHR logic is illustrated in Reference 8.

a. Manual Initiation

This LCO requires two channels of CHR Manual Initiation to be OPERABLE. Pushbuttons are available for manual actuation of each CHR logic train.

b. Actuation Logic

This LCO requires two channels of CHR Actuation Logic to be OPERABLE.

4. Steam Generator Low Pressure

One SGLP circuit is provided for each steam generator. Each SGLP circuit is actuated by 2-out-of-4 pressure channels on the associated steam generator reaching their setpoint. SGLP initiates the following actions:

a) Close the associated Feedwater Regulating valve and its bypass.

b) Close both Main Steam Isolation Valves (MSIVs).

BASES

LCO (continued)

The steam generator pressure instrument channels which provide input to SGLP are the same channels which provide an input to the RPS. Both the SGLP logic and the RPS receive analog signals from the instrument channel, and both have their own bistables to initiate actuation on low pressure.

The SGLP signal from each SG may be blocked when 3-of-4 steam pressure channels indicate below 550 psia. This block prevents undesired actuation during a normal plant cooldown. The block signal is automatically removed when pressure exceeds the setpoint.

Each SGLP logic is made up of output contacts from four pressure bistables from the associated steam generator. When the logic circuit is satisfied, two relays are energized to actuate steam and feedwater line isolation. A similar logic circuit is provided for each block circuit. The block is automatically removed when the steam pressure exceeds 550 psig. SGLP logic is illustrated in Reference 9.

Two MSIV manual close handswitches are provided in the control room. Either handswitch will close both MSIVs. The feedwater regulating and bypass valves must be manually closed by individual component controls.

a. Manual Initiation

This LCO requires two channels of SGLP Manual Initiation to be OPERABLE. There is no manual control which actuates the SGLP logic circuits. The actuated components must be individually actuated using control room manual controls.

b. Actuation Logic

This LCO requires two channels of SGLP Actuation Logic to be OPERABLE.

5. Auxiliary Feedwater Actuation Signal

AFAS is actuated by manual action or by 2-out-of-4 level sensors on either steam generator reaching their setpoints. Manual actuation of Auxiliary Feedwater may be accomplished through pushbutton actuation of each AFAS channel or by use of individual pump and valve controls. Each AFAS channel starts the associated AFW pump(s) and opens the associated flow control valves.

BASES

LCO (continued)

The steam generator level instrument channels which provide input to AFAS are the same channels which provide an input to the RPS. Both the AFAS cabinets and the RPS receive analog signals from the instrument channel, and both have their own bistables to initiate actuation on low level.

Each AFAS train contains a 2-out-of-4 logic for each steam generator. One AFAS logic train actuates motor driven AFW pump P-8A and turbine driven pump P-8B and the associated flow control valves; the other actuates motor driven pump P-8C and the associated valves. Each train provides flow to both steam generators. The AFAS logic uses solid state logic circuits. It is illustrated in Reference 6.

a. Manual Initiation

This LCO requires two channels of AFAS Manual Initiation to be OPERABLE. Each train of AFAS may be manually initiated with either of two sets of controls. Only one set of manual controls is required to be OPERABLE for each AFW train. One set of controls is the pushbuttons provided to actuate each train on the C-11 panel; the other set of controls is those manual controls provided on C-01 for each AFW pump and flow control valve.

b. Actuation Logic

This LCO requires two channels of AFAS Actuation Logic to be OPERABLE.

6. Recirculation Actuation Signal

RAS is actuated by manually actuating the circuit "Test" switch or by two of the four level sensors in the SIRWT reaching their setpoints. RAS initiates the following actions:

a) Trip LPSI pumps (this trip can be manually bypassed)

b) Switch HPSI & Spray suction from SIRWT to Containment Sump

c) Adjust cooling water to Shutdown Cooling Heat Exchangers

d) Closes the SIRWT Recirc CVs.

BASES

LCO (continued)

The four SIRWT level sensors each de-energize two relays, one per logic train, when tank level reaches the setpoint. Each level sensor and associated output relay channel is powered from a different Preferred AC bus. Two Preferred AC buses are powered, through inverters, from each station battery. The manual RAS control for each train de-energizes two of these relays, initiating RAS through the logic train.

Each train of RAS logic consists of the output contacts of the relays actuated by the level switches arranged in a "1-out-of-2 taken twice" logic. The contacts are arranged so that at least one low level signal powered from each station battery is required to initiate RAS. Loss of a single battery, therefore, cannot either cause or prevent RAS initiation. When the logic is satisfied, two DC relays are energized to initiate RAS actions and alarms. RAS logic is shown in Reference 5.

a. Manual Initiation

This LCO requires two channels of RAS Manual Initiation to be OPERABLE. There is no manual control which actuates the RAS logic circuits. The actuated components must be individually actuated using control room manual controls.

b. Actuation Logic

This LCO requires two channels of RAS Logic to be OPERABLE.

Actuation Logic consists of all circuitry housed within the actuation subsystems, including the initiating relay contacts responsible for actuating the ESF equipment.

APPLICABILITY

All ESF Functions are required to be OPERABLE in MODES 1, 2, and 3. In MODES 1, 2, and 3, there is sufficient energy in the primary and secondary systems to warrant automatic ESF System responses to:

- Close the MSIVs to preclude a positive reactivity addition;
- Actuate AFW to preclude the loss of the steam generators as a heat sink (in the event the normal feedwater system is not available);

BASES

APPLICABILITY (continued)

- Actuate ESF systems to prevent or limit the release of fission product radioactivity to the environment by isolating containment and limiting the containment pressure from exceeding the containment design pressure during a design basis LOCA or MSLB; and

- Actuate ESF systems to ensure sufficient borated inventory to permit adequate core cooling and reactivity control during a design basis LOCA or MSLB accident.

In MODES 4, 5, and 6, automatic actuation of ESF Functions is not required, because adequate time is available for plant operators to evaluate plant conditions and respond by manually operating the ESF components if required.

ESF Manual isolation capability for the CHP and CHR function is retained on a component actuation level in MODE 4 by the LCO 3.6.3 "Containment Isolation Valves."

The ESF Actuation Logic must be OPERABLE in the same MODES as the Automatic and Manual Initiation functions.

In MODES 5 and 6, ESF initiated systems are either reconfigured or disabled for shutdown cooling operation. Accidents in these MODES are slow to develop and would be mitigated by manual operation of individual components.

ACTIONS

When the number of inoperable channels in a trip Function exceeds those specified in any related Condition associated with the same trip Function, then the plant is outside the safety analysis. Therefore, LCO 3.0.3 should be immediately entered, if applicable in the current MODE of operation.

A Note has been added to the ACTIONS to clarify the application of the Completion Time rules. The Conditions of this Specification may be entered independently for each Function in Table 3.3.4-1 in the LCO. Completion Times for the inoperable channel of a Function will be tracked separately.

A.1

Condition A applies to one Manual Initiation or Actuation Logic channel inoperable.

The channel must be restored to OPERABLE status to restore redundancy of the affected Functions. The 48 hour Completion Time is commensurate with the importance of avoiding the vulnerability of a single failure in the only remaining OPERABLE channel.

BASES

ACTIONS (continued)

B.1 and B.2

Condition B is entered when the Required Action and associated Completion Time of Condition A are not met. If Required Action A.1 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 4 within 30 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.

SURVEILLANCE REQUIREMENTS

SR 3.3.4.1

A CHANNEL FUNCTIONAL TEST is performed each 92 days on the AFAS logic circuits using the installed test circuits to ensure the entire channel will perform its intended function when needed. Sensor subsystem tests are addressed in LCO 3.3.3. This SR addresses Actuation Logic tests.

The Frequency of 92 days is based on the reliability analysis presented in topical report CEN-327, "RPS/ESF Extended Test Interval Evaluation" (Ref. 2).

SR 3.3.4.2

A CHANNEL FUNCTIONAL TEST is performed each 92 days on the SIS logic circuits using the installed test circuits. Logic for SIS both with and without offsite power must be tested. When testing the "without power" circuits, proper operation of the DBA sequence and the associated logic circuit must be verified. The test circuits are designed to block those SIS functions, such as injection of concentrated boric acid, which would interfere with plant operation. This frequency is acceptable since the test may be performed at power, and the logic circuitry is not subject to drift.

BASES

SURVEILLANCE REQUIREMENTS (continued)

SR 3.3.4.3

A CHANNEL FUNCTIONAL TEST is performed on the manual ESF Initiation Channel every 18 months, providing Manual Initiation of the Function. This may be performed as part of the Logic CHANNEL FUNCTIONAL TEST, SR 3.3.4.4.

This Surveillance verifies that the trip push buttons or switches are capable of operating contacts in the Actuation Logic as designed, providing manual initiation of the Function. The 18 month Frequency is based on the need to perform this Surveillance under the conditions that apply during a plant outage and the potential for an unplanned transient if the Surveillance were performed with the reactor at power. Operating experience has shown these components usually pass the Surveillance when performed at a Frequency of once every 18 months.

SR 3.3.4.4

A CHANNEL FUNCTIONAL TEST is performed on each ESF Logic Channel every 18 months. This shall verify all automatic actuations and the automatic resetting capability of the Low Pressure bypass on the SIS Low Pressure block and SGLP Block circuitry. This may be performed as part of the Manual Initiation CHANNEL FUNCTIONAL TEST, SR 3.3.4.3.

In the SIS circuit, the complete SIS actuation logic is tested by inserting an actual or simulated low pressure input into the Pressurizer Pressure channels feeding the SIS actuation logic and verify that all normal automatic operations occur as designed.

The 18 month Frequency is based on the need to perform this Surveillance under the conditions that apply during a plant outage and the potential for an unplanned transient if the Surveillance were performed with the reactor at power. Operating experience has shown these components usually pass the Surveillance when performed at a Frequency of once every 18 months.

BASES

REFERENCES

1. FSAR, Section 7.3
2. CEN-327, June 2, 1986, including Supplement 1, March 3, 1989
3. FSAR Appendix 7A, Engineered Safeguards Testing
4. Logic Diagram, Safety Injection Initiation, E-17, Sh 3
5. Logic Diagram, SIS Test and RAS E-17, Sh 5
6. Updated FSAR, Figure 7-37
7. Logic Diagram, Containment High Pressure, E-17, Sh 6
8. Logic Diagram, Containment High Radiation, E-17, Sh 7
9. Logic Diagram, SG Low Pressure and MSIS, E-17, Sh 20

B 3.3 INSTRUMENTATION

B 3.3.5 Diesel Generator (DG) - UV Start (UV Start)

BASES

BACKGROUND

The DGs provide a source of emergency power when offsite power is either unavailable or insufficiently stable to allow safe plant operation. Undervoltage protection will generate a UV Start in the event a Loss of Voltage or Degraded Voltage condition occurs. There are two UV Start Functions for each 2.4 kV vital bus 1C and 1D.

Voltage protection and load shedding features for safety-related buses at the 2,400 volt and lower voltage levels are designed in accordance with 10 CFR 50, Appendix A, General Design Criterion 17 (Ref. 5) and the following features:

1. Two levels of automatic voltage protection from loss or degradation of offsite power sources are provided. The first level (loss of voltage) provides normal loss of voltage protection. The second level of protection (degraded voltage) has voltage and time delay set points selected for automatic trip of the offsite sources to protect safety-related equipment from sustained degraded voltage conditions at all bus voltage levels. Coincidence logic is provided to preclude spurious trips.

2. The voltage protection system automatically prevents load shedding of the safety-related buses when the emergency generators are supplying power to the safeguards loads.

3. Control circuits for shedding of Class 1E and Nonclass 1E loads during a Loss of Coolant Accident themselves are Class 1E or are separated electrically from the Class 1E portions.

Description

Each 2,400 volt Bus 1C and 1D is equipped with two levels of voltage protection relays. The first level (loss of voltage) Relays 127-1 and 127-2 are set at approximately 77% of rated voltage with an inverse time relay. Each of these relays measures voltage on all three phases, and protects against a sudden loss of voltage as sensed on the corresponding bus using a 3-out-of-3 coincidence logic. The actuation of these relays will trip their respective incoming bus circuit breakers, start both emergency generators, initiate bus load shed, and activate annunciators in the control room. The emergency generator circuit breaker is closed automatically upon establishment of satisfactory voltage and frequency by the use of voltage protection Relays 127D-1 and/or 127D-2.

BASES

BACKGROUND (continued)

The second level of voltage protection (degraded voltage) undervoltage Relays 127-7 and 127-8 are set at approximately 92% of rated voltage, with each relay monitoring all three phases on its respective bus. These relays protect against sustained degraded voltage conditions on the corresponding bus using a 3-out-of-3 coincidence logic. These relays have a built-in 0.5 second time delay, after which both emergency generators will receive a start signal and activate annunciators in the control room. If a bus undervoltage exists after an additional six seconds, then the respective incoming bus circuit breaker will be tripped and a bus load shed will be initiated.

Trip Setpoints and Allowable Values

The trip setpoints and Allowable Values are based on the analytical limits presented in Reference 3, and justified in Reference 9. The selection of these trip setpoints is such that adequate protection is provided when all sensor and processing time delays are taken into account. To allow for calibration tolerances, instrumentation uncertainties, and instrument drift, Allowable Values specified in SR 3.3.5.1 are conservatively adjusted with respect to the analytical limits. A detailed analysis of the degraded voltage setpoints is provided in References 6 and 7. If the measured setpoint does not exceed the documented surveillance trip acceptance criteria, the undervoltage relay is considered OPERABLE.

APPLICABLE SAFETY ANALYSES

The DG-UV Trip is required for Engineered Safety Features (ESF) systems to function in any accident with a loss of offsite power. Its design basis is that of the ESF.

Accident analyses credit the loading of the DG based on a loss of offsite power during a loss of coolant accident. The diesel loading has been included in the delay time associated with each safety system component requiring DG supplied power following a loss of offsite power. This delay time includes contributions from the DG start, DG loading, and Safety Injection System component actuation.

The required channels of DG UV Start, in conjunction with the ESF systems powered from the DGs, provide plant protection in the event of any of the (continued) analyzed accidents discussed in Reference 2, in which a loss of offsite power is assumed. DG-UV Start channels are required to meet the redundancy and testability requirements of GDC 21 in 10 CFR 50, Appendix A (Ref.4).

LCO

The LCO for the DG-UV Start requires that all three channels (phases) per bus of each UV Start instrumentation Function be OPERABLE when the associated DG is required to be OPERABLE. The UV Start supports safety systems associated with the ESF actuation.

Actions require that in the event one or more UV sensor channels becomes inoperable, the associated DG must be declared inoperable. The 3-out-of-3 logic is intolerant of component failures, and there is no readily available means of bypassing a failed channel, without using jumpers.

Loss of DG-UV Start Function could result in the delay of safety system initiation when required. This could lead to unacceptable consequences during accidents. During the loss of offsite power, which is an anticipated operational occurrence, the DG powers the motor driven auxiliary feedwater pumps. Failure of these pumps to start would leave only the one turbine driven pump as well as an increased potential for a loss of decay heat removal through the secondary system.

Only Allowable Values are specified for each Function in the LCO. Nominal trip setpoints are specified in the plant specific setpoint calculations. The nominal setpoints are selected to ensure that the setpoint measured by CHANNEL FUNCTIONAL TESTS does not exceed the Allowable Value if the bistable is performing as required. Operation with a trip setpoint less conservative than the nominal trip setpoint, but within the Allowable Value, is acceptable, provided that operation and testing are consistent with the assumptions of the plant specific setpoint calculation. A channel is inoperable if its actual trip setpoint is not within its required Allowable Value.

The Bases for the Allowable Values and trip setpoints are as follows:

The voltage trip setpoint has been set low enough such that spurious trips of the offsite source due to operation of the undervoltage relays are not expected for any combination of unit loads and normal grid voltages.

This setpoint at the 2,400 volt bus and reflected down to the 480 volt buses has been verified through an analysis to be greater than the minimum allowable motor voltage (90% of nominal voltage). Motors are the most limiting equipment in the system. MCC contractor pickup and drop-out voltage is also adequate at the setpoint values. The analysis ensured that the distribution system is capable of starting and operating all safety-related equipment within the equipment voltage rating at the allowed source voltages. The power distribution system model used in the analysis has been verified by actual testing (Refs. 8, 9).

BASES

LCO (continued)

The time delays involved will not cause any thermal damage as the setpoints are within voltage ranges for sustained operation. They are long enough to preclude trip of the offsite source caused by the starting of large motors and yet do not exceed the time limits of safeguards actuation assumed in Chapter 14 (Ref. 2), and validated by Reference 10.

Calibration of the undervoltage relays verify that the time delay is sufficient to avoid spurious trips.

APPLICABILITY

The DG - UV Start actuation Function is required in MODES 1, 2, and 3, because ESF Functions are designed to provide protection in these MODES. Actuation in MODE 4, 5 or 6 is required whenever the required DG must be OPERABLE, so that it can perform its function on a loss of power or degraded power to the vital bus.

ACTIONS

A DG-UV Start channel is inoperable when it does not satisfy the OPERABILITY criteria for the channel's Function.

In the event a channel's trip setpoint is found nonconservative with respect to the Allowable Value, or the channel is found inoperable, then all affected Functions provided by that channel must be declared inoperable and the LCO Condition entered. The required channels are specified on a per DG basis.

A.1

Condition A applies if one or more of the three phase UV sensors or relay logic is inoperable for one or more Functions (Degraded Voltage or Loss of Voltage) per DG bus.

If the channel cannot be restored to OPERABLE status, the affected DG should be declared inoperable and the appropriate Conditions entered. Because of the 3-out-of-3 logic in both the loss of voltage and degraded voltage Functions, combined with the absence of readily available channel bypass capability, the most expeditious means of addressing channel failure is declaring the channel inoperable, and effecting repair in a manner consistent with other DG failures. Required Action A.1 ensures that Required Actions for the affected DG inoperabilities are initiated. Depending upon plant MODE, the actions specified in LCO 3.8.1, "AC Sources - Operating," or LCO 3.8.2 "AC Sources - Shutdown" are required immediately.

BASES

SURVEILLANCE REQUIREMENTS

The following SR applies to each DG - UV Start Function.

SR 3.3.5.1

SR 3.3.5.1 is the performance of a CHANNEL CALIBRATION every 18 months. The CHANNEL CALIBRATION verifies the accuracy of each component within the instrument channel. This includes calibration of the undervoltage relays and demonstrates that the equipment falls within the specified operating characteristics defined by the manufacturer.

The Surveillance verifies that the channel responds to a measured parameter within the necessary range and accuracy.

CHANNEL CALIBRATION leaves the channel adjusted to account for instrument drift between successive calibrations to ensure that the channel remains operational between successive tests. CHANNEL CALIBRATIONS must be performed consistent with the plant specific setpoint analysis.

REFERENCES

1. FSAR, Section 8.6
2. FSAR, Chapter 14
3. CPCo Analysis EGAD-ELEC-22
4. 10 CFR 50, Appendix A, GDC 21
5. 10 CFR 50 Appendix A, GDC 17
6. CPCo Analysis EA-ELEC-VOLT-033
7. CPCo Analysis EA-ELEC-VOLT-034
8. CPCo Analysis EA-ELEC-VOLT-13
9. CPCo Analysis EA-ELEC-VOLT-17
10. CPCo Analysis A-NL-92-111

B 3.3 **INSTRUMENTATION**

B 3.3.6 Refueling Containment High Radiation (CHR) Initiation

BASES

BACKGROUND

This LCO addresses Refueling CHR initiation. This signal provides automatic containment isolation valve closure during refueling operations, using two radiation monitors located in the refueling area of Containment. Each monitor actuates one train of CHR logic when containment radiation exceeds the setpoint. Two separate enabling keylock handswitches, one per train, enable the Refueling CHR input to the CHR logic when switched to the "Refueling" Mode. Each Refueling CHR channel, associated keylock handswitch, and initiation circuit input to the CHR logic thus forms a 1-out-of-1 logic input to its associated CHR actuation logic train. The Refueling CHR isolation instrumentation is separate from the CHR instrumentation addressed in LCO 3.3.3, "ESF Instrumentation." However, the Refueling CHR Instrumentation does operate the same CHR actuation relays as the 2-out-of-4 CHR logic addressed in LCO 3.3.4. These include relays 5R1, 5R3, 5R5, and 5R7 for Train A, and 5R2, 5R4, 5R6, and 5R8 for Train B. This LCO is not included in LCOs 3.3.3 and 3.3.4 due to the differences in APPLICABILITY and due to the single channel nature of the Refueling CHR input. The Refueling CHR signal performs the automatic containment isolation valve closure function during refueling operations required by LCO 3.9.3, (Containment Penetrations).

The Refueling CHR Isolation provides protection from radioactive contamination in the containment in the event a fuel assembly should be severely damaged during handling.

The Refueling CHR Instrumentation will detect any abnormal amounts of radioactive material in the containment and will initiate CHR Containment Isolation to limit the release of radioactivity to the environment. The same valves are closed as on a CHR signal.

The Refueling CHR includes two independent, redundant actuation subsystems, as described above. Reference 1 describes the Refueling CHR circuitry. Reference 3 shows Refueling CHR Logic.

BACKGROUND (continued)

Trip Setpoints and Allowable Values

Trip setpoints used in the Refueling CHR bistables are based on the nominal values required by Reference 2, and are described in Reference 4.

Setpoints in accordance with the Allowable Value will ensure that Safety Limits are not violated during Anticipated Operational Occurrences (AOOs) and the consequences of Design Basis Accidents will be acceptable, providing the plant is operated from within the LCOs at the onset of the AOO or accident and the equipment functions as designed.

APPLICABLE SAFETY ANALYSES

The Refueling CHR isolates containment in the event of a fuel handling accident. The alarm function is required by 10 CFR 70.24 (a)(2) (Ref. 2)

LCO

Only the Allowable Values are specified for the trip Function in the LCO. Operation with a trip setpoint less conservative than the nominal trip setpoint, but within its Allowable Value, is acceptable, provided that the difference between the nominal trip setpoint and the Allowable Value is equal to or greater than the drift allowance assumed for each trip in the transient and accident analyses.

The LCO on the radiation monitoring channels requires that both channels be OPERABLE. In addition to the Containment Refueling Radiation Monitor, this LCO also addresses the enabling keyswitch and all logic components necessary to initiate this mode of CHR Isolation. The four CHR radiation channels addressed by LCO 3.3.3, and the portion of the CHR logic addressed by LCO 3.3.4 which provides the 2-out-of-4 CHR channel comparison are excluded from LCO, since these channels and logic are not necessary to accomplish the Refueling CHR Isolation function.

The Containment Radiation - Hi setpoint is specified in 10 CFR 70.24(a)(2) , as greater than 5 millirem above background, but less than 20 millirem above background. This setpoint is high enough to avoid inadvertent actuation in the event of normal background radiation fluctuations during fuel handling, but low enough to alarm and isolate the containment in the event of a fuel handling accident.

BASES

APPLICABILITY

In MODE 5 or 6, the isolation of containment is not required to be OPERABLE. However, during CORE ALTERATIONS or during movement of irradiated fuel, there is the possibility of a fuel handling accident requiring the Containment Isolation on high radiation in containment. Accordingly, the Refueling CHR Isolation must be OPERABLE during CORE ALTERATIONS and when moving any irradiated fuel in containment.

In MODES 1, 2, and 3, both the Containment High Pressure (CHP) and CHR signals provide containment isolation as explained in LCOs 3.3.3 and 3.3.4.

ACTIONS

A Refueling CHR channel is inoperable when it does not satisfy the OPERABILITY criteria for the channel's Function.

In the event a channel's trip setpoint is found nonconservative with respect to the Allowable Value, or the associated instrument channel is found inoperable, then the Refueling CHR Function provided by that channel should be declared inoperable and LCO Condition A entered.

A.1 and A.2

Condition A applies to the failure of one or both Refueling CHR channels. This failure may be in the radiation monitor, enabling keyswitch, or downstream logic. If the keyswitch is failed such that the Refueling CHR is enabled, then the Refueling CHR shall be considered OPERABLE unless otherwise incapacitated. The Required Action is to suspend CORE ALTERATIONS and suspend movement of irradiated fuel assemblies within containment. This places the plant in a condition where the LCO does not apply. The immediate completion time is justified on the basis of loss of containment isolation capability.

SURVEILLANCE REQUIREMENTS

SR 3.3.6.1

Performance of the CHANNEL CHECK once every 24 hours ensures that a gross failure of instrumentation has not occurred. A CHANNEL CHECK is normally a comparison of the parameter indicated on one channel to a similar parameter on other channels. It is based on the assumption that instrument channels monitoring the same parameter should read approximately the same value.

BASES

SURVEILLANCE REQUIREMENTS (continued)

Significant deviations between the two instrument channels could be an indication of excessive instrument drift in one of the channels or of something even more serious. CHANNEL CHECK will detect gross channel failure; thus, it is key to verifying the instrumentation continues to operate properly between each CHANNEL CALIBRATION.

Agreement criteria are determined by the plant staff, based on a combination of the channel instrument uncertainties, including indication and readability. If a channel is outside the criteria, it may be an indication that the transmitter or the signal processing equipment has drifted outside its limits.

The Frequency, is based on operating experience that demonstrates the rarity of channel failure. Since the probability of two random failures in redundant channels in any 24 hour period is low, the CHANNEL CHECK minimizes the chance of loss of protective function due to failure of redundant channels. The CHANNEL CHECK supplements less formal, but more frequent, checks of channel OPERABILITY during normal operational use of the displays associated with the LCO required channels.

SR 3.3.6.2

A CHANNEL FUNCTIONAL TEST is performed on each refueling CHR channel to ensure the entire channel will perform its intended function. Any setpoint adjustment shall be consistent with the assumptions of the current plant specific setpoint analysis.

The Frequency of 31 days is based on plant operating experience with regard to channel OPERABILITY and drift, which demonstrates that failure of more than one channel of a given Function in any 31 day interval is a rare event.

SR 3.3.6.3

CHANNEL CALIBRATION is a complete check of the instrument channel including the sensor. The Surveillance verifies that the channel responds to a measured parameter within the necessary range and accuracy. CHANNEL CALIBRATION leaves the channel adjusted to account for instrument drift between successive calibrations to ensure that the channel remains operational between successive tests.

The Frequency is based upon the assumption of an 18 month calibration interval for the determination of the magnitude of equipment drift in the setpoint analysis.

BASES

SURVEILLANCE REQUIREMENTS (continued)

SR 3.3.6.4

Every 18 months, a CHANNEL FUNCTIONAL TEST is performed on the manual CHR actuation circuitry.

This Surveillance verifies that the manual actuation push buttons are capable of energizing the RIAX initiation relays and providing Manual actuation of the CHR Function. The 18 month Frequency is based on Operating experience.

REFERENCES

1. FSAR, Section 7.3
2. 10 CFR 70.24(a)(2)
3. FSAR Figure 7-37
4. RI-86E Basis Document

B 3.3 INSTRUMENTATION

B 3.3.7 Accident Monitoring (AM) Instrumentation

BASES

BACKGROUND

The primary purpose of the Accident Monitoring (AM) instrumentation is to display plant variables that provide information required by the control room operators during accident situations. This information provides the necessary support for the operator to take the manual actions, for which no automatic control is provided, that are required for safety systems to accomplish their safety Functions for Design Basis Events.

The OPERABILITY of the AM instrumentation ensures that there is sufficient information available on selected plant parameters to monitor and assess plant status and behavior following an accident.

The availability of AM instrumentation is important so that responses to corrective actions can be observed and the need for, and magnitude of, further actions can be determined. These essential instruments are identified by the FSAR Appendix 7C (Ref. 1) addressing the recommendations of Regulatory Guide 1.97 (Ref. 2), as required by Supplement 1 to NUREG-0737, "TMI Action Items" (Ref. 3).

Type A variables are included in this LCO because they provide the primary information required to permit the control room operator to take specific manually controlled actions, for which no automatic control is provided, that are required for safety systems to accomplish their safety functions for Design Basis Accidents (DBAs).

Category I variables are the key variables deemed risk significant because they are needed to:

- Determine whether other systems important to safety are performing their intended functions;
- Provide information to the operators that will enable them to determine the potential for causing a gross breach of the barriers to radioactivity release; and
- Provide information regarding the release of radioactive materials to allow for early indication of the need to initiate action necessary to protect the public and for an estimate of the magnitude of any impending threat.

BASES

BACKGROUND (continued)

These key variables are identified by Regulatory Guide 1.97 Parameter Summary table in FSAR Appendix 7C (Ref. 1). This analysis identified the plant specific Type A and Category I variables and provided justification for deviating from the NRC proposed list of Category I variables.

The specific instrument Functions listed in Table 3.3.7-1 are discussed in the LCO Bases.

APPLICABLE SAFETY ANALYSES

The AM instrumentation ensures the OPERABILITY of Regulatory Guide 1.97 Type A variables, so that the control room operating staff can:

- Perform the diagnosis specified in the emergency operating procedures. These variables are restricted to preplanned actions for the primary success path of DBAs; and
- Take the specified, preplanned, manually controlled actions, for which no automatic control is provided, that are required for safety systems to accomplish their safety functions.

The AM instrumentation also ensures OPERABILITY of Category I, non-Type A variables. This ensures the control room operating staff can:

- Determine whether systems important to safety are performing their intended functions;
- Determine the potential for causing a gross breach of the barriers to radioactivity release;
- Determine if a gross breach of a barrier has occurred; and
- Initiate action necessary to protect the public as well as to obtain an estimate of the magnitude of any impending threat.

Category I, non-Type A AM instruments are retained in the Specification because they are intended to assist operators in minimizing the consequences of accidents. Therefore, these Category I variables are important in reducing public risk.

BASES

LCO

LCO 3.3.7 requires two OPERABLE channels for all but one Function to ensure no single failure prevents the operators from being presented with the information necessary to determine the status of the plant and to bring the plant to, and maintain it in, a safe condition following that accident.

Furthermore, provision of two channels allows a CHANNEL CHECK during the post accident phase to confirm the validity of displayed information.

The exception to the two channel requirement is Containment Isolation Valve Position. In this case, the important information is the status of the containment penetrations. The LCO requires one position indicator for each active containment isolation valve. This is sufficient to redundantly verify the isolation status of each isolable penetration either via indicated status of the active valve and prior knowledge of the passive valve or via system boundary status. If a normally active containment isolation valve is known to be closed and deactivated, position indication is not needed to determine status. Therefore, the position indication for valves in this state is not required to be OPERABLE.

Listed below are discussions of instrument Functions in Table 3.3.7-1. Component ID's of the sensors, indicators, power supplies, displays and recorders in each instrument loop required to meet RG 1.97 are found in Reference 1.

1, 2 Primary Coolant System (PCS) Hot and Cold Leg Temperature

PCS Hot and Cold Leg Temperatures are Type B Category I variables provided for verification of core cooling and long term surveillance.

PCS outlet temperature inputs to the AM are provided by two wide range resistance elements and associated transmitters in each loop. The channels provide indication over a range of 50°F to 700°F.

3. Wide Range Neutron Flux

Wide Range Neutron Flux indication a Type B, Category 1, and is provided to verify reactor shutdown.

BASES

LCO (continued)

4. Containment Floor Water Level

Containment wide range Floor Water Level is a Category 1, Type B variable. It is provided for verification and long term surveillance of PCS integrity.

There are separate narrow range sump level channels. However, they are Type B Category 2 instruments, and are not required as AM instrumentation.

5. Subcooled Margin Monitor

The Subcooled Margin Monitor is a Type A, Category 1 variable used to initiate tripping of the primary coolant pumps and to initiate throttling of SIS flows. Each SMM channel uses a number of PCS pressure and temperature inputs to determine the degree of PCS subcooling or superheat.

6. Wide Range Pressurizer Level

Pressurizer Level is a Type A Category 1 variable used to determine whether to terminate Safety Injection (SI), if still in progress, or to reinitiate SI if it has been stopped. Knowledge of pressurizer water level is also used to verify the plant conditions necessary to establish natural circulation in the PCS and to verify that the plant is maintained in a safe shutdown condition.

7. Containment Hydrogen Monitors

Containment Hydrogen Monitors are a Category 1 Type A variable. They are provided to detect high hydrogen concentration conditions that represent a potential for containment breach, and are used to determine when to initiate hydrogen recombiners. This variable is also important in verifying the adequacy of mitigating actions.

8. Condensate Storage Tank (CST) Level

CST Level is a Type D Category 1 variable and is provided to ensure water supply for Auxiliary Feedwater (AFW). The CST provides the ensured safety grade water supply for the AFW System. Inventory is monitored by a 0 to 100% level indication. CST Level is displayed on a control room indicator, and plant computer. In addition, a control room annunciator alarms on low level.

The CST is the initial source of water for the AFW System. However, as the CST is depleted, manual operator action is necessary to replenish the CST.

BASES

LCO (continued)

9. Primary Coolant System Pressure (wide range)

PCS wide range pressure is a Type A Category I variable provided for verification of core cooling and PCS integrity long term surveillance. The indication is used by the operator to manually to initiate a trip of a Primary Coolant Pump following small break LOCA.

Wide range PCS loop pressure is measured by pressure transmitters with a span of 0 psia to 3000 psia. Redundant monitoring capability is provided by two trains of instrumentation. Control room indications are provided through the Plant Process Computer (PPC) and on C12 and C02.

10. Containment Pressure (wide range)

Containment Pressure is a Type C Category 1 variable, and is provided for verification of PCS and containment OPERABILITY.

11, 12. Wide Range Steam Generator Water Level

Steam Generator Water Level is provided to monitor operation of decay heat removal via the steam generators. It is a Type A, Category 1 Variable.

The indication of steam generator level instrumentation covers a span extending from the tubesheet to the steam, with an indicated range of -140% to +150%. Redundant monitoring capability is provided by two channels of instrumentation.

Operator action is based on the control room indication of Steam Water Level. The indication is used during a Steam Generator Tube Rupture to determine which SG has the ruptured tube. It is also used to initiate once through cooling on low-low water level.

13, 14. SG Pressure

Steam Generator Pressure is a Category 1 Type A variable used in accident identification, including Loss of Coolant, and Steam Line Break.

BASES

LCO (continued)

15. Containment Isolation Valve (CIV) Position

Containment Isolation Valve Position is a Type B Category 1 variable and is provided for verification of containment OPERABILITY.

CIV position is provided for verification of containment integrity. In the case of CIV position, the important information is the isolation status of the containment penetration. The LCO requires one channel of valve position indication in the control room to be OPERABLE for each active CIV in a containment penetration flow path. For containment penetrations with only one active PCIV having control room indication, Note (b) requires a single channel of valve position indication to be OPERABLE. This is sufficient to redundantly verify the isolation status of each isolable penetration via indicated status of the active valve, as applicable, and prior knowledge of passive valve or system boundary status. If a penetration flow path is isolated, position indication for the CIV(s) in the associated penetration flow path is not needed to determine status. Therefore, the position indication for valves in an isolated penetration flow path is not required to be OPERABLE.

16, 17, 18, 19. Core Exit Temperature

Core Exit Temperature is a Type C Category I variable and is provided for verification and long term surveillance of core cooling.

Each Core Exit Thermocouple (CET) channel consists of a single environmentally qualified thermocouple. This definition of a CET channel differs from standard Technical Specifications. The CET requirements actions were added to the Palisades Technical Specifications by amendment 147 on June 22, 1992.

The design of the Incore Instrumentation System includes a Type K (chromel-alumel thermocouple within each of 16 incore instrument detector assemblies.

The junction of each thermocouple is located above the core exit, inside the incore detector assembly guide tube, which supports and shields the incore instrument detector assembly string from flow forces in the outlet plenum region. These core exit thermocouples monitor the temperature of the reactor coolant as it exits the fuel assemblies.

The core exit thermocouples have a usable temperature range from 32°F to 2300°F, although accuracy is reduced at temperatures above 1800°F.

BASES

LCO (continued)

20. PCS Vessel Water Level

PCS Vessel Water Level is monitored by the Reactor Vessel Level Monitoring System (RVLMS). It is not listed in Reference 1 as either a Category 1 or a Type A instrument. It is described in FSAR Section 7.4, (Ref. 4). Reactor vessel level monitoring is provided for verification and long term surveillance of core cooling.

The Reactor Vessel Water Level monitoring system provides a direct measurement of the collapsed liquid level above the fuel alignment plate. The collapsed level represents the amount of liquid mass that is in the reactor vessel above the core. Measurement of the collapsed water level is selected because it is a direct indication of the water inventory. The collapsed level is obtained over the same temperature and pressure range as the saturation measurements, thereby encompassing all operating and accident conditions where it must function. Also, it functions during the recovery interval. Therefore, it is designed to survive the high steam temperature that may occur during the preceding core recovery interval.

The level range extends from the top of the vessel down to the top of the fuel alignment plate. A total of eight HJTC pairs are employed in each of the two RVLMS channels. Four are located in the reactor vessel head area, and four are located within the upper guide structure. Each pair consists of a heated junction TC and an unheated junction TC. The differential temperature at each HJTC pair provides discrete indication of uncovery at the HJTC pair location. This indication is displayed using LEDs in the control room. This provides the operator with adequate indication to track the progression of the accident and to detect the consequences of its mitigating actions or the functionality of automatic equipment.

A Reactor Vessel Water Level channel consists of eight sensors in a probe. A channel is OPERABLE if four or more sensors, two or more of the upper four and two or more of the lower four, are OPERABLE.

21. Containment Area Radiation (high range)

Containment Area Radiation is a Category 1 Type E variable. It is provided to monitor for the potential of significant radiation releases and to provide release assessment for use by operators in determining the need to invoke site emergency plans.

BASES

LCO (continued)

Two channels are required to be OPERABLE for all but one Function. Two OPERABLE channels ensure that no single failure, within either the AM instrumentation or its auxiliary supporting features or power sources (concurrent with the failures that are a condition of or result from a specific accident), prevents the operators from being presented the information necessary for them to determine the safety status of the plant and to bring the plant to and maintain it in a safe condition following that accident.

In Table 3.3.7-1 the exception to the two channel requirement is Containment Isolation Valve Position.

For loop and steam generator related variables, the required information is individual loop temperature and individual steam generator pressure and level. In these cases two channels are required to be OPERABLE for each loop of steam generator to redundantly provide the necessary information.

In the case of Containment Isolation Valve Position, the important information is the status of the containment penetrations. The LCO requires one position indicator for each active containment isolation valve. This is sufficient to redundantly verify the isolation status of each isolable penetration either via indicated status of the active valve and prior knowledge of the passive valve or via system boundary status. If a normally active containment isolation valve is known to be closed and deactivated, position indication is not needed to determine status. Therefore, the position indication for valves in this state is not required to be OPERABLE.

APPLICABILITY

The AM instrumentation LCO is applicable in MODES 1, 2, and 3. These variables are related to the diagnosis and preplanned actions required to mitigate DBAs. The applicable DBAs are assumed to occur in MODES 1, 2, and 3. In MODES 4, 5, and 6, plant conditions are such that the likelihood of an event occurring that would require AM instrumentation is low; therefore, AM instrumentation is not required to be OPERABLE in these MODES.

BASES

ACTIONS

Note 1 has been added in the ACTIONS to exclude the MODE change restriction of LCO 3.0.4. This exception allows entry into the applicable MODE while relying on the ACTIONS, even though the ACTIONS may eventually require plant shutdown. This exception is acceptable due to the passive function of the instruments, the operator's ability to monitor an accident using alternate instruments and methods, and the low probability of an event requiring these instruments.

Note 2 has been added in the ACTIONS to clarify the application of Completion Time rules. The Conditions of this Specification may be entered independently for each Function listed in Table 3.3.7-1. The Completion Time(s) of the inoperable channel(s) of a Function will be tracked separately for each Function, starting from the time the Condition was entered for that Function.

A.1

When one or more Functions have one required channel that is inoperable, the required inoperable channel must be restored to OPERABLE status within 7 days. The 7 day Completion Time is based on operating experience and takes into account the remaining OPERABLE channel (or in the case of a Function that has only one required channel, other non-Regulatory Guide 1.97 instrument channels to monitor the Function), the passive nature of the instrument (no critical automatic action occurs from these instruments), and the low probability of an event requiring AM instrumentation during this interval.

In the case of Containment Isolation Valve Position (Function 15), the 7 days allows ample time to isolate the affected penetration in accordance with Note (a), if repairs cannot be effected.

B.1

When one or more Functions have two required channels inoperable (i.e., two channels inoperable in the same Function), one channel in the Function should be restored to OPERABLE status within 48 hours. The Completion Time of 48 hours is based on the relatively low probability of an event requiring AM instrumentation operation and the availability of alternate means to obtain the required information. Continuous operation with two required channels inoperable in a Function is not acceptable because the alternate indications may not fully meet all performance qualification requirements applied to the AM instrumentation. Therefore, requiring restoration of one inoperable channel of the Function limits the risk that the AM Function will be in a degraded condition should an accident occur.

BASES

ACTIONS (continued)

C.1

If the Required Action and associated Completion Time of Condition A (one channel inoperable) are not met for Functions 1 through 15, or the Required Actions and associated Completion Times of Condition B (2 channels inoperable) are not met for Functions 1 through 19, the plant must be brought to a MODE in which the requirements of this LCO do not apply. To achieve this status, the plant must be brought to at least MODE 3 within 6 hours and to MODE 4 within 30 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.

The shutdown track for Table 3.3.7-1 items not addressed by this Condition are addressed by Condition D.

D.1 and D.2

If the Required Action and associated Completion Time of Condition A (one channel inoperable) are not met for Functions 16 through 21, or the Required Actions and associated Completion Times of Condition B (2 channels inoperable) are not met for Functions 20 and 21, Condition D is entered.

Required Action D.1 specifies initiation of actions in accordance with Specification 5.6.7, which requires a written report to be submitted to the Nuclear Regulatory Commission. This report discusses the results of the root cause evaluation of the inoperability and identifies proposed restorative Required Actions. This Required Action is appropriate in lieu of a shutdown requirement, given the likelihood of plant conditions that would require information provided by this instrumentation. Also, alternative Required Actions are identified before a loss of functional capability condition occurs.

Required Action D.2 requires restoration of these channels to OPERABLE status prior to the next startup after entering MODE 6. Items 16 through 20 employ sensing elements located within the reactor vessel, whose access is precluded except during refueling operations. Since Specification 3.0.4 is not applicable, this action is necessary to assure that repair is accomplished when the equipment is accessible during the next refueling.

BASES

ACTIONS (continued)

If two RVWL channels are inoperable, alternate instrument channels must be used for monitoring reactor vessel water level. The alternate channels normally used are Subcooled Margin Monitors, Wide Range Pressurizer Level, and Core Exit Thermocouples required by Table 3.3.7-1.

SURVEILLANCE REQUIREMENTS

SR 3.3.7.1

Performance of the CHANNEL CHECK once every 31 days ensures that a gross failure of instrumentation has not occurred. It is based on the assumption that instrument channels monitoring the same parameter should read approximately the same value. Significant deviations between the two instrument channels could be an indication of excessive instrument drift in one of the channels or of something even more serious. A CHANNEL CHECK will detect gross channel failure; thus, it is key to verifying the instrumentation continues to operate properly between each CHANNEL CALIBRATION.

Agreement criteria are determined by the plant staff based on a combination of the channel instrument uncertainties, including indication and readability. If a channel is outside the criteria, it may be an indication that the sensor or the signal processing equipment has drifted outside its limit. If the channels are within the criteria, it is an indication that the channels are OPERABLE. If the channels are normally off scale during times when surveillance is required, the CHANNEL CHECK will only verify that they are off scale in the same direction. Off scale low current loop channels are verified to be reading at the bottom of the range and not failed downscale.

The Frequency of 31 days is based upon plant operating experience with regard to channel OPERABILITY and drift, which demonstrates that failure of more than one channel of a given Function in any 31 day interval is a rare event. The CHANNEL CHECK supplements less formal, but more frequent, checks of channel during normal operational use of the displays associated with this LCO's required channels.

BASES

SURVEILLANCE REQUIREMENTS (continued)

SR 3.3.7.2

A CHANNEL CALIBRATION is performed every 18 months or approximately every refueling. CHANNEL CALIBRATION is a complete check of the instrument channel including the sensor. The Surveillance verifies the channel responds to the measured parameter within the necessary range and accuracy.

A note is added that Core Exit Thermocouple calibration is performed by substituting a known voltage for the thermocouple voltage.

The Frequency is based upon operating experience and consistency with the typical industry refueling cycle and is justified by an 18 month calibration interval for the determination of the magnitude of equipment drift.

REFERENCES

1. FSAR Appendix 7.C, Regulatory Guide 1.97 Instrumentation
2. Regulatory Guide 1.97
3. NUREG-0737, Supplement 1
4. FSAR Section 7.4, Other Safety Related Protection, Control, and Display Systems

B 3.3 **INSTRUMENTATION**

B 3.3.8 Alternate Shutdown System

BASES

BACKGROUND

The Alternate Shutdown System provides the control room operator with sufficient instrumentation and controls to place and maintain the unit in a safe shutdown condition from a location other than the control room. This capability is necessary to protect against the possibility that the control room becomes inaccessible. A safe shutdown condition is defined as MODE 3. With the unit in MODE 3, the Auxiliary Feedwater (AFW) System and the steam generator safety valves or the steam generator atmospheric dump valves can be used to remove core decay heat and meet all safety requirements. The long term supply of water for the AFW System and the ability to borate the Primary Coolant System (PCS) from outside the control room allow extended operation in MODE 3.

In order to ensure use of sufficient components of the Auxiliary Feedwater System and sufficient process information to permit reactor MODE 3 control in the event a fire damages equipment and circuitry of the main feedwater system or the Auxiliary Feedwater System in the control room, cable spreading room, Engineered Safeguards Auxiliary Panel C-33 room, or the corridor between Switchgear Room 1-C and the charging pump rooms, auxiliary Hot Shutdown Control Panels (C-150C-150A) have been provided and located in the southwest electrical penetration room. These panels are comprised of two enclosures, the main enclosure C-150 and an auxiliary one called C-150A. The description below combines these two enclosures into one entity called "Panel C-150" (Ref. 4).

From this panel, control of the auxiliary feedwater valves is enabled by transfer and control of auxiliary feedwater turbine steam supply Valve B. Indication of auxiliary feedwater flow to both steam generators, water level of both steam generators and pressurizer level are enabled by transfer. In addition, primary coolant pressure (pressurizer pressure) is displayed by a primary sensor dedicated to this use. Transfer of the above-mentioned systems is annunciated in the control room. See FSAR Section 7.4 (Ref. 3) for operation via Panel C-150.

The equipment controls that are required are listed in the LCO section of this basis.

Switches, which transfer control or instrument functions from the control room to the auxiliary shutdown control panel, alarm in the control room when the devices in the Auxiliary Hot Shutdown Control Panel are enabled.

BASES

BACKGROUND (continued)

The transfer switches of the Auxiliary Hot Shutdown Control Panel provide access to the Auxiliary Feedwater System for MODE 3 control only. No other means of achieving MODE 3 control exists if a fire damages the control room or the cable spreading room.

Wiring, including power sources for the control circuit and equipment operation for the alternate shutdown method, is independent of equipment wiring in the postulated fire areas.

Alternate shutdown power sources, including all breakers, have isolation devices on control circuits that are routed through the postulated fire areas, even if the breaker is to be operated manually.

Procedures are provided for taking the Plant to hot shutdown via the Auxiliary Hot Shutdown Control Panel in the event a fire prevents use of the control room.

The unit automatically reaches MODE 3 following a unit shutdown and can be maintained safely in MODE 3 for an extended period of time.

The OPERABILITY of the Alternate Shutdown System control and instrumentation Functions ensures that there is sufficient information available on selected plant parameters to place and maintain the plant in MODE 3, should the control room become inaccessible.

APPLICABLE SAFETY ANALYSES

The Alternate Shutdown System is required to provide equipment at appropriate locations outside the control room with a capability to promptly shut down and maintain the plant in a safe condition in MODE 3.

The criteria governing the design and the specific system requirements of the Remote Shutdown System are located in 10 CFR 50, Appendix A, GDC 19, and Appendix R (Ref. 1).

LCO

The Alternate Shutdown System LCO provides the requirements for the OPERABILITY of the instrumentation and controls necessary to place and maintain the unit in MODE 3 from a location other than the control room. The instrumentation and controls typically required are listed in Table 3.3.8-1 in the accompanying LCO.

BASES

LCO (continued)

Equipment controls that are required by the alternative dedicated method of achieving and maintaining MODE 3 are as follows:

1. Auxiliary feedwater valves
2. Turbine-driven Auxiliary feedwater pump

Instrumentation systems displayed on the Auxiliary Hot Shutdown Control Panel are:

1. Source range flux monitor
2. Auxiliary feedwater flow
3. Pressurizer pressure
4. Pressurizer level
5. Steam generator level and pressure
6. Primary coolant temperatures (hot and cold legs)
7. Turbine-driven auxiliary feedwater pump low-suction pressure warning light
8. SIRW tank level

A Function of the Alternate Shutdown System is OPERABLE if all instrument and control channels needed to support the remote shutdown Functions are OPERABLE.

The Alternate Shutdown System instrumentation and control circuits covered by this LCO do not need to be energized to be considered OPERABLE. This LCO is intended to ensure that the instrument and control circuits will be OPERABLE if plant conditions require that the Alternate Shutdown System be placed in operation.

Indication channels 3 through 14 in Table 3.3.8-1 use a transmitter which also serves normal control room instrumentation. When the control switches are changed to the "AHSDP" (Alternate Hot Shut Down Panel) position, the transmitter is isolated from its normal power supply and circuitry, and connected into the C-150 or C-150A panel circuit; control for AFW flow control valves CV-0727 and 0749 is also transferred to C-150. .The transfer switches are alarmed in the control room.

BASES

LCO (continued)

Pressurizer Pressure indicator channel 2 is provided with its own pressure transmitter. Its circuitry is energized when the transfer switch is in the AHSDP position.

APPLICABILITY

The Remote Shutdown System LCO is applicable in MODES 1, 2, and 3. This is required so that the unit can be placed and maintained in MODE 3 for an extended period of time from a location other than the control room.

This LCO is not applicable in MODE 4, 5, or 6. In these MODES, the unit is already subcritical and in the condition of reduced PCS energy. Under these conditions, considerable time is available to restore necessary instrument control Functions if control room instruments or control become unavailable.

ACTIONS

A Note has been included that excludes the LCO 3.0.3 shutdown requirements and MODE change restrictions of LCO 3.0.4. This exception allows entry into an applicable MODE while relying on the ACTIONS, even though the ACTIONS may eventually require a plant shutdown. This is acceptable due to the low probability of an event requiring this system. The Remote Shutdown System equipment can generally be repaired during operation without significant risk of spurious trip.

A Remote Shutdown System division is inoperable when each Function is not accomplished by at least one designated Remote Shutdown System channel that satisfies the OPERABILITY criteria for the channel's Function.

Note 2 has been added in the ACTIONS to clarify the application of Completion Time rules. The Conditions of this Specification may be entered independently for each Function listed in Table 3.3.8-1. The Completion Times of the inoperable channels of a Function will be tracked separately for each Function, starting from the time the Condition was entered for that Function.

BASES

ACTIONS (continued)

A.1 and A.2

Condition A addresses the situation where one or more channels of the Alternate Shutdown System are inoperable. This includes any Function listed in Table 3.3.8-1 as well as the control and transfer switches.

Required Action A.1 is to provide equivalent shutdown capability within 7 days. There may be several possible means of satisfying the remote shutdown capability. The Completion Time is based on operating experience and the low probability of an event that would require evacuation of the control room.

Required Action A.2 is to restore the channels to OPERABLE status within 60 days. This allows time to complete repairs on the failed channel, while maintaining alternate monitoring capability in accordance with Action A.1.

B.1 and B.2

If the Required Action and associated Completion Time of Condition A are not met, 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 4 within 30 hours. The allowed Completion Times are reasonable, based on operating experience, to reach the required MODE from full power conditions in an orderly manner and without challenging plant systems.

SURVEILLANCE REQUIREMENTS

SR 3.3.8.1

Performance of the CHANNEL CHECK on Functions 2 through 12, once every 92 days ensures that a gross failure of instrumentation has not occurred. A CHANNEL CHECK is normally a comparison of the parameter indicated on one channel to a similar parameter on other channels. It is based on the assumption that instrument channels monitoring the same parameter should read approximately the same value. Significant deviations between the instrument channels could be an indication of excessive instrument drift in one of the channels or of something even more serious. A CHANNEL CHECK will detect gross channel failure; thus, it is key to verifying that the instrumentation continues to operate properly between each CHANNEL CALIBRATION. Agreement criteria are determined by the plant staff, based on a combination of the channel instrument uncertainties, including indication and readability. If a channel is outside the criteria, it may be an indication that the sensor or the signal processing equipment has drifted outside its limit.

BASES

SURVEILLANCE REQUIREMENTS (continued)

As specified in the Surveillance, a CHANNEL CHECK is only required for those channels that are normally energized. If the channels are within the criteria, it is an indication that the channels are OPERABLE. If the channels are normally off scale during times when surveillance is required, the CHANNEL CHECK will only verify that they are off scale in the same direction. Off scale low current loop channels are verified to be reading at the bottom of the range and not failed downscale.

The 92 day interval was chosen because completion of a CHANNEL CHECK requires actuating the circuits with the associated transfer switches and thereby deactivating several normal control room channels which share the same detectors. The CHANNEL CHECK for the Neutron Flux channel is discussed below. AFW flow indicators are excepted because during normal operation there is zero AFW flow and a CHANNEL CHECK would be inconclusive.

SR 3.3.8.2

A CHANNEL CHECK of the Neutron Flux Monitoring Channel is performed within 7 days prior to reactor startup, as part of the CHANNEL FUNCTIONAL TEST of the neutron flux monitoring channels addressed by SR 3.3.1.6. The CHANNEL CHECK consists of comparing the remote indication with that from the control room. The Startup Range provides no alarm or automatic functions; the CHANNEL FUNCTIONAL TEST consists of verifying proper response of the channel to the internal test signals, and verification that a detectable signal is available from the detector. After lengthy shutdown periods flux may be below the range of the channel indication. Signal verification with test equipment is acceptable.

SR 3.3.8.3

A CHANNEL CHECK is performed on each AFW flow channel (Functions 13 and 14) at 18 month intervals as part of the CHANNEL CALIBRATION of SR 3.3.8.5. AFW flow indicators are excepted from more frequent CHANNEL CHECKS because during normal operation there is zero AFW flow and a CHANNEL CHECK would be inconclusive.

BASES

SURVEILLANCE REQUIREMENTS (continued)

SR 3.3.8.4

A CHANNEL FUNCTIONAL TEST is performed on each Alternate Shutdown Panel control channel (Functions 13 through 18) each 18 months to assure its operability. A CHANNEL FUNCTIONAL TEST is performed on the AFW pump suction pressure alarm as part of its CHANNEL CALIBRATION. SR 3.3.8.4 also verifies that each required Alternate Shutdown System transfer switch and control circuit for Functions 13 through 18 performs its intended function. Operability of the transfer and control switches for Functions 1 through 15 is addressed in the performance of SR 3.3.8.5, CHANNEL CALIBRATION. This verification is performed from the reactor shutdown panel and locally, as appropriate. This will ensure that if the control room becomes inaccessible, the plant can be placed and maintained in MODE 3 from the reactor shutdown panel and the local control stations. The 18 month Frequency is based on the need to perform this Surveillance under the conditions that apply during a plant outage and the potential for an unplanned transient if the Surveillance were performed with the reactor at power. Operating experience demonstrates that Remote Shutdown System control channels seldom fail to pass the Surveillance when performed at a Frequency of once every 18 months.

SR 3.3.8.5

Performance of a CHANNEL CALIBRATION every 18 months on Functions 1 through 15 ensures that the channels are operating accurately and within specified tolerances. Operating experience has shown this test interval to be satisfactory.

SR 3.3.8.5 also verifies that each required Remote Shutdown System transfer switch and control circuit for Functions 1 through 15 performs its intended function. Operability of the transfer and control switches for Functions 13 through 18 is addressed in the performance of SR 3.3.8.4, CHANNEL FUNCTIONAL TEST. This verification is performed from the alternate shutdown panel and locally, as appropriate. This will ensure that if the control room becomes inaccessible, the plant can be placed and maintained in MODE 3 from the alternate shutdown panel and the local control stations. The 18 month Frequency is based on the need to perform this Surveillance under the conditions that apply during a plant outage and the potential for an unplanned transient if the Surveillance were performed with the reactor at power. Operating experience demonstrates that Remote Shutdown System control channels seldom fail to pass the Surveillance when performed at a Frequency of once every 18 months.

BASES

REFERENCES

1. 10 CFR 50, Appendix A, GDC 19, and Appendix R
2. NRC Safety Evaluation Report (SER)
3. FSAR Section 7.4, "Other Safety Related Protection, Control, and Display Systems"
4. FSAR Section 7.7, "Operating Control Stations"

B 3.3 **INSTRUMENTATION**

B 3.3.9 Neutron Flux Monitoring Channels

BASES

BACKGROUND

The wide range neutron flux monitoring channels consist of two combined source range/wide range channels, designated NI 01/03 and NI 02/04. The wide range portions, (NI 03 and 04) provide neutron flux power indication from < 1 X 10^{-7}% RTP to > 100% RTP. They also provide an equipment protective High Startup Rate reactor trip when the RPS is OPERABLE, in MODES 1, 2, and 3, 4, and 5 when more than one control rod is capable of being withdrawn. The source range portions, designated NI 01 and NI 02 provide source range indication over the range of 1 to 1 X 10^{+5} cps.

This LCO addresses MODES 3, 4, and 5 with no more than one control rod capable of being withdrawn. When more than one control rod is capable of being withdrawn, the neutron flux monitoring channels are addressed by LCO 3.3.1, "Reactor Protective System (RPS) Instrumentation - Operating."

When the plant is shutdown with no more than one control rod capable of being withdrawn, both neutron flux monitoring channels must be available to monitor neutron flux power. If only one section of a neutron flux monitoring channel, source or wide range, is functioning, the neutron flux monitoring channel may be considered OPERABLE if it is capable of detecting the existing reactor neutron flux. In this application, the RPS channels need not be OPERABLE since the reactor trip Function is not required. By monitoring neutron flux power, loss of SDM caused by boron dilution can be detected as an increase in flux. Alarms are also provided when power increases above the fixed bistable setpoints. Two channels must be OPERABLE to provide single failure protection and to facilitate detection of channel failure by providing CHANNEL CHECK capability.

APPLICABLE SAFETY ANALYSES

The wide range neutron flux monitoring channels are necessary to monitor core reactivity changes. They are the primary means for detecting and triggering operator actions to respond to reactivity transients initiated from conditions in which the RPS is not required to be OPERABLE. They also trigger operator actions to anticipate RPS actuation in the event of reactivity transients starting from shutdown or low power conditions. The neutron flux monitoring channel's LCO requirements support compliance with 10 CFR 50, Appendix A, GDC 13 (Ref. 1). The FSAR Chapters 7 and 14 (Refs. 2 and 3, respectively), describe the specific neutron flux power monitoring channel features that are critical to comply with the GDC.

BASES

APPLICABLE SAFETY ANALYSES (continued)	The OPERABILITY of neutron flux monitoring channels is necessary to meet the assumptions of the safety analyses and provide for the mitigation of accident and transient conditions. The neutron flux monitoring channels satisfy Criterion 3 of the NRC Policy Statement.
LCO	The LCO on the neutron flux monitoring channels ensures that adequate information is available to verify core reactivity conditions while shut down. If only one section of a neutron flux monitoring channel, source or wide range, is functioning, the neutron flux monitoring channel may be considered OPERABLE if it is capable of detecting the existing reactor neutron flux. For example, with the source range count rate indicator functioning properly, and in reasonable agreement with the other source range, a neutron flux monitor channel may be considered OPERABLE even though its wide range indicator is not functioning.
APPLICABILITY	In MODES 3, 4, and 5, with no more than one control capable of withdrawal, neutron flux monitoring channels must be OPERABLE to monitor core power for reactivity changes. In MODES 1 and 2, and in MODES 3, 4, and 5 with more than one control rod capable of withdrawal, the neutron flux monitoring channels are addressed as part of the RPS in LCO 3.3.1, "Reactor Protective System (RPS) Instrumentation." The requirements for source range neutron flux monitoring in MODE 6 are addressed in LCO 3.8.2, "Nuclear Instrumentation." The source range nuclear instrumentation channels (NI 01 and 02) provide neutron flux coverage extending an additional one to two decades below the wide range channels for use during refueling, when neutron flux may be extremely low.

BASES

ACTIONS

A.1 and A.2

With one required channel inoperable, it may not be possible to perform a CHANNEL CHECK to verify that the other required channel is OPERABLE. Therefore, with one or more required channels inoperable, the neutron flux monitoring Function cannot be reliably performed. Consequently, the Required Actions are the same for one required channel inoperable or more than one required channel inoperable. The absence of reliable neutron flux indication makes it difficult to ensure SDM is maintained. Required Action A.1, therefore, requires that all positive reactivity additions that are under operator control, such as boron dilution or Reactor Coolant System temperature changes, be halted immediately, preserving SDM.

SDM must be verified periodically to ensure that it is being maintained. Both required channels must be restored as soon as possible. The initial Completion Time of 4 hours and once every 12 hours thereafter to perform SDM verification takes into consideration that Required Action A.1 eliminates many of the means by which SDM can be reduced. These Completion Times are also based on operating experience in performing the Required Actions and the fact that plant conditions will change slowly.

SURVEILLANCE REQUIREMENTS

SR 3.3.9.1

SR 3.3.9.1 is the performance of a CHANNEL CHECK on each required channel every 12 hours. It is based upon the assumption that instrument channels monitoring the same parameter should read approximately the same value. Significant deviations between instrument channels could be an indication of excessive instrument drift in one of the channels or of something even more serious. CHANNEL CHECK will detect gross channel failure; thus, it is key to verifying that the instrumentation continues to operate properly between each CHANNEL CALIBRATION.

Agreement criteria are determined by the plant staff and should be based on a combination of the channel instrument uncertainties including control isolation, indication, and readability. If a channel is outside the criteria, it may be an indication that the detector or the signal processing equipment has drifted outside its limits. If the channels are within the criteria, it is an indication that the channels are OPERABLE.

BASES

SURVEILLANCE REQUIREMENTS (continued)

The Frequency, about once every shift, is based on operating experience that demonstrates the rarity of channel failure. Since the probability of two random failures in redundant channels in any 12 hour period is extremely low, CHANNEL CHECK minimizes the chance of loss of protective function due to failure of redundant channels. CHANNEL CHECK supplements less formal, but more frequent, checks of channel OPERABILITY during normal operational use of displays associated with the LCO required channels.

SR 3.3.9.2

SR 3.3.9.2 is the performance of a CHANNEL CALIBRATION. A CHANNEL CALIBRATION is performed every 18 months. The Surveillance is a complete check and readjustment of the wide range power channel from the preamplifier input through to the remote indicators.

This Frequency is the same as that employed for the same channels in the other applicable MODES.

REFERENCES

1. 10 CFR 50, Appendix A, GDC 13
2. FSAR, Chapter 7
3. FSAR, Chapter 14

B 3.3 INSTRUMENTATION

B 3.3.10. Spent Fuel Pool (SFP) Radiation Monitor

BASES

BACKGROUND

This LCO addresses SFP Criticality Monitoring. It consists of two SFP Radiation Monitors, which provide alarms in the event of an approach to criticality. This satisfies the requirements of 10 CFR 70.24 (a)(2), (Ref. 1) which requires an alarm system to warn of criticality events capable of generating radiation levels in excess of 300 Rem/hr one foot from the source of the radiation.

Each of the two radiation monitors located in the spent fuel pool area is capable of providing the required alarm functions. No automatic actuation functions are provided by this circuitry.

Trip Setpoints and Allowable Values

Trip setpoints used in the SFP Criticality Monitor are based on the Reference 1 requirement of providing an alarm at a setpoint of less than 20 millirem/hr to warn of criticality accidents, while assuring that the setpoint is at least 5 millirem/hr to avoid spurious actuations. If the measured setpoint does not exceed the Allowable Value, the bistable is considered OPERABLE.

APPLICABLE SAFETY ANALYSES

The SFP Radiation Monitors used to effect the criticality monitoring function are required by Reference 1. This reference requires that persons licensed to possess special nuclear materials prior to December 6, 1974 maintain a monitoring system capable of detecting criticality events which generate radiation levels in excess of 300 Rem/hr at one foot. This reference stipulates that the devices shall in no case be further than 120 feet from the special nuclear material being handled, with the possibility of lesser distances to account for shielding or other pertinent factors. It also requires the trip setpoints between 5 millirem/hr and 20 millirem/hr, as stated above.

LCO

The LCO on the SFP Radiation Monitoring channels requires that both channels be OPERABLE.

BASES

APPLICABILITY

The APPLICABILITY of the SFP Radiation Monitor is whenever fuel is in the Fuel Pool Area. This is consistent with the requirements of Reference 1. The APPLICABILITY is independent of any operational MODES by the nature of the monitoring requirements.

ACTIONS

A note has been added which excludes the shutdown requirements of LCO 3.0.3 and the power change restrictions of LCO 3.0.4. These exclusions are appropriate because the APPLICABILITY and Actions are not MODE dependent, and initiating LCO 3.0.3 or 3.0.4 Required Actions will not result in an improvement in plant safety.

A SFP Radiation Monitoring channel is inoperable when it does not satisfy the criteria for the channel's Function. The most common cause of channel inoperability is outright failure or drift of the bistable or process module. Typically, the drift is not large and would result in an alarm delay rather than a total loss of function. This determination is generally made during the performance of a CHANNEL FUNCTIONAL TEST when the process instrument is set up for adjustment to bring it within specification. If the actual trip setpoint is not within the SR 3.3.10.2 Allowable Value, the channel is inoperable and Condition A must be entered.

<u>A.1, A.2.1, A.2.2</u>

Condition A applies to the failure of one or both SFP Radiation Monitoring channels used to perform the Criticality Monitoring Function. No distinction is made between one channel inoperable or two channels inoperable, since with only one channel inoperable there is no backup if the second monitor should fail. Therefore the Required Actions are the same in both cases.

Required Action A.1 is to immediately suspend fuel movement in the SFP area. The fuel pool is designed to be subcritical even at zero PPM Boron concentration. This makes it extremely unlikely that a criticality accident could occur.

Required Actions A.2.1 and A.2.2 requires restoration of the inoperable channels to OPERABLE status in 72 hours, or to provide equivalent monitoring capability. The 72 hour Completion Time is sufficient to either effect the required repairs, or provide other monitoring equipment.

BASES

SURVEILLANCE REQUIREMENTS

SR 3.3.10.1

Performance of the CHANNEL CHECK once every 24 hours ensures that a gross failure of instrumentation has not occurred.

Significant deviations between the two instrument channels could be an indication of excessive instrument drift in one of the channels or of something even more serious. CHANNEL CHECK will detect gross channel failure; thus, it is key to verifying the instrumentation continues to operate properly between each CHANNEL CALIBRATION. Agreement criteria are determined by the plant staff, based on a combination of the channel instrument uncertainties, including indication and readability.

The Frequency, is based on operating experience that demonstrates the rarity of channel failure. Since the probability of two random failures in redundant channels in any 24 hour period is low, the CHANNEL CHECK minimizes the chance of loss of function due to failure of redundant channels. The CHANNEL CHECK supplements less formal, but more frequent, checks of channel OPERABILITY during normal operational use of the displays associated with the LCO required channels.

SR 3.3.10.2

A CHANNEL FUNCTIONAL TEST is performed on each SFP Radiation Monitoring channel to ensure the entire channel will perform its intended function.

The Frequency of 31 days is based on plant operating experience with regard to channel OPERABILITY and drift, which demonstrates that failure of more than one channel of a given Function in any 31 day interval is a rare event.

SR 3.3.10.3

CHANNEL CALIBRATION is a complete check of the instrument channel including the sensor. The Surveillance verifies that the channel responds to a measured parameter within the necessary range and accuracy. CHANNEL CALIBRATION leaves the channel adjusted to account for instrument drift between successive calibrations to ensure that the channel remains operational between successive tests.

The Frequency is based upon the assumption of an 18 month calibration interval for the determination of the magnitude of equipment drift in the setpoint analysis.

REFERENCES

1. 10 CFR 70.24 (a)(2)

ATTACHMENT 3

CONSUMERS POWER COMPANY
PALISADES PLANT
DOCKET 50-255

STS CONVERSION TECHNICAL SPECIFICATION CHANGE REQUEST

3.3 INSTRUMENTATION PART

Comparison of Existing and Revised Technical Specifications

Palisades Tech Spec Requirement List. Corrected through Amendment 170

A list of the existing Palisades Tech Specs (TS) correlated to Palisades Revised Technical Specifications (RTS).

First Column; Existing Palisades Tech Spec (TS) number

Each numbered TS item is listed in the left-most column. Items which contain more than one requirement are listed once for each requirement.

Second Column; Palisades Revised Tech Spec (RTS) number

The nearest corresponding numbered RTS item is listed in the second column. If the item does not appear in RTS, it is noted as 'Deleted' or 'Relocated.'

Deleted is used where an item has been eliminated as a tech spec, ie deleting, iaw GL 84-15, the requirement to test a D.G. when an ECCS pump in the opposite train becomes inoperable.

Relocated is used where an item has been moved to a controlled program or document because it does not meet the "Criteria" of 10 CFR 50.36(2)(c)(ii).

Where an item is relocated or deleted, the number of the associated RTS section has been added to allow sorting the list by section number. Relocated items, such as heavy load restrictions, which are not associated with any particular RTS section are arbitrarily assigned the number 5.0.

Third Column; TS Item Description

An abbreviation of the TS requirement appears in the third column. Each item is identified as: LCO, ACTION, SR, Admin, Exception, etc. Some items are implied, rather than explicit, ie a LCO is implied when an ACTION exists without a stated LCO.

Description Key;	TS requirement type:	Column 3 syntax:
	Safety Limit	SL: Safety limit; Applicable conditions
	Surveillance Requirement	SR: Equipment to be tested; Test description; Frequency
	Limiting Safety Setting	LSS: RPS Trip Channel & required setting
	Limiting Condition for Operation	LCO: Equipment to be operable; Applicable conditions
	Action	ACTN: Condition requiring action; Required action; Completion time
	Administrative Requirement	ADMN: Administrative requirement
	Permitted Instrument Bypass	Byps: Bypassable component; conditions when bypass permitted
	Defined Term	DEF: Name of defined item
	Exception to other Requirement	XCPT: Excepted spec or condition; Applicable conditions
	Descriptive material	DESC: Subject matter
	Table	TBL: Table

Forth Column; Classification of Changes:

Each change is identified as ADMINISTRATIVE, RELOCATED, MORE RESTRICTIVE, or LESS RESTRICTIVE.

Fifth Column; Discussion of Changes:

Each change is discussed briefly.

TS Number	RTS Number	TS requirement description	Classification and Description of Changes	
2.3	3.3	Limiting Safety Settings - RPS		
2.3	3.3.1	LSS: RPS settings iaw Tbl 2.3.1; When RPS req by 3.17.1	ADMINISTRATIVE:	Unchanged in intent. The explicit statement is eliminated in STS format. Implicit in LCO 3.0.1 definition/stated in Bases.
2.3.1	3.3.1	ACTN: Setting not w/in limits; declare inop; Immediately	ADMINISTRATIVE:	Unchanged in intent. The explicit statement is eliminated in STS format. The intent is satisfied by LCO 3.0.2 wording.
2.3.1	3.3.1	TBL: RPS Trip Settings	MORE RESTRICTIVE:	Unchanged for 4 PCP operation. Only 4 PCP values listed, as 2 or 3 PCP operation is no longer permitted.
2.3.1.1	3.3.1	LSS: Variable Hi power Trip settings	ADMINISTRATIVE:	Requirement Unchanged.
2.3.1.2	3.3.1	LSS: PCS Flow trip settings	ADMINISTRATIVE:	Requirement Unchanged.
2.3.1.3	3.3.1	LSS: Hi Pressurizer Press trip setting	ADMINISTRATIVE:	Requirement Unchanged.
2.3.1.4	3.3.1	LSS: TM/LP Trip settings	ADMINISTRATIVE:	Requirement Unchanged.
2.3.1.5	3.3.1	LSS: SG Lo level trip setting	ADMINISTRATIVE:	Requirement Unchanged.
2.3.1.6	3.3.1	LSS: SG Lo Press trip setting	ADMINISTRATIVE:	Requirement Unchanged.
2.3.1.7	3.3.1	LSS: CHP Trip setting	ADMINISTRATIVE:	Requirement Unchanged.
3.8.1.c	3.3.6.1, 2, 3	SR: 2 radiation monit; verify oper; B4 refuel	MORE RESTRICTIVE:	Proposed SRs, like STS counterpart require verifications on a periodic basis, not "immediately" before refueling. Like most instrumentation channels, a channel check is required each 12 hrs, a channel functional test each 31 days, and a channel calibration each 18 months.
3.8.1.d	3.3.6	LCO: Monitor CB Rad lvl; Refueling	ADMINISTRATIVE:	Requirement unchanged. Proposed LCO requires two radiation monitor channels to be operable during Core Alterations. These monitors actuate containment isolation during refueling.
3.8.1.d	3.3.10	LCO: Monitor SFP Rad lvl; Refueling	ADMINISTRATIVE:	LCO added to instrumentation section of RTS.
3.14.a	3.3.1 G	ACTN: W CR >120°F; Immediate action to fix or to SD	MORE RESTRICTIVE:	Required temperature reduced from 120°F to 90°F. This reduced temperature supports operability of the Reactor Protective System Thermal Margin Monitors. Its inclusion in RTS completes an action requested in Amendment 118.

TS Number	RTS Number	TS requirement description	Classification and Description of Changes	
3.16	3.3.3	ESF Sys Initiation Settings	ADMINISTRATIVE:	The Specification, Applicability, and Action statements are implicit in LCO 3.3.3, as supported by LCOs 3.0.1 and 3.0.2
3.16	3.3.3	LCO: ESF settings iaw Tbl 3.16.1	ADMINISTRATIVE:	Unchanged, now Table 3.3.3-1.
3.16 T	3.3.3-1	TBL: ESF Instrument Setting Limits	ADMINISTRATIVE:	Requirement Unchanged.
3.16 T.1	3.3.3-1 t1a	LCO: Pzr Low Press >1593#	ADMINISTRATIVE:	Requirement Unchanged.
3.16 T.2	3.3.3-1 t2a	LCO: Cont Hi Press 3.70-4.40#	ADMINISTRATIVE:	Requirement Unchanged.
3.16 T.3	3.3.3-1 t3a	LCO: Cont High Rad <20 R/H	ADMINISTRATIVE:	Requirement Unchanged.
3.16 T.4	3.3.3-1 t4a,b	LCO: SG Lo Press ≥500#	ADMINISTRATIVE:	Requirement Unchanged.
3.16 T.5	3.3.3-1 t5a,b	LCO: SG Lo Level ≥25.9%	ADMINISTRATIVE:	Requirement Unchanged.
3.16 T.6	3.3.3-1 t6a	LCO: SIRWT Low Level 21 to 27 inch	ADMINISTRATIVE:	Requirement Unchanged.
3.16.T.6	3.3 Relocated	LCO: ESF Pump Room Rad Monitors <2.2E5 CPM	RELOCATED:	The ESF pump room monitors are not assumed to function by the safety analyses. This requirement does not meet the criterion of 10 CFR 50.36.

TS Number	RTS Number	TS requirement description	Classification and Description of Changes	
3.17	3.3.1-3.3.10	Instrumentation Systems	ADMINISTRATIVE:	Requirement unchanged. Worded per STS.
3.17.1	3.3.1/3.3.2	LCO: 4 RPS channels in Tbl 3.17.1; Fuel, >1 rod, etc	ADMINISTRATIVE:	Specification: Requirement unchanged in intent. Reworded and divided into two LCOs per STS; instrumentation in LCO 3.3.1, logic and manual initiation in LCO 3.3.2.
3.17.1.1	3.3.2 C.	ACTN: 1 manual trip inoperable; Restore; Before startup	ADMINISTRATIVE:	Unchanged in intent- RTS 3.3.2 Condition C, changed "before Startup" to read "Prior to entering MODE 2 following next MODE 3 entry" to be similar to Indefinite bypass wording of digital plant LCOs for STS consistency.
3.17.1.2	3.3.1 A	ACTN: 1 trip unit or inst inop; put in trip; 7 days	ADMINISTRATIVE:	Requirement unchanged.
3.17.1.2 a	3.3.1 C	ACTN: Hi SUR/LOL, 1 trip unit inop; No restore required	MORE RESTRICTIVE:	RTS requires restoring to OPERABLE prior to entering MODE 2 following MODE 5 entry. In effect, this is prior to the next reactor startup. TS does not require any restoration.
3.17.1.3.a	3.3.1 B.1.	ACTN: 2 trip units or inst inop; trip 1; 1 hr	ADMINISTRATIVE:	Requirement unchanged.
3.17.1.3.b	3.2.5 D.1/E.1	ACTN: 2 Pwr range instruments inoperable; be 70%; 2 hrs	ADMINISTRATIVE:	This action is replaced by actions which assure the desired protection is retained, or require a power reduction to below 25% RTP. The existing Bases (2nd paragraph, page B 3.17-8) state that the reason for the required power reduction is the loss of the ability to detect flux tilts when only two power range NI channels are available. With the proposed RTS, if 1 (of 3) required ASI monitoring channels (which are fed by the power range NI channels) are inoperable, Action 3.2.5 D.1 directs using the Incore detectors for measurement of LHR. The incores provide the ability to detect flux tilts, and thereby provide the information which the inoperable NIs are unable to provide. If this action cannot be completed, (ie the desired flux tilt detection function is lost) Action 3.2.5 E.1 requires a power reduction to below 25%.
3.17.1.3.c	3.3.1.b.2	ACTN: 2 trip units or inst inop; restore 1; 7 days	ADMINISTRATIVE:	Requirement unchanged.
3.17.1.3 c	3.3.1 D	ACTN: Hi SUR/LOL, 2 Trip Units inop; no restore required	MORE RESTRICTIVE:	RTS requires restoring one Trip units to OPERABLE prior to entering MODE 2 following MODE 5 entry. In effect, this is prior to the next reactor startup. TS does not require any restoration.
3.17.1.4	3.3.2 A	ACTN: 1 matrix logic Channel inop· restore; 48 hrs	ADMINISTRATIVE:	Requirement unchanged.

TS Number	RTS Number	TS requirement description	Classification and Description of Changes	
3.17.1.5	•3.3.2 B	ACTN: 1 init. chnl inop; de-energize pwr supplies; 1 hr	ADMINISTRATIVE:	Requirement unchanged.
3.17.1.6a	3.3.1 G/3.3.2 F	ACTN: Action not met or <min chnls; HSD 12 hrs	MORE RESTRICTIVE:	The shutdown actions for both the instrumentation (RTS 3.3.1 F) And logic (3.3.2 D) Use the STS shutdown track requiring mode 3 entry in 6 hrs, and placing the plant in a condition where the LCO does not apply in 6 hrs. This contrasts with the 12 hrs Hot Shutdown Completion Time of the TS.
3.17.1.6b	3.3.1 G/3.3.2 F	ACTN: Action not met or <min chnls; leave applic; 48 hrs	MORE RESTRICTIVE:	The RTS Action B.2 uses the STS Completion Time of 6 hrs to ensure no more than one CR is capable of withdrawal. This requirement is not explicitly stated in the TS, but meets the TS requirement to place the plant in a Condition where the LCO does not apply. Action B.2 requirement in the RTS requires ensuring no more than one CR is capable of withdrawal. This differs from the STS, where all RTCBs must be opened, due to the LCO APPLICABILITY difference between the RTS and STS, It is consistent with the TS.
3.17.1T	3.3.1-1T	TBL: RPS instrument requirements		
3.17.1T#1	3.3.2	LCO: 2 manual trip Chnls	ADMINISTRATIVE:	Unchanged in intent. No longer addressed in Table, in accordance with STS format. Addressed in LCO 3.3.2 Statement.
3.17.1T#2	3.3.1-1 T1	LCO: 4 VHPT Chnls	ADMINISTRATIVE:	Unchanged in intent. IAW STS, No. of channels is addressed in LCO 3.3.1 statement.
3.17.1T#3	3.3.1-1 T2	LCO: 4 Hi Rate Chnls	ADMINISTRATIVE:	Unchanged in intent. IAW STS, No. of channels is addressed in LCO 3.3.1 statement.
3.17.1T#4	3.3.1-1 T9	LCO: 4 TM/lpt Chnls	ADMINISTRATIVE:	Unchanged in intent. IAW STS, No. of channels is addressed in LCO 3.3.1 statement.
3.17.1T#5	3.3.1-1 T5	LCO: 4 Hi Pressurizer pressure Chnls	ADMINISTRATIVE:	Unchanged in intent. IAW STS, No. of channels is addressed in LCO 3.3.1 statement.
3.17.1T#6	3.3.1-1 T6	LCO: 4 Low Flow Chnls	ADMINISTRATIVE:	Unchanged in intent. IAW STS, No. of channels is addressed in LCO 3.3.1 statement.
3.17.1T#7	3.3.1-1 T10	LCO: 4 Loss of Load Chnls	ADMINISTRATIVE:	Unchanged in intent. IAW STS, No. of channels is addressed in LCO 3.3.1 statement.
3.17.1T#8	3.3.1-1 T4	LCO: 4 Low "A" SG Level Chnls	ADMINISTRATIVE:	Unchanged in intent. IAW STS, No. of channels is addressed in LCO 3.3.1 statement.

Comparison of existing Palisades Tech Specs and Proposed Palisades Tech Specs. (03/28/96)

TS Number	RTS Number	TS requirement description	Classification and Description of Changes	
3.17.1T#9	3.3.1-1 T5	LCO: 4 Low "B" SG Level Chnls	ADMINISTRATIVE:	Unchanged in intent. IAW STS, No. of channels is addressed in LCO 3.3.1 statement.
3.17.1T#10	3.3.1-1 T6	LCO: 4 Low "A" SG Pressure Chnls	ADMINISTRATIVE:	Unchanged in intent. IAW STS, No. of channels is addressed in LCO 3.3.1 statement.
3.17.1T#11	3.3.1-1 T7	LCO: 4 Low "B" SG Pressure Chnls	ADMINISTRATIVE:	Unchanged in intent. IAW STS, No. of channels is addressed in LCO 3.3.1 statement.
3.17.1T#12	3.3.1-1 T12	LCO: 4 Hi Cont Pressure Chnls	ADMINISTRATIVE:	Unchanged in intent. IAW STS, No. of channels is addressed in LCO 3.3.1 statement.
3.17.1T#13	3.3.2	LCO: 6 RPS Matrix Logic Chnls	ADMINISTRATIVE:	Requirement Unchanged. Addressed in LCO statement.
3.17.1T#14	3.3.2	LCO: 4 Initiation Logic Chnls	ADMINISTRATIVE:	Requirement unchanged. Addressed in LCO statement.
3.17.1T(a)	3.3.1 E	LCO: 2 WR NI Chnls; Zero Pwr Mode Bypass	MORE RESTRICTIVE:	The option to use the Zero Power Mode Bypass has been removed. This bypass may only be used under conditions when the RPS is not required to be operable.
3.17.1T(b)	T3.3.1-1 Note b	NOTE: Bypass conditions	MORE RESTRICTIVE:	The option to use the Zero Power Mode Bypass has been removed. This bypass may only be used under conditions when the RPS is not required to be operable.
3.17.1T(c)	Deleted	NOTE: bypass conditions, physics testing	MORE RESTRICTIVE:	Note deleted. This deletion of the note permitting raising the bypass setpoint is done because this provision of raising the bypass enable setpoint is not actually used at Palisades during Physics Testing. Therefore it is Not Required.
3.17.1T(d)	T3.3.1-1 Note c	NOTE: Special Loss of Load applicability	ADMINISTRATIVE:	Requirement unchanged.
3.17.2	3.3.3/3.3.4	LCO: ESF chnls in Table 3.17.2; ≥300°F	ADMINISTRATIVE:	Unchanged in Intent. Worded per STS. Instrumentation in LCO 3.3.2. Logic and Manual in LCO 3.3.4. Note that TS LCOs 3.17.2 (ESF) and 3.17.3 (Isolation Functions) are combined into LCO 3.3.3 and 3.3.4.
3.17.2.1	3.3.4 A.	ACTN: 1 Manual Chnl inop; Restore 48 hrs	ADMINISTRATIVE:	Requirement unchanged.
3.17.2.2	3.3.3 B.1	ACTN: 1 inst Chnl inop; put in trip; 7 days	ADMINISTRATIVE:	Requirement unchanged.
3.17.2.3(a)	3.3.3 C.1	ACTN: 2 inst Chnls inop; trip 1; 8 hrs	ADMINISTRATIVE:	Requirement unchanged.
3.17.2.3(b)	3.3.3 C.2	ACTN: 2 inst Chnls inop; restore 1; 7 days	ADMINISTRATIVE:	Requirement unchanged.

TS Number	RTS Number	TS requirement description	Classification and Description of Changes	
3.17.2.4(a)	3.3.3 A.1	ACTN: 1 SIRWT Lvl Chnl inop; bypass; 8 hrs	ADMINISTRATIVE:	Requirement unchanged.
3.17.2.4(b)	3.3.3 A.2	ACTN: 1 SIRWT Lvl Chnl inop; restore; 7 days	ADMINISTRATIVE:	Requirement unchanged.
3.17.2.5	3.8.1 F.1	ACTN: sequencer inop; declare DG inop; Immediately	ADMINISTRATIVE:	Requirement Unchanged. The sequencers are addressed as a required part of the Diesel Generators.
3.17.2.6a	3.3.3 E/3.3.4 B	ACTN: Action not met or <min chnls; Hot SD 12 hrs	MORE RESTRICTIVE:	The RTS requires MODE 3 entry in 6 hrs, as in the STS. MODE 4 entry is in 30 hrs, vice 48 for the TS.
3.17.2.6b	3.3.3 E/3.3.4 B	ACTN: Action not met or <min chnls; leave applic; 48 hrs	MORE RESTRICTIVE:	The RTS requires MODE 3 entry in 6 hrs, as in the STS. MODE 4 entry is in 30 hrs, vice 48 for the TS.
3.17.2T#1a	3.3.4-1 t1a	LCO: 2 manual SIS Chnls	ADMINISTRATIVE:	Requirement unchanged.
3.17.2T#1b	3.3.4-1 t1b	LCO: 2 SIS Logic Chnls	ADMINISTRATIVE:	Requirement unchanged.
3.17.2T#1c	3.3.4-1 t1c	LCO: 2 CHP SIS initiation Chnls	ADMINISTRATIVE:	Requirement unchanged.
3.17.2T#1d	3.3.3-1 t1a	LCO: 4 Pressurizer Pressure Chnls	ADMINISTRATIVE:	Requirement unchanged.
3.17.2T#2a	3.3.4-1 6a	LCO: 2 manual RAS Chnls	ADMINISTRATIVE:	Requirement unchanged.
3.17.2T#2b	3.3.4-1 6b	LCO: 2 RAS logic Chnls	ADMINISTRATIVE:	Requirement unchanged.
3.17.2T#2c	3.3.3-1 6a	LCO: 4 SIRWT Level Chnls	ADMINISTRATIVE:	Requirement unchanged.
3.17.2T#3a	3.3.4-1 5a	LCO: 2 manual AFAS Chnls	ADMINISTRATIVE:	Requirement unchanged.
3.17.2T#3b	3.3.4-1 5b	LCO: 2 AFAS Logic Chnls	ADMINISTRATIVE:	Requirement unchanged.
3.17.2T#3c	3.3.3-1 5a	LCO: 4 SG "A" level Chnls	ADMINISTRATIVE:	Requirement unchanged.
3.17.2T#3d	3.3.3-1 5b	LCO: 4 SG "B" level Chnls	ADMINISTRATIVE:	Requirement unchanged.
3.17.2T#4a	3.8.1	LCO: 2 DBA Sequencers	ADMINISTRATIVE:	The sequencers are addressed in the RTS electrical chapter as a functional part of the Diesel Generator. LCO 3.8.1 provides both Actions and SRs for the sequencers.
3.17.2T#4b	3.8.1	LCO: 2 Shutdown Sequencers	ADMINISTRATIVE:	The sequencers are addressed in the RTS electrical chapter as a functional part of the Diesel Generator. LCO 3.8.1 provides both Actions and SRs for the sequencers.

TS Number	RTS Number	TS requirement description	Classification and Description of Changes	
3.17.3	3.3.3/3.3.4	LCO: Isolation chnls in Table 3.17.3; >Cold SD	LESS RESTRICTIVE:	APPLICABILITY Current TS APPLICABILITY for the containment isolation functions of Table 3.17.3 is >COLD SHUTDOWN. RTS APPLICABILITY is MODES 1, 2, and 3. This is justifiable in the case of SGLP since the SGLP function may be bypassed below 550 psia, which corresponds to a temperature above 300°F. In the case of CHP and CHR, manual initiation capability is still possible in MODE 4 due to the MODE 4 applicability requirements of LCO 3.6.3, Containment Isolation Valves. In addition, the Refueling CHR specification (LCO 3.3.6) addresses CHR isolation in MODE 6, during fuel handling.
3.17.3.1	3.3.4 A	ACTN: 1 Isolation manual chnl inop; restore; 48 hrs	ADMINISTRATIVE:	Requirement unchanged.
3.17.3.2	3.3.3 B.1	ACTN: 1 isolation inst chnl inop; trip; 7 days	ADMINISTRATIVE:	Requirement unchanged.
3.17.3.3a	3.3.4 C.1	ACTN: 2 isolation inst Chnls inop; trip 1; 8 hrs	ADMINISTRATIVE:	Requirement unchanged.
3.17.3.3b	3.3.4 C.2	ACTN: 2 isolation inst Chnls inop; restore 1; 7 days	ADMINISTRATIVE:	Requirement unchanged.
3.17.3.4	3.3 Relocated	ACTN: Safeguards rm monitors inop; isolate vent; Immed	RELOCATED:	The ESF pump room monitors are not assumed to function by the safety analyses. This requirement does not meet the criterion of 10 CFR 50.36.
3.17.3.5a	3.3.3 E/3.3.4 B	ACTN: Action not met or <min chnls; Hot SD 12 hrs	MORE RESTRICTIVE:	The RTS requires MODE 3 entry in 6 hrs, as in the STS. MODE 4 entry is in 30 hrs, vice 48 for the TS.
3.17.3.5b	3.3.3 E/3.3.4 B	ACTN: Action not met or <min chnls; leave applic; 48 hrs	MORE RESTRICTIVE:	See above description
3.17.3T#1a	3.3.4-1 t1a.	LCO: 2 CHP Logic Chnls	ADMINISTRATIVE:	Requirement unchanged.
3.17.3T#1b	3.3.3-1 t2a	LCO: 4 "left" containment Pressure switches	ADMINISTRATIVE:	Requirement unchanged.
3.17.3T#1c	3.3.3-1 t2b	LCO: 4 "right" containment Pressure switches	ADMINISTRATIVE:	Requirement unchanged.
3.17.3T#2a	3.3.4-1 t3a	LCO: 2 manual CHR Chnls	ADMINISTRATIVE:	Requirement unchanged.
3.17.3T#2b	3.3.3-1 t3b	LCO: 2 CHR logic Chnls	ADMINISTRATIVE:	Requirement unchanged.
3.17.3T#2c	3.3.3-1 t3a	LCO: 4 Containment Monitors	ADMINISTRATIVE:	Requirement unchanged.
3.17.3T#3a	3.3.4-1 t4a	LCO: 2 manual SGLP Chnls	ADMINISTRATIVE:	Requirement unchanged.
3.17.3T#3b	3.3.4-1 t4b	LCO: 2 SGLP Logic Chnls	ADMINISTRATIVE:	Requirement unchanged.
3.17.3T#3c	3.3.3-1 4a	LCO: 4 SG "A" pressure Chnls	ADMINISTRATIVE:	Requirement unchanged.

TS Number	RTS Number	TS requirement description	Classification and Description of Changes	
3.17.3T#3d	3.3.3-1 4b	LCO: 4 SG "B" pressure Chnls	ADMINISTRATIVE:	Requirement unchanged.
3.17.3T#4a	3.3 Relocated	LCO: 1 East room monitor	RELOCATED:	The ESF pump room monitors are not assumed to function by the safety analyses. This requirement does not meet the criterion of 10 CFR 50.36.
3.17.3T#4b	3.3 Relocated	LCO: 1 West room monitor	RELOCATED:	The ESF pump room monitors are not assumed to function by the safety analyses. This requirement does not meet the criterion of 10 CFR 50.36.
3.17.4	3.3.7	LCO: AMI chnls in Table 3.17.4; >300°F	ADMINISTRATIVE:	Requirement unchanged.
3.17.4.1	3.3.7 A	ACTN: 1 chnl 1-14 inop; restore; 7 days	ADMINISTRATIVE:	Requirement unchanged.
3.17.4.2	3.3.7 B	ACTN: 2 chnls 1-14 inop; restore 1; 48 hrs	ADMINISTRATIVE:	Requirement unchanged.
3.17.4.3	3.3.7-1 T Note C.	ACTN: Valve Pos inop; restore or lock vlv shut; 7 days	ADMINISTRATIVE:	Requirement unchanged.
3.17.4.4a	3.3.7 C	ACTN: Action 1-3 not met or <min chnl; Hot SD 12 hrs	MORE RESTRICTIVE:	LCO 3.0.3 shutdown action of 6 hrs to MODE 3 and 30 hrs to MODE 4 used to be consistent with shutdown action in other LCOs.
3.17.4.4b	3.3.7 C	ACTN: Action 1-3 not met or <min chnl; leave applic; 48 hrs	MORE RESTRICTIVE:	RTS MODE 4 Completion Time is 30 hrs.
3.17.4.5	3.3.7 A	ACTN: 1 chnl 16-21 inop; restore; 7 days	ADMINISTRATIVE:	Requirement unchanged.
3.17.4.6	3.3.7 B	ACTN: 2 chnls 16-21 inop; restore 1; 48 hrs	ADMINISTRATIVE:	Requirement unchanged.
3.17.4.7(a)	3.3.7 C	ACTN: 2 CETs inop & Action not met; Do 3.17.4.4	ADMINISTRATIVE:	Requirement unchanged.
3.17.4.7(b)	3.3.7	ACTN: 2 RVWL inop & Action not met; alt monitor; 48 hrs	ADMINISTRATIVE:	The deletion of this specific requirement does not impact the requirements for equipment operability in any way. The bases do address the need for alternative monitoring using SMM, CETs, and Pressurizer Level. All of these parameters are in table 3.3.7-1, and are required to be OPERABLE. In addition, should both channels of any of these become inoperable, shutdown is required. Therefore it is impossible not to meet the alternative monitoring requirement.
3.17.4.7(c)	3.3.7 D	ACTN: Action 5 or 6 not met; submit report; 30 days	ADMINISTRATIVE:	Unchanged in intent. Referencing Spec. 5.6.7 is in accordance with STS format. The result is the same.
3.17.4.7(d)	3.3.7 D	ACTN: Action 5 or 6 not met; Fix inst prior to SU	ADMINISTRATIVE:	Requirement unchanged.
3.17.4T#1	3.3.7-1 T1	LCO: 2 WR Th chnls	ADMINISTRATIVE:	Requirement unchanged.

TS Number	RTS Number	TS requirement description	Classification and Description of Changes	
3.17.4T#2	3.3.7-1 T2	LCO: 2 WR Tc chnls	ADMINISTRATIVE:	Requirement unchanged.
3.17.4T#3	3.3.7-1 T3	LCO: 2 WR NI chnls	ADMINISTRATIVE:	Requirement unchanged.
3.17.4T#4	3.3.7-1 T4	LCO: 2 Cont water lvl chnls	ADMINISTRATIVE:	Requirement unchanged.
3.17.4T#5	3.3.7-1 T5	LCO: 2 Subcooled margin chnls	ADMINISTRATIVE:	Requirement unchanged.
3.17.4T#6	3.3.7-1 T6	LCO: 2 WR Pzr Level chnls	ADMINISTRATIVE:	Requirement unchanged.
3.17.4T#7	3.3.7-1 T7	LCO: 2 Cont H_2 chnls	ADMINISTRATIVE:	Requirement unchanged.
3.17.4T#8	3.3.7-1 T8	LCO: 2 CST Level chnls	ADMINISTRATIVE:	Requirement unchanged.
3.17.4T#9	3.3.7-1 T9	LCO: 2 WR Pressurizer Pressure chnls	ADMINISTRATIVE:	Requirement unchanged.
3.17.4T#10	3.3.7-1 T10	LCO: 2 WR Cont Pressure chnls	ADMINISTRATIVE:	Requirement unchanged.
3.17.4T#11	3.3.7-1 T11	LCO: 2 WR SG "A" Level Th chnls	ADMINISTRATIVE:	Requirement unchanged.
3.17.4T#12	3.3.7-1 T12	LCO: 2 WR SG "B" Level chnls	ADMINISTRATIVE:	Requirement unchanged.
3.17.4T#13	3.3.7-1 T13	LCO: 2 NR SG "A" Pressure chnls	ADMINISTRATIVE:	Requirement unchanged.
3.17.4T#14	3.3.7-1 T14	LCO: 2 NR SG "B" Pressure chnls	ADMINISTRATIVE:	Requirement unchanged.
3.17.4T#15	3.3.7-1 T15	LCO: 1 pos indicator for each cont iso valve	ADMINISTRATIVE:	Note a added in accordance with STS. This allows deletion of the TS Action 3.17.4.3,(valve closure in 7 days) since locking the valve shut per Note c accomplishes the same thing.
3.17.4T#16	3.3.7-1 T16	LCO: 4 CETs quad 1	ADMINISTRATIVE:	Requirement unchanged.
3.17.4T#17	3.3.7-1 T17	LCO: 4 CETs quad 2	ADMINISTRATIVE:	Requirement unchanged.
3.17.4T#18	3.3.7-1 T18	LCO: 4 CETs quad 3	ADMINISTRATIVE:	Requirement unchanged.
3.17.4T#19	3.3.7-1 T19	LCO: 4 CETs quad 4	ADMINISTRATIVE:	Requirement unchanged.
3.17.4T#20	3.3.7-1 T20	LCO: 2 RVWL chnls	ADMINISTRATIVE:	Requirement unchanged.
3.17.4T#21	3.3.7-1 T21	LCO: 2 HR Cont Rad chnls	ADMINISTRATIVE:	Requirement unchanged.
3.17.5	3.3.8	LCO: Alt SD chnls in Table 3.17.5; >300°F	ADMINISTRATIVE:	Requirement unchanged.
3.17.5.1a	3.3.8 A.1	ACTN: Alt SD Chnls inop; provide equiv; 7 days	ADMINISTRATIVE:	Requirement unchanged.

Comparison of existing Palisades Tech Specs and Proposed Palisades Tech Specs. (03/28/96)

TS Number	RTS Number	TS requirement description	Classification and Description of Changes	
3.17.5.1b	3.3.8 A.2	ACTN: Alt SD Chnls inop; restore; 60 days	ADMINISTRATIVE:	Requirement unchanged.
3.17.5.2a	3.3.8 B.1	ACTN: Action not met or <min chnls; Hot SD 12 hrs	MORE RESTRICTIVE:	Used STS shutdown time of 6 hrs to MODE 3.
3.17.5.2b	3.3.8 B.2	ACTN: Action not met or <min chnls; leave applic; 48 hrs	MORE RESTRICTIVE:	Used STS shutdown time of 6 hrs to MODE 3.
3.17.5T#1	3.3.8-1 T1	LCO: 1 SU Nuclear Inst chnl	ADMINISTRATIVE:	Requirement unchanged.
3.17.5T#2	3.3.8-1 T2	LCO: 1 Pressurizer Pressure chnl	ADMINISTRATIVE:	Requirement unchanged.
3.17.5T#3	3.3.8-1 T3	LCO: 1 Pressurizer Level chnl	ADMINISTRATIVE:	Requirement unchanged.
3.17.5T#4	3.3.8-1 T4	LCO: 1 Loop 1 Th chnl	ADMINISTRATIVE:	Requirement unchanged.
3.17.5T#5	3.3.8-1 T5	LCO: 1 loop 2 Th chnl	ADMINISTRATIVE:	Requirement unchanged.
3.17.5T#6	3.3.8-1 T6	LCO: 1 Loop 1 Tc chnl	ADMINISTRATIVE:	Requirement unchanged.
3.17.5T#7	3.3.8-1 T7	LCO: 1 Loop 2 Tc chnl	ADMINISTRATIVE:	Requirement unchanged.
3.17.5T#8	3.3.8-1 T8	LCO: 1 SG "A" Pressure chnl	ADMINISTRATIVE:	Requirement unchanged.
3.17.5T#9	3.3.8-1 T9	LCO: 1 SG "B" Pressure chnl	ADMINISTRATIVE:	Requirement unchanged.
3.17.5T#10	3.3.8-1 T10	LCO: 1 SG "A" Level chnl	ADMINISTRATIVE:	Requirement unchanged.
3.17.5T#11	3.3.8-1 T11	LCO: 1 SG "B" Level chnl	ADMINISTRATIVE:	Requirement unchanged.
3.17.5T#12	3.3.8-1 T12	LCO: 1 SIRWT Level chnl	ADMINISTRATIVE:	Requirement unchanged.
3.17.5T#13	3.3.8-1 T13	LCO: 1 AFW Flow to SG "A" chnl	ADMINISTRATIVE:	Requirement unchanged.
3.17.5T#14	3.3.8-1 T14	LCO: 1 AFW Flow to SG "B" chnl	ADMINISTRATIVE:	Requirement unchanged.
3.17.5T#15	3.3.8-1 T15	LCO: 1 Pump P-8B Suction Pressure chnl	ADMINISTRATIVE:	Requirement unchanged.
3.17.5T#16	3.3.8-1 T16	LCO: 1 Pump P-8B steam Valve Control chnl	ADMINISTRATIVE:	Requirement unchanged.
3.17.5T#17	3.3.8-1 T17	LCO: 1 AFW Flow Control to SG "A" chnl	ADMINISTRATIVE:	Requirement unchanged.
3.17.5T#18	3.3.8-1 T18	LCO: 1 AFW Flow Control to SG "B" chnl	ADMINISTRATIVE:	Requirement unchanged.

TS Number	RTS Number	TS requirement description	Classification	Description of Changes
3.17.5T#19	3.3 Deleted	LCO: C-150 Transfer Switches	ADMINISTRATIVE:	Unchanged in intent. This transfer switch is not specifically called out because Transfer Switches must function for the other instrumentation to function. Performing SRs on the above instrumentation validated the transfer switch automatically. This is stated in the bases.
3.17.5T#20	3.3 Deleted	LCO: C-150A Transfer Switches	ADMINISTRATIVE:	Unchanged in intent. This transfer switch is not specifically called out because Transfer Switches must function for the other instrumentation to function. Performing SRs on the above instrumentation validated the transfer switch automatically. This is stated in the bases.
3.17.6	3.3 LCOs	LCO: Safety function chnls in Table 3.17.6; in Table	ADMINISTRATIVE:	Unchanged in intent. APPLICABILITY wording changed to be consistent with new MODE definitions. Item 1 in Table 3.17.6 is now LCO 3.3.9. It is the counterpart of RTS LCO 3.3.1 for use in monitoring when the RPS is not required. It is the same in intent as in the TS and STS. Item 20 in Table 3.17.6 is now LCO 3.3.6. Item 19 is now LCO 3.3.10.
3.17.6.1a	3.3.9 A.1	ACTN: Flux Monitoring inop; stop adding rx; Immediately	ADMINISTRATIVE:	Requirement unchanged.
3.17.6.1b	3.3 Deleted	ACTN: Flux Monitoring inop; Hot SD; 15 minutes	ADMINISTRATIVE:	This requirement to be in HSD is not applicable with the arrangement of requirements in RTS. LCOs 3.3.1 and 3.3.9 have complementary applicabilities. LCO 3.3.9, therefore cannot be applicable with the reactor "above" hot shutdown (ie, MODES 1 or 2) and LCO 3.3.1 carries its own flux monitoring requirements and associated actions. Therefore, this TS requirement addresses conditions which cannot arise under the structure of the RTS instrument LCOs.
3.17.6.1c	3.3.9 A.3	ACTN: Flux Monitoring inop; Verify SDM 4 hrs & each 12 hrs	ADMINISTRATIVE:	Requirement unchanged.
3.17.6.2	3.1.5 D.1	ACTN: 1 Rod Pos chnl inop; check rods 15; Min after motion	ADMINISTRATIVE:	Requirement unchanged.
3.17.6.3	3.3 Relocated	ACTN: SIRWT Temp chnl inop; provide alternate; 7 days	RELOCATED:	This requirement does not meet the criterion of 10 CFR 50.36.
3.17.6.4	3.3 Relocated	ACTN: 1 MFW Flow chnl inop; provide alternate; 24 hrs	RELOCATED:	This requirement does not meet the criterion of 10 CFR 50.36.
3.17.6.5	3.3 Relocated	ACTN: 1 MFW Temp chnl inop; provide alternate; 24 hrs	RELOCATED:	This requirement does not meet the criterion of 10 CFR 50.36.

TS Number	RTS Number	TS requirement description	Classification and Description of Changes	
3.17.6.6.1	3.7.5	ACTN: 1 AFW Flow chnl inop; verify valve operable; 2 hrs	ADMINISTRATIVE:	The AFW LCO, 3.7.5, includes the operability of the flow control valves as an integral part of the operability of an AFW train. Therefore, if a flow channel becomes inoperable, the operability of the associated valve, and therefore the train, must be determined immediately. While RTS provided no time limit or making this determination, the intent of the two requirements is the same.
3.17.6.6.2	3.7.5	ACTN: 2 AFW Flow chnls inop; declare valve inop; Immed	ADMINISTRATIVE:	The AFW LCO, 3.7.5, includes the operability of the flow control valves as an integral part of the operability of an AFW train. Therefore, if a flow channel cause a valve to be inoperable, the valve and the associated AFW train are also inoperable.
3.17.6.7.1	3.4.15 A.1	ACTN: 1 leak detector inop; restore; Prior to startup	ADMINISTRATIVE:	Requirements unchanged.
3.17.6.7.2	3.4.15 B.1	ACTN: 2 of 3 leak detectors inop; restore; 30 days	ADMINISTRATIVE:	Requirements unchanged.
3.17.6.8	3.4 Relocated	ACTN: 1 Safety Vlv Pos Ind inop; restore; Prior to startup	RELOCATED:	This requirement does not meet the criterion of 10 CFR 50.36.
3.17.6.9	3.4 Relocated	ACTN: 1 PORV Pos Ind inop; restore; Prior to startup	RELOCATED:	This requirement does not meet the criterion of 10 CFR 50.36.
3.17.6.10a	3.4 Relocated	ACTN: 1 Block vlv Pos Ind inop; restore; B4 SU	RELOCATED:	This requirement does not meet the criterion of 10 CFR 50.36.
3.17.6.10b	3.4 Relocated	ACTN: 1 LTOP Block Pos Ind inop; verify open; Each 12 hrs	RELOCATED:	This requirement does not meet the criterion of 10 CFR 50.36.
3.17.6.11	3.3 Relocated	ACTN: SWS Break Detector inop; restore prior to startup	RELOCATED:	This requirement does not meet the criterion of 10 CFR 50.36.
3.17.6.12.1	3.3 Relocated	ACTN: 1 Comparitor inop; restore; Prior to Startup	RELOCATED:	The Flux - ΔT comparitors are used only for indication. They do not provide any protective function, nor do they meet any of the criterion of 10 CFR 50.36.
3.17.6.12.2	3.3 Relocated	ACTN: 2 Comparitors inop; be ≤70% pwr; 2 hrs	RELOCATED:	The Flux - ΔT comparitors are used only for indication. They do not provide any protective function, nor do they meet any of the criterion of 10 CFR 50.36.
3.17.6.13	3.3 Relocated	ACTN: 1 seq chnl inop; check rods; 15 min after motion	RELOCATED:	This requirement does not meet the criterion of 10 CFR 50.36.

TS Number	RTS Number	TS requirement description	Classification and Description of Changes	
3.17.6.14	3.5 Relocated	ACTN: CBA lo Lvl alm inop; Verify level each 12 hrs	RELOCATED:	This requirement does not meet the criterion of 10 CFR 50.36.
3.17.6.15	3.2.5 A.1	ACTN: Deviation Alm inop; Calculate T_q each 12 hrs	ADMINISTRATIVE:	Requirement unchanged.
3.17.6.16	3.2 Relocated	ACTN: ASI Alm inop; Restore prior to startup	RELOCATED:	This requirement does not meet the criterion of 10 CFR 50.36.
3.17.6.17	3.4.6 E.1	ACTN: SDC interlock inop; Breaker "Racked Out" position; 8 hrs	MORE RESTRICTIVE:	RTS required circuit breaker be in "OPEN" position in 1 hr.
3.17.6.18	3.1.7 C.1	ACTN: PDIL Alm inop; check rods; 15; Min after motion	ADMINISTRATIVE:	Requirement unchanged.
3.17.6.19a	3.3.10 A.1	ACTN: Fuel Pool monitor inop; stop moving fuel; Immediate	ADMINISTRATIVE:	Requirement unchanged.
3.17.6.19b	3.3.10 A.2	ACTN: Fuel Pool monitor inop; restore capability; 72 hrs	ADMINISTRATIVE:	Requirement unchanged.
3.17.6.20	3.3.6	ACTN: Cont Refueling Monitor inop; Stop refueling	MORE RESTRICTIVE:	Unchanged in Intent, but Action A.1 in LCO 3.3.6 now requires suspending CORE ALTERATIONS (the equivalent of suspending TS Refueling operations), and in addition, Action A.2 requires suspending movement of Irradiated Fuel.
3.17.6.21a	3.3	ACTN: Action not met or <min chnls; Hot SD 12 hrs	MORE RESTRICTIVE:	The general shutdown action is moved to the associated LCOs. In each case it requires being in MODE 3 (similar to TS HSD) within 6 hrs.
3.17.6.21b	3.3	ACTN: Action not met or <min chnls; leave applic; 48 hrs	MORE RESTRICTIVE:	The general shutdown action is moved to the associated LCOs. In each case it requires being in Mode in 30 hrs or in MODE 5 in 36 hrs, either of which is more restrictive than the TS action.
3.17.6T#1	3.3.9	LCO: 2 chnls Flux Monitoring; $<10^{-4}$% w/fuel	ADMINISTRATIVE:	Applicability has been made complementary with that of LCO 3.3.1 so that when the RPS and four channels of NIs are not required, this LCO will require flux monitoring capability.
3.17.6T#2	3.1.5	LCO: 2 chnls Rod Pos; >1 rod capable of withdrawal	ADMINISTRATIVE:	Rod position indication is addressed as a functional part of Rod Operability in LCO 3.1.5.
3.17.6T#3	3.3 Relocated	LCO: 2 chnls SIRWT Temp; 300°F	RELOCATED:	This requirement does not meet the criterion of 10 CFR 50.36.
3.17.6T#4	3.3 Relocated	LCO: 2 chnls MFW Flow; >15% power	RELOCATED:	This requirement does not meet the criterion of 10 CFR 50.36.

TS Number	RTS Number	TS requirement description	Classification and Description of Changes	
3.17.6T#5	3.3 Relocated	LCO: 2 chnls MFW Temp; >15% power	RELOCATED:	This requirement does not meet the criterion of 10 CFR 50.36.
3.17.6T#6	3.3 Relocated	LCO: 2 chnl / line AFW Flow; >300°F	RELOCATED:	This requirement does not meet the criterion of 10 CFR 50.36. At least one channel of AFW flow per feed line is required by LCO 3.7.5 as part of AFW train operability, but redundancy is not required.
3.17.6T#7	3.4.15	LCO: 4 chnls diverse PCS leak detection; >300°F	ADMINISTRATIVE:	Requirement unchanged.
3.17.6T#8	3.4 Relocated	LCO: 2 chnls pos ind per safety vlv; >300°F	RELOCATED:	This requirement does not meet the criterion of 10 CFR 50.36.
3.17.6T#9	3.4 Relocated	LCO: 3 chnls pos ind per PORV; >210°F	RELOCATED:	This requirement does not meet the criterion of 10 CFR 50.36.
3.17.6T#10	3.4 Relocated	LCO: 2 chnls pos ind per Block Vlv; At all times	RELOCATED:	This requirement does not meet the criterion of 10 CFR 50.36.
3.17.6T#11	3.7 Relocated	LCO: 1 SWS break detector; ≥Hot Standby	RELOCATED:	This requirement does not meet the criterion of 10 CFR 50.36.
3.17.6T#12	3.3 Relocated	LCO: 4 Flux ΔT comparitors; Power Operation	RELOCATED:	The Flux - ΔT comparitors are used only for indication. They do not provide any protective function, nor do they meet any of the criterion of 10 CFR 50.36.
3.17.6T#13	3.3 Relocated	LCO: 2 chnls Rod sequence control/Alarm; >1 rod	RELOCATED:	This requirement does not meet the criterion of 10 CFR 50.36.
3.17.6T#14	3.5 Relocated	LCO: 2 Boric Acid Tank Lvl Alm; ≥Hot Standby	RELOCATED:	This requirement does not meet the criterion of 10 CFR 50.36.
3.17.6T#15	3.2.5	LCO: 1 Excore Deviation Alm; >25% power	ADMINISTRATIVE:	Requirements unchanged.
3.17.6T#16	3.2 Relocated	LCO: 4 chnls ASI Alarm; >25% power	RELOCATED:	This requirement does not meet the criterion of 10 CFR 50.36.
3.17.6T#17	3.4.6 E	LCO: 2 SDC interlocks; >200 psia	ADMINISTRATIVE:	Requirements unchanged, interlock not required when SDC in operation.
3.17.6T#18	3.1.7	LCO: 2 chnls PDIL Alm; ≥Hot Standby	ADMINISTRATIVE:	Requirements unchanged.
3.17.6T#19	3.3.10	LCO: 2 chnls Fuel Pool Monitor; W/fuel in pool	ADMINISTRATIVE:	Requirements unchanged.
3.17.6T#20	3.3.6	LCO: 2 chnls Cont Refuel Monitor; Refueling Ops	MORE RESTRICTIVE:	See APPLICABILITY discussion for LCO 3.17.6.20.

TS Number	RTS Number	TS requirement description		Classification and Description of Changes	
4.2.2.5	3.3 Relocated	SR:	Ref Sys Interlocks; verify function; B4 refuel	RELOCATED:	This requirement does not meet the criterion of 10 CFR 50.36.
4.2.3.g	3.3.1.8	SR:	CR Vent Sys; check CR temp <120°F w/>105°F; 12 hrs	MORE RESTRICTIVE:	Required temperature reduced from 120°F to 90°F. This reduced temperature supports operability of the Reactor Protective System Thermal Margin Monitors. Its inclusion in RTS completes an action requested in Amendment 118.
4.17	3.3		Instrumentation Systems Tests		
4.17.1T	3.3.1/3.3.2	TABL:	RPS instrument SRs	ADMINISTRATIVE:	Requirement unchanged. RPS Inst. SRs in 3.3.1. RPS Logic SRs in 3.3.2.
4.17.1T#1-cc	3.3.2.	SR:	Manual Trip; Chnl Check; Not req	ADMINISTRATIVE:	Requirement unchanged. Applicable SRs specified in LCO. There is no table in LCO 3.3.2.
4.17.1T#1-cft	3.3.3.2	SR:	Manual Trip; Chnl Func Test; 7 days B4 Startup	ADMINISTRATIVE:	Requirement unchanged.
4.17.1T#2-cc	3.3.1.1	SR:	VHPT Chnls; Chnl Check; 12 hrs	ADMINISTRATIVE:	Requirement unchanged.
4.17.1T#2-cft	3.3.1.3	SR:	VHPT Chnls; Chnl Func Test; 31 days	LESS RESTRICTIVE:	Changed to 92 days in accordance with CEN 327, surveillance interval extension, iaw STS.
4.17.1T#2-cal	3.3.1.2	SR:	VHPT Chnls; Cal w Heat bal; 24 hrs	ADMINISTRATIVE:	Requirement unchanged.
4.17.1T#2-cal	3.3.1.4	SR:	VHPT Chnls; Cal Excores; 31 days	ADMINISTRATIVE:	Requirement unchanged.
4.17.1T#2-cal	3.3.1.7	SR:	VHPT Chnls; Chnl Cal; 18 months	ADMINISTRATIVE:	Requirement unchanged.
4.17.1T#3-cc	3.3.1.1	SR:	Hi Rate Chnls; Chnl Check; 12 hrs	ADMINISTRATIVE:	Requirement unchanged.
4.17.1T#3-cft	3.3.1.6	SR:	Hi Rate Chnls; Chnl Func Test; 7 days B4 startup	ADMINISTRATIVE:	Requirement unchanged.
4.17.1T#3-cal	3.3.1.7	SR:	Hi Rate Chnls; Chnl Cal; 18 mo	ADMINISTRATIVE:	Requirement unchanged.
4.17.1T#4-cc	3.3.1.1	SR:	TM/lpt Chnls; Chnl Check; 12 hrs	ADMINISTRATIVE:	Requirement unchanged.
4.17.1T#4-cft	3.3.1.3	SR:	TM/lpt Chnls; Chnl Func Test; 31 days	LESS RESTRICTIVE:	Changed to 92 days in accordance with CEN 327, surveillance interval extension.
4.17.1T#4-cal	3.3.1.5	SR:	TM/lpt Chnls; Chnl Cal; 18 mo	ADMINISTRATIVE:	Requirement unchanged.
4.17.1T#5-cc	3.3.1.1	SR:	Hi Pressurizer pressure Chnls; Chnl Check; 12 hrs	ADMINISTRATIVE:	Requirement unchanged.
4.17.1T#5-cft	3.3.1.3	SR:	Hi Pressurizer press Chnls; Chnl Func Test; 31 days	LFSS RESTRICTIVE:	Changed to 92 days in accordance with CEN 327, surveillance interval extension.

TS Number	RTS Number	TS requirement description	Classification and Description of Changes	
4.17.1T#5-cal	3.3.1.7	SR: Hi Pressurizer pressure Chnls; Chnl Cal; 18 mo	ADMINISTRATIVE:	Requirement unchanged.
4.17.1T#6-cc	3.3.1.1	SR: Low Flow Chnls; Chnl Check; 12 hrs	ADMINISTRATIVE:	Requirement unchanged.
4.17.1T#6-cft	3.3.1.3	SR: Low Flow Chnls; Chnl Func Test; 31 days	LESS RESTRICTIVE:	Changed to 92 days in accordance with CEN 327, surveillance interval extension.
4.17.1T#6-cal	3.3.1.7	SR: Low Flow Chnls; Chnl Cal; 18 Months	ADMINISTRATIVE:	Requirement unchanged.
4.17.1T#7-cft	3.3.1.6	SR: Loss of Load; Chnl Func Test; 7 days B4 startup	ADMINISTRATIVE:	Requirement unchanged.
4.17.1T#7-cal	3.3.1.7	SR: Loss of Load; Chnl Cal; 18 mo	ADMINISTRATIVE:	Requirement unchanged.
4.17.1T#8-cc	3.3.1.1	SR: Low "A" SG Level Chnls; Chnl Check; 12 hrs	ADMINISTRATIVE:	Requirement unchanged.
4.17.1T#8-cft	3.3.1.3	SR: Low "A" SG Level Chnls; Chnl Func Test; 31 days	LESS RESTRICTIVE:	Changed to 92 days in accordance with CEN 327, surveillance interval extension.
4.17.1T#8-cal	3.3.1.7	SR: Low "A" SG Level Chnls; Chnl Cal; 18 mo	ADMINISTRATIVE:	Requirement unchanged.
4.17.1T#9-cc	3.3.1.1	SR: Low "B" SG Level Chnls; Chnl Check; 12 hrs	ADMINISTRATIVE:	Requirement unchanged.
4.17.1T#9-cft	3.3.1.3	SR: Low "B" SG Level Chnls; Chnl Func Test; 31 days	LESS RESTRICTIVE:	Changed to 92 days in accordance with CEN 327, surveillance interval extension.
4.17.1T#9-cal	3.3.1.7	SR: Low "B" SG Level Chnls; Chnl Cal; 18 mo	ADMINISTRATIVE:	Requirement unchanged.
4.17.1T#10-cc	3.3.1.1	SR: Low "A" SG Pressure Chnls; Chnl Check; 12 hrs	ADMINISTRATIVE:	Requirement unchanged.
4.17.1T#10-cft	3.3.1.3	SR: Low "A" SG Pressure Chnls; Chnl Func Test; 31 days	LESS RESTRICTIVE:	Changed to 92 days in accordance with CEN 327, surveillance interval extension.
4.17.1T#10-cal	3.3.1.7	SR: Low "A" SG Pressure Chnls; Chnl Cal; 18 mo	ADMINISTRATIVE:	Requirement unchanged.
4.17.1T#11-cc	3.3.1.1	SR: Low "B" SG Pressure Chnls; Chnl Check; 12 hrs	ADMINISTRATIVE:	Requirement unchanged.
4.17.1T#11-cft	3.3.1.3	SR: Low "B" SG Pressure Chnls; Chnl Func Test; 31 days	LESS RESTRICTIVE:	Changed to 92 days in accordance with CEN 327, surveillance interval extension.
4.17.1T#11-cal	3.3.1.7	SR: Low "B" SG Pressure Chnls; Chnl Cal; 18 mo	ADMINISTRATIVE:	Requirement unchanged.
4.17.1T#12-cft	3.3.1.3	SR: Hi Cont Pressure Chnls; Chnl Func Test; 31 days	LESS RESTRICTIVE:	Changed to 92 days in accordance with CEN 327, surveillance interval extension.
4.17.1T#12-cal	3.3.1.7	SR: Hi Cont Pressure Chnls; Chnl Cal; 18 mo	ADMINISTRATIVE:	Requirement unchanged.

TS Number	RTS Number	TS requirement description	Classification and Description of Changes	
4.17.1T#13-cft	3.3.2.1	SR: RPS Matrix Logic Chnls; Chnl Func Test; 31 days	LESS RESTRICTIVE:	Changed to 92 days in accordance with CEN 327, surveillance interval extension.
4.17.1T#14-cft	3.3.2.1	SR: Initiation Logic Chnls; Chnl Func Test; 31 days	LESS RESTRICTIVE:	Changed to 92 days in accordance with CEN 327, surveillance interval extension.
4.17.1T#15	3.3.1.5	SR: TM/LP Calculators; Verify Constants; 92 days	ADMINISTRATIVE:	Requirement unchanged.
4.17.2T#1a-cft	3.3.4.3	SR: Manual SIS Chnls; Chnl Func Test; 18 mo	ADMINISTRATIVE:	Requirement unchanged.
4.17.2T#1b-cft	3.3.4.2	SR: SIS Logic Chnls; Test W. Test Switches; 92 days	ADMINISTRATIVE:	Requirement unchanged.
4.17.2T#1b-cal	3.3.4.4	SR: SIS Logic Chnls; Chnl Func Test; 18 months	ADMINISTRATIVE:	Requirement unchanged.
4.17.2T#1c-cft	3.3.4.4	SR: CHP SIS initiation Chnls; Chnl Func Test; 18 mo	ADMINISTRATIVE:	Requirement unchanged.
4.17.2T#1d-cc	3.3.3.1	SR: Pressurizer Pressure Chnls; Chnl Check; 12 hrs	ADMINISTRATIVE:	Requirement unchanged.
4.17.2T#1d-cft	3.3.3.2	SR: Pressurizer Pressure Chnls; Chnl Func Test; 31 days	LESS RESTRICTIVE:	Changed to 92 days in accordance with CEN 327, surveillance interval extension.
4.17.2T#1d-cal	3.3.3.3	SR: Pressurizer Pressure Chnls; Chnl Cal; 18 mo	ADMINISTRATIVE:	Requirement unchanged.
4.17.2T#2a-cft	3.3.4.3	SR: Manual RAS Chnls; Chnl Func Test; 18 mo	ADMINISTRATIVE:	Requirement unchanged.
4.17.2T#2b-cft	3.3.4.4	SR: RAS logic Chnls; Chnl Func Test; 18 mo	ADMINISTRATIVE:	Requirement unchanged.
4.17.2T#2c-cft	3.3.3.3	SR: SIRWT Level Chnls; Chnl Func test; 18 mo	ADMINISTRATIVE:	A CHANNEL FUNCTIONAL TEST is part of the 18 month CHANNEL CALIBRATION, by definition.
4.17.2T#2c-cal	3.3.3.3	SR: SIRWT Level Chnls; Chnl Cal; 18 mo	ADMINISTRATIVE:	Requirement unchanged.
4.17.2T#3a-cft	3.3.4.3	SR: Manual AFAS Chnls; Chnl Func Test; 18 mo	ADMINISTRATIVE:	Requirement unchanged.
4.17.2T#3b-cft	3.3.4.1	SR: AFAS Logic Chnls; Chnl Func Test; 92 days	ADMINISTRATIVE:	Requirement unchanged.
4.17.2T#3c-cc	3.3.3.1	SR: SG "A" level Chnls; Chnl Check; 12 hrs	ADMINISTRATIVE:	Requirement unchanged.
4.17.2T#3c-cft	3.3.3.2	SR: SG "A" level Chnls; Chnl Func Test; 31 days	LESS RESTRICTIVE:	Changed to 92 days in accordance with CEN 327, surveillance interval extension.
4.17.2T#3c-cal	3.3.3.3	SR: SG "A" level Chnls; Chnl Cal; 18 mo	ADMINISTRATIVE:	Requirement unchanged.
4.17.2T#3d-cc	3.3.3.1	SR: SG "B" level Chnls; Chnl Check; 12 hrs	ADMINISTRATIVE:	Requirement unchanged.

TS Number	RTS Number	TS requirement description		Classification and Description of Changes	
4.17.2T#3d-cft	3.3.3.2	SR:	SG "B" level Chnls; Chnl Func Test; 31 days	LESS RESTRICTIVE:	Changed to 92 days in accordance with CEN 327, surveillance interval extension.
4.17.2T#3d-cal	3.3.3.3	SR:	SG "B" level Chnls; Chnl Cal; 18 mo	ADMINISTRATIVE:	Requirement unchanged.
4.17.2T#4a-cft	3.8.1.13	SR:	DBA Sequencers; Chnl Func Test; 92 days	ADMINISTRATIVE:	Requirement unchanged. Moved to electrical section as part of DG operability.
4.17.2T#4a-cal	3.8.1.13	SR:	DBA Sequencers; Chnl Cal; 18 mo	ADMINISTRATIVE:	Requirement unchanged. Moved to electrical section as part of DG operability.
4.17.2T#4b-cft	3.8.1.13	SR:	Shutdown Sequencers; Chnl Func Test; 18 mo	ADMINISTRATIVE:	Requirement unchanged. Moved to electrical section as part of DG operability.
4.17.2T#4b-cal	3.8.1.13	SR:	Shutdown Sequencers; Chnl Cal; 18 mo	ADMINISTRATIVE:	Requirement unchanged. Moved to electrical section as part of DG operability.
4.17.3T#1a-cft	3.3.4.2	SR:	CHP Logic Chnls; Chnl Func Test; 18 mo	ADMINISTRATIVE:	Requirement unchanged.
4.17.3T#1b-cft	3.3.3.2	SR:	"Left" cont Pres. switches; Chnl Func Test; 31 days	LESS RESTRICTIVE:	Changed to 92 days in accordance with CEN 327, surveillance interval extension.
4.17.3T#1b-cal	3.3.3.3	SR:	"Left" cont Pres. switches; Chnl Cal; 18 mo	ADMINISTRATIVE:	Requirement unchanged.
4.17.3T#1c-cft	3.3.3.2	SR:	"Right" cont Pres. switches; Chnl Func Test; 31 days	LESS RESTRICTIVE:	Changed to 92 days in accordance with CEN 327, surveillance interval extension.
4.17.3T#1c-cal	3.3.3.3	SR:	"Right" cont Press. switches; Chnl Cal; 18 mo	ADMINISTRATIVE:	Requirement unchanged.
4.17.3T#2a-cft	3.3.4.3	SR:	Manual CHR Chnls; Chnl Func Test; 18 mo	ADMINISTRATIVE:	Requirement unchanged.
4.17.3T#2b-cft	3.3.4.2	SR:	CHR logic Chnls; Chnl Func Test; 18 mo	ADMINISTRATIVE:	Requirement unchanged.
4.17.3T#2c-cc	3.3.3.1	SR:	Containment Monitors; Chnl Check; 12 hrs	ADMINISTRATIVE:	Requirement unchanged.
4.17.3T#2c-cft	3.3.3.2	SR:	Containment Monitors; Chnl Func Test; 31 days	LESS RESTRICTIVE:	Changed to 92 days in accordance with CEN 327, surveillance interval extension.
4.17.3T#2c-cal	3.3.3.3	SR:	Containment Monitors; Chnl Cal; 18 mo	ADMINISTRATIVE:	Requirement unchanged.
4.17.3T#3a-cft	3.3.4.3	SR:	Manual SGLP Chnls; Chnl Func Test; 18 mo	ADMINISTRATIVE:	Requirement unchanged.
4.17.3T#3b-cft	3.3.4.4	SR:	SGLP Logic Chnls; Chnl Func Test; 18 mo	ADMINISTRATIVE:	Requirement unchanged.
4.17.3T#3c-cc	3.3.3.1	SR:	SG "A" pressure Chnls; Chnl Check; 12 hrs	ADMINISTRATIVE:	Requirement unchanged.

TS Number	RTS Number	TS requirement description		Classification and Description of Changes	
4.17.3T#3c-cft	3.3.3.2	SR:	SG "A" pressure Chnls; Chnl Func Test; 31 days	LESS RESTRICTIVE:	Changed to 92 days in accordance with CEN 327, surveillance interval extension.
4.17.3T#3c-cal	3.3.3.3	SR:	SG "A" pressure Chnls; Chnl Cal; 18 mo	ADMINISTRATIVE:	Requirement unchanged.
4.17.3T#3d-cc	3.3.3.1	SR:	SG "B" pressure Chnls; Chnl Check; 12 hrs	ADMINISTRATIVE:	Requirement unchanged.
4.17.3T#3d-cft	3.3.3.2	SR:	SG "B" pressure Chnls; Chnl Func Test; 31 days	LESS RESTRICTIVE:	Changed to 92 days in accordance with CEN 327, surveillance interval extension.
4.17.3T#3d-cal	3.3.3.3	SR:	SG "B" pressure Chnls; Chnl Cal; 18 mo	ADMINISTRATIVE:	Requirement unchanged.
4.17.3T#4a-cc	3.3 Relocated	SR:	East room monitor; Chnl Check; 12 hrs	RELOCATED:	See LCO Table 3.17.2/3.17.3 discussion.
4.17.3T#4a-cft	3.3 Relocated	SR:	East room monitor; Chnl Func Test; 31 days	RELOCATED:	See LCO Table 3.17.2/3.17.3 discussion.
4.17.3T#4a-cal	3.3 Relocated	SR:	East room monitor; Chnl Cal; 18 mo	RELOCATED:	See LCO Table 3.17.2/3.17.3 discussion.
4.17.3T#4b-cc	3.3 Relocated	SR:	West room monitor; Chnl Check; 12 hrs	RELOCATED:	See LCO Table 3.17.2/3.17.3 discussion.
4.17.3T#4b-cft	3.3 Relocated	SR:	West room monitor; Chnl Func Test; 31 days	RELOCATED:	See LCO Table 3.17.2/3.17.3 discussion.
4.17.3T#4b-cal	3.3 Relocated	SR:	West room monitor; Chnl Cal; 18 mo	RELOCATED:	See LCO Table 3.17.2/3.17.3 discussion.
4.17.4T#1-cc	3.3.7.1	SR:	WR Th chnls; Chnl Check; 31 days	ADMINISTRATIVE:	Requirement unchanged.
4.17.4T#1-cal	3.3.7.2	SR:	WR Th chnls; Chnl Cal; 18 mo	ADMINISTRATIVE:	Requirement unchanged.
4.17.4T#2-cc	3.3.7.1	SR:	WR Tc chnls; Chnl Check; 31 days	ADMINISTRATIVE:	Requirement unchanged.
4.17.4T#2-cal	3.3.7.2	SR:	WR Tc chnls; Chnl Cal; 18 mo	ADMINISTRATIVE:	Requirement unchanged.
4.17.4T#3-cc	3.3.7.1	SR:	WR NI chnls; Chnl Check; 31 days	ADMINISTRATIVE:	Requirement unchanged.
4.17.4T#3-cal	3.3.7.2	SR:	WR NI chnls; Chnl Cal; 18 mo	ADMINISTRATIVE:	Requirement unchanged.
4.17.4T#4-cc	3.3.7.1	SR:	Cont water lvl chnls; Chnl Check; 31 days	ADMINISTRATIVE:	Requirement unchanged.
4.17.4T#4-cal	3.3.7.2	SR:	Cont water lvl chnls; Chnl Cal; 18 mo	ADMINISTRATIVE:	Requirement unchanged.
4.17.4T#5-cc	3.3.7.1	SR:	Subcooled margin chnls; Chnl Check; 31 days	ADMINISTRATIVE:	Requirement unchanged.
4.17.4T#5-cal	3.3.7.2	SR:	Subcooled margin chnls; Chnl Cal; 18 mo	ADMINISTRATIVE:	Requirement unchanged.
4.17.4T#6-cc	3.3.7.1	SR:	WR Pzr Level chnls; Chnl Check; 31 days	ADMINISTRATIVE:	Requirement unchanged.

TS Number	RTS Number	TS requirement description		Classification and Description of Changes	
4.17.4T#6-cal	3.3.7.2	SR:	WR Pzr Level chnls; Chnl Cal; 18 mo	ADMINISTRATIVE:	Requirement unchanged.
4.17.4T#7-cc	3.3.7.1	SR:	Cont H_2 chnls; Chnl Check; 31 days	ADMINISTRATIVE:	Requirement unchanged.
4.17.4T#7-cal	3.3.7.2	SR:	Cont H_2 chnls; Chnl Cal; 18 mo	ADMINISTRATIVE:	Requirement unchanged.
4.17.4T#8-cc	3.3.7.1	SR:	CST Level chnls; Chnl Check; 31 days	ADMINISTRATIVE:	Requirement unchanged.
4.17.4T#8-cal	3.3.7.2	SR:	CST Level chnls; Chnl Cal; 18 mo	ADMINISTRATIVE:	Requirement unchanged.
4.17.4T#9-cc	3.3.7.1	SR:	WR Pressurizer Pressure chnls; Chnl Check; 31 days	ADMINISTRATIVE:	Requirement unchanged.
4.17.4T#9-cal	3.3.7.2	SR:	WR Pressurizer Pressure chnls; Chnl Cal; 18 mo	ADMINISTRATIVE:	Requirement unchanged.
4.17.4T#10-cc	3.3.7.1	SR:	WR Cont Pressure chnls; Chnl Check; 31 days	ADMINISTRATIVE:	Requirement unchanged.
4.17.4T#10-cal	3.3.7.2	SR:	WR Cont Pressure chnls; Chnl Cal; 18 mo	ADMINISTRATIVE:	Requirement unchanged.
4.17.4T#11-cc	3.3.7.1	SR:	WR SG"A" Level chnls; Chnl Check; 31 days	ADMINISTRATIVE:	Requirement unchanged.
4.17.4T#11-cal	3.3.7.2	SR:	WR SG"A" Level chnls; Chnl Cal; 18 mo	ADMINISTRATIVE:	Requirement unchanged.
4.17.4T#12-cc	3.3.7.1	SR:	WR SG "B" Level chnls; Chnl Check; 31 days	ADMINISTRATIVE:	Requirement unchanged.
4.17.4T#12-cal	3.3.7.2	SR:	WR SG "B" Level chnls; Chnl Cal; 18 mo	ADMINISTRATIVE:	Requirement unchanged.
4.17.4T#13-cc	3.3.7.1	SR:	NR SG "A" Pressure chnls; Chnl Check; 31 days	ADMINISTRATIVE:	Requirement unchanged.
4.17.4T#13-cal	3.3.7.2	SR:	NR SG "A" Pressure chnls; Chnl Cal; 18 mo	ADMINISTRATIVE:	Requirement unchanged.
4.17.4T#14-cc	3.3.7.1	SR:	NR SG "B" Pressure chnls; Chnl Check; 31 days	ADMINISTRATIVE:	Requirement unchanged.
4.17.4T#14-cal	3.3.7.2	SR:	NR SG "B" Pressure chnls; Chnl Cal; 18 mo	ADMINISTRATIVE:	Requirement unchanged.
4.17.4T#15-cc	3.3.7.1	SR:	Pos indic. each cont iso valve; Chnl Check; 31 days	ADMINISTRATIVE:	Requirement unchanged.
4.17.4T#15-cal	3.3.7.2	SR:	Pos indic. each cont iso valve; Chnl Cal; 18 mo	ADMINISTRATIVE:	Requirement unchanged.
4.17.4T#16-cc	3.3.7.1	SR:	CETs quad 1; Chnl Check; 31 days	ADMINISTRATIVE:	Requirement unchanged.
4.17.4T#16-cal	3.3.7.2	SR:	CETs quad 1; Chnl Cal; 18 mo	ADMINISTRATIVE:	Requirement unchanged.
4.17.4T#17-cc	3.3.7.1	SR:	CETs quad 2; Chnl Check; 31 days	ADMINISTRATIVE:	Requirement unchanged.
4.17.4T#17-cal	3.3.7.2	SR:	CETs quad 2; Chnl Cal; 18 mo	ADMINISTRATIVE:	Requirement unchanged.

TS Number	RTS Number	TS requirement description	Classification and Description of Changes	
4.17.4T#18-cc	3.3.7.1	SR: 4 CETs quad 3; Chnl Check; 31 days	ADMINISTRATIVE:	Requirement unchanged.
4.17.4T#18-cal	3.3.7.2	SR: 4 CETs quad 3; Chnl Cal; 18 mo	ADMINISTRATIVE:	Requirement unchanged.
4.17.4T#19-cc	3.3.7.1	SR: 4 CETs quad 4; Chnl Check; 31 days	ADMINISTRATIVE:	Requirement unchanged.
4.17.4T#19-cal	3.3.7.2	SR: 4 CETs quad 4; Chnl Cal; 18 mo	ADMINISTRATIVE:	Requirement unchanged.
4.17.4T#20-cc	3.3.7.1	SR: 2 RVWL chnls; Chnl Check; 31 days	ADMINISTRATIVE:	Requirement unchanged.
4.17.4T#20-cal	3.3.7.2	SR: 2 RVWL chnls; Chnl Cal; 18 mo	ADMINISTRATIVE:	Requirement unchanged.
4.17.4T#21-cc	3.3.7.1	SR: 2 HR Cont Rad chnls; Chnl Check; 31 days	ADMINISTRATIVE:	Requirement unchanged.
4.17.4T#21-cal	3.3.7.2	SR: 2 HR Cont Rad chnls; Chnl Cal; 18 mo	ADMINISTRATIVE:	Requirement unchanged.
4.17.5T#1-cc	3.3.8.2	SR: 1 SU Nuclear Inst chnl; Chnl Check; (a)	ADMINISTRATIVE:	Requirement unchanged.
4.17.5T#1-cft	3.3.1.6/3.3.8.2	SR: 1 SU Nuclear Inst chnl; Chnl func Test; (a)	ADMINISTRATIVE:	The CFT Surveillance Interval is the same as the CC. The instrumentation consists only of an indicator, which is channel checked per SR 3.3.8.2 during the performance of the RPS CHANNEL FUNCTIONAL TEST of SR 3.3.1.6. No specific CFT is performed on this instrument, other than that performed in SR 3.3.1.6.
4.17.5T#1-cal	3.3.8.5	SR: 1 SU Nuclear Inst chnl; Chnl Cal; 18 mo	ADMINISTRATIVE:	Requirement unchanged.
4.17.5T#2-cc	3.3.8.1	SR: 1 Pressurizer Pressure chnl; Chnl Check; 92 days	ADMINISTRATIVE:	Requirement unchanged.
4.17.5T#2-cal	3.3.8.5	SR: 1 Pressurizer Pressure chnl; Chnl Cal; 18 mo	ADMINISTRATIVE:	Requirement unchanged.
4.17.5T#3-cc	3.3.8.1	SR: 1 Pressurizer Level chnl; Chnl Check; 92 days	ADMINISTRATIVE:	Requirement unchanged.
4.17.5T#3-cal	3.3.8.5	SR: 1 Pressurizer Level chnl; Chnl Cal; 18 mo	ADMINISTRATIVE:	Requirement unchanged.
4.17.5T#4-cc	3.3.8.1	SR: 1 Loop 1 Th chnl; Chnl Check; 92 days	ADMINISTRATIVE:	Requirement unchanged.
4.17.5T#4-cal	3.3.8.5	SR: 1 Loop 1 Th chnl; Chnl Cal; 18 mo	ADMINISTRATIVE:	Requirement unchanged.
4.17.5T#5-cc	3.3.8.1	SR: 1 loop 2 Th chnl; Chnl Check; 92 days	ADMINISTRATIVE:	Requirement unchanged.
4.17.5T#5-cal	3.3.8.5	SR: 1 loop 2 Th chnl; Chnl Cal; 18 mo	ADMINISTRATIVE:	Requirement unchanged.
4.17.5T#6-cc	3.3.8.1	SR: 1 Loop 1 Tc chnl; Chnl Check; 92 days	ADMINISTRATIVE:	Requirement unchanged.
4.17.5T#6-cal	3.3.8.5	SR: 1 Loop 1 Tc chnl; Chnl Cal; 18 mo	ADMINISTRATIVE:	Requirement unchanged.

TS Number	RTS Number	TS requirement description	Classification and Description of Changes	
4.17.5T#7-cc	3.3.8.1	SR: 1 Loop 2 Tc chnl; Chnl Check; 92 days	ADMINISTRATIVE:	Requirement unchanged.
4.17.5T#7-cal	3.3.8.5	SR: 1 Loop 2 Tc chnl; Chnl Cal; 18 mo	ADMINISTRATIVE:	Requirement unchanged.
4.17.5T#8-cc	3.3.8.1	SR: 1 SG "A" Pressure chnl; Chnl Check; 92 days	ADMINISTRATIVE:	Requirement unchanged.
4.17.5T#8-cal	3.3.8.5	SR: 1 SG "A" Pressure chnl; Chnl Cal; 18 mo	ADMINISTRATIVE:	Requirement unchanged.
4.17.5T#9-cc	3.3.8.1	SR: 1 SG "B" Pressure chnl; Chnl Check; 92 days	ADMINISTRATIVE:	Requirement unchanged.
4.17.5T#9-cal	3.3.8.5	SR: 1 SG "B" Pressure chnl; Chnl Cal; 18 mo	ADMINISTRATIVE:	Requirement unchanged.
4.17.5T#10-cc	3.3.8.1	SR: 1 SG "A" Level chnl; Chnl Check; 92 days	ADMINISTRATIVE:	Requirement unchanged.
4.17.5T#10-cal	3.3.8.5	SR: 1 SG "A" Level chnl; Chnl Cal; 18 mo	ADMINISTRATIVE:	Requirement unchanged.
4.17.5T#11-cc	3.3.8.1	SR: 1 SG "B" Level chnl; Chnl Check; 92 days	ADMINISTRATIVE:	Requirement unchanged.
4.17.5T#11-cal	3.3.8.5	SR: 1 SG "B" Level chnl; Chnl Cal; 18 mo	ADMINISTRATIVE:	Requirement unchanged.
4.17.5T#12-cc	3.3.8.1	SR: 1 SIRWT Level chnl; Chnl Check; 92 days	ADMINISTRATIVE:	Requirement unchanged.
4.17.5T#12-cal	3.3.8.5	SR: 1 SIRWT Level chnl; Chnl Cal; 18 mo	ADMINISTRATIVE:	Requirement unchanged.
4.17.5T#13-cc	3.3.8.3	SR: 1 AFW Flow to SG "A" chnl; Chnl Check; 18 mo	ADMINISTRATIVE:	Requirement unchanged.
4.17.5T#13-cft	3.3.8.4	SR: 1 AFW Flow to SG "A" chnl; Chnl func test; 18 mo	ADMINISTRATIVE:	Requirement unchanged.
4.17.5T#13-cal	3.3.8.5	SR: 1 AFW Flow to SG "A" chnl; Chnl Cal; 18 mo	ADMINISTRATIVE:	Requirement unchanged.
4.17.5T#14-cc	3.3.8.3	SR: 1 AFW Flow to SG "B" chnl; Chnl Check; 18 mo	ADMINISTRATIVE:	Requirement unchanged.
4.17.5T#14-cft	3.3.8.4	SR: 1 AFW Flow to SG "B" chnl; Chnl func test; 18 mo	ADMINISTRATIVE:	Requirement unchanged.
4.17.5T#14-cal	3.3.8.5	SR: 1 AFW Flow to SG "B" chnl; Chnl Cal; 18 mo	ADMINISTRATIVE:	Requirement unchanged.
4.17.5T#15-cft	3.3.8.4	SR: 1 Pump P-8B Suct. Press. chnl; Chnl fnc tst; 18 mo	ADMINISTRATIVE:	Requirement unchanged.
4.17.5T#15-cal	3.3.8.5	SR: 1 Pump P-8B Suction Pressure chnl; Chnl Cal; 18 mo	ADMINISTRATIVE:	Requirement unchanged.
4.17.5T#16-cft	3.3.8.4	SR: 1 Pump P-8B stm Vlv Cont chnl; Chnl func test; 18 mo	ADMINISTRATIVE:	Requirement unchanged.
4.17.5T#17-cft	3.3.8.4	SR: 1 AFW Flow Cont to SG "A" chnl; Ch. fnc tst; 18 mo	ADMINISTRATIVE:	Requirement unchanged.
4.17.5T#18-cft	3.3.8.4	SR: 1 AFW Flow Cont to SG "B" chnl; Chnl fnc tst; 18 mo	ADMINISTRATIVE:	Requirement unchanged.

TS Number	RTS Number	TS requirement description	Classification and Description of Changes	
4.17.5T#19-cft	3.3.8	SR: C-150 Transfer Switches; Chnl func test; 18 mo	ADMINISTRATIVE:	Unchanged in intent. Operability of the transfer switches is verified in the act of performing SRs on the rest of the equipment in the table. There is no reason to specifically address the switches.
4.17.5T#20-cft	3.3.8	SR: C-150A Transfer Switch; Chnl func test; 18 mo	ADMINISTRATIVE:	Unchanged in intent. Operability of the transfer switches is verified in the act of performing SRs on the rest of the equipment in the table. There is no reason to specifically address the switches.
4.17.6T#1-cc	3.3.9.1	SR: 2 chnls Flux Monitoring; Chnl Check; 12 hrs	ADMINISTRATIVE:	Requirement unchanged.
4.17.6T#1-cft	3.3.1.6	SR: 2 chnls Flux Monitoring; Chnl func test; (a)	ADMINISTRATIVE:	Requirement unchanged.
4.17.6T#1-cal	3.3.9.2	SR: 2 chnls Flux Monitoring; Chnl Cal; 18 mo	ADMINISTRATIVE:	Requirement unchanged.
4.17.6T#2-cc	3.1.5.2	SR: 2 chnls Rod Pos; Chnl Check; 12 hrs	ADMINISTRATIVE:	Requirement unchanged.
4.17.6T#2-cft	3.3 Relocated	SR: 2 chnls Rod Pos; Chnl func test; (b)	RELOCATED:	This requirement does not meet the criterion of 10 CFR 50.36.
4.17.6T#2-cal	3.3 Relocated	SR: 2 chnls Rod Pos; Chnl cal; 18 mo	RELOCATED:	This requirement does not meet the criterion of 10 CFR 50.36.
4.17.6T#3-cc	3.3 Relocated	SR: 2 chnls SIRWT Temp; Chnl Check; 12 hrs	RELOCATED:	This requirement does not meet the criterion of 10 CFR 50.36.
4.17.6T#3-cal	3.3 Relocated	SR: 2 chnls SIRWT Temp; Chnl cal; 18 mo	RELOCATED:	This requirement does not meet the criterion of 10 CFR 50.36.
4.17.6T#4-cc	3.3 Relocated	SR: 2 chnls MFW Flow; Chnl Check; 12 hrs	RELOCATED:	This requirement does not meet the criterion of 10 CFR 50.36.
4.17.6T#4-cal	3.3 Relocated	SR: 2 chnls MFW Flow; Chnl Cal; 18 mo	RELOCATED:	This requirement does not meet the criterion of 10 CFR 50.36.
4.17.6T#5-cc	3.3 Relocated	SR: 2 chnls MFW Temp; Chnl Check; 12 hrs	RELOCATED:	This requirement does not meet the criterion of 10 CFR 50.36.
4.17.6T#5-cal	3.3 Relocated	SR: 2 chnls MFW Temp; Chnl Cal; 18 mo	RELOCATED:	This requirement does not meet the criterion of 10 CFR 50.36.
4.17.6T#6-cc	3.3 Relocated	SR: 2 chnl/line AFW Flow; Chnl Check; 12 hrs	RELOCATED:	This requirement does not meet the criterion of 10 CFR 50.36. This equipment forms part of the AFW trains required by LCO 3.7.5, but the instrumentation, itself, is not required by the safety analyses.

Comparison of existing Palisades Tech Specs and Proposed Palisades Tech Specs. (03/28/96)

TS Number	RTS Number	TS requirement description	Classification and Description of Changes	
4.17.6T#6-cft	3.3 Relocated	SR: 2 chnl / line AFW Flow; Chnl func test; 18 mo	RELOCATED:	This requirement does not meet the criterion of 10 CFR 50.36. This equipment forms part of the AFW trains required by LCO 3.7.5, but the instrumentation, itself, is not required by the safety analyses.
4.17.6T#6-cal	3.3 Relocated	SR: 2 chnl / line AFW Flow; Chnl Cal; 18 mo	RELOCATED:	This requirement does not meet the criterion of 10 CFR 50.36. This equipment forms part of the AFW trains required by LCO 3.7.5, but the instrumentation, itself, is not required by the safety analyses.
4.17.6T#7-cc	3.4.15.1	SR: 4 chnls diverse PCS leak det; Chnl Check; 12 hrs	ADMINISTRATIVE:	Requirements unchanged.
4.17.6T#7-cft	3.4.15.2	SR: 4 chnls diverse PCS leak det; Chnl func test; 18 mo	ADMINISTRATIVE:	Requirements unchanged.
4.17.6T#7-cal	3.4.15.3 3.4.15.4 3.4.15.5	SR: 4 chnls diverse PCS leak det; Chnl Cal; 18 mo	ADMINISTRATIVE:	Requirements unchanged.
4.17.6T#8-cft	3.4 Relocated	SR: 2 chnls pos ind/safety vlv; Chnl fnc tst; 18 mo	RELOCATED:	This requirement does not meet the criterion of 10 CFR 50.36.
4.17.6T#8-cal	3.4 Relocated	SR: 2 chnls pos ind per safety vlv; Chnl Cal; 18 mo	RELOCATED:	This requirement does not meet the criterion of 10 CFR 50.36.
4.17.6T#9-cc	3.4 Relocated	SR: 3 chnls pos ind per PORV; Chnl Check; 12 hrs	RELOCATED:	This requirement does not meet the criterion of 10 CFR 50.36.
4.17.6T#9-cft	3.4 Relocated	SR: 3 chnls pos ind per PORV; Chnl func test; 18 mo	RELOCATED:	This requirement does not meet the criterion of 10 CFR 50.36.
4.17.6T#9-cal	3.4 Relocated	SR: 3 chnls pos ind per PORV; Chnl Cal; 18 mo	RELOCATED:	This requirement does not meet the criterion of 10 CFR 50.36.
4.17.6T#10-cc	3.4 Relocated	SR: 2 chnls pos ind per Block Vlv; Chnl Check; 12 hrs	RELOCATED:	This requirement does not meet the criterion of 10 CFR 50.36.
4.17.6T#10-cal	3.4 Relocated	SR: 2 chnls pos ind per Block Vlv; Chnl Cal; 18 mo	RELOCATED:	This requirement does not meet the criterion of 10 CFR 50.36.
4.17.6T#11-cft	3.7 Relocated	SR: 1 SWS break detector; Chnl func test; 18 mo	RELOCATED:	This requirement does not meet the criterion of 10 CFR 50.36.
4.17.6T#11-cal	3.7 Relocated	SR: 1 SWS break detector; Chnl cal; 18 mo	RELOCATED:	This requirement does not meet the criterion of 10 CFR 50.36.

TS Number	RTS Number	TS requirement description		Classification and Description of Changes	
4.17.6T#12-cc	3.3 Relocated	SR:	4 Flux ΔT comparitors; Chnl Check; 12 hrs	RELOCATED:	The Flux - ΔT comparitors are used only for indication. They do not provide any protective function, nor do they meet any of the criterion of 10 CFR 50.36.
4.17.6T#12-cft	3.3 Relocated	SR:	4 Flux ΔT comparitors; Chnl func test; 31 days	RELOCATED:	The Flux - ΔT comparitors are used only for indication. They do not provide any protective function, nor do they meet any of the criterion of 10 CFR 50.36.
4.17.6T#12-cal	3.3 Relocated	SR:	4 Flux ΔT comparitors; Chnl cal; 18 mo	RELOCATED:	The Flux - ΔT comparitors are used only for indication. They do not provide any protective function, nor do they meet any of the criterion of 10 CFR 50.36.
4.17.6T#13-cft	3.1 Relocated	SR:	2 chnls Rod seq. cont/Alarm; Chnl fnc tst; 18 mo	RELOCATED:	This requirement does not meet the criterion of 10 CFR 50.36.
4.17.6T#13-cal	3.1 Relocated	SR:	2 chnls Rod sequence control/Alarm; Chnl cal; 18 mo	RELOCATED:	This requirement does not meet the criterion of 10 CFR 50.36.
4.17.6T#14-cft	3.5 Relocated	SR:	2 Boric Acid Tank Lvl Alm; Chnl func test; 18 mo	RELOCATED:	This requirement does not meet the criterion of 10 CFR 50.36.
4.17.6T#15-cft	3.2.5.2	SR:	1 Excore Deviation Alm; Chnl func test; 18 mo	ADMINISTRATIVE:	Requirement unchanged. CFT is part of Channel Calibration.
4.17.6T#15-cal	3.2.5.2	SR:	1 Excore Deviation Alm; Chnl cal; 18 mo	ADMINISTRATIVE:	Requirement unchanged.
4.17.6T#16-cft	3.2 Relocated	SR:	4 chnls ASI Alarm; Chnl func test; 18 mo	RELOCATED:	This requirement does not meet the criterion of 10 CFR 50.36.
4.17.6T#16-cal	3.2 Relocated	SR:	4 chnls ASI Alarm; Chnl cal; 18 mo	RELOCATED:	This requirement does not meet the criterion of 10 CFR 50.36.
4.17.6T#17-cft	3.4.6.4	SR:	2 SDC interlocks; Chnl func test; 18 mo	ADMINISTRATIVE:	Requirements unchanged. Calibration includes cft.
4.17.6T#17-cal	3.4.6.4	SR:	2 SDC interlocks; Chnl cal; 18 mo	ADMINISTRATIVE:	Requirement unchanged.
4.17.6T#18-cft	3.1.7.2	SR:	2 chnls PDIL Alm; Chnl func test; 31 days	ADMINISTRATIVE:	Requirement unchanged.
4.17.6T#18-cal	3.1.7.2	SR:	2 chnls PDIL Alm; Chnl cal; 18 mo	ADMINISTRATIVE:	The PDIL is a computer generated alarm and is not subject to drift. A channel functional test is required by SR 3.1.7.2, which accomplishes the same function.
4.17.6T#19-cc	3.3.10.1	SR:	2 chnls Fuel Pool Monitor; Chnl Check; 24 hrs	ADMINISTRATIVE:	Requirement unchanged.
4.17.6T#19-cft	3.3.10.2	SR:	2 chnls Fuel Pool Monitor; Chnl func test; 31 days	ADMINISTRATIVE:	Requirement unchanged.

TS Number	RTS Number	TS requirement description		Classification and Description of Changes	
4.17.6T#19-cal	3.3.10.3	SR:	2 chnls Fuel Pool Monitor; Chnl cal; 18 mo	ADMINISTRATIVE:	Requirement unchanged.
4.17.6T#20-cc	3.3.6.1	SR:	2 chnls Cont Refuel Monitor; Chnl check; 24 hrs	ADMINISTRATIVE:	Requirement unchanged.
4.17.6T#20-cft	3.3.6.2	SR:	2 chnls Cont Refuel Monitor; Chnl func test; 31 days	ADMINISTRATIVE:	Requirement unchanged.
4.17.6T#20-cal	3.3.6.3	SR:	2 chnls Cont Refuel Monitor; Chnl cal; 18 mo	ADMINISTRATIVE:	Requirement unchanged.

ATTACHMENT 4

CONSUMERS POWER COMPANY
PALISADES PLANT
DOCKET 50-255

STS CONVERSION TECHNICAL SPECIFICATION CHANGE REQUEST

3.3 INSTRUMENTATION PART

STS Pages Marked to Show the Differences Between RTS and STS

3.3 **INSTRUMENTATION**

3.3.1 REACTOR PROTECTIVE SYSTEM (RPS) INSTRUMENTATION ~~– Operating (Analog)~~

LCO 3.3.1 Four RPS trip units and associated instrument and bypass removal channels for each Function in Table 3.3.1-1 shall be OPERABLE.

APPLICABILITY: MODES 1 and 2,
MODES 3, 4, and 5, when more than one Control Rod is capable of being withdrawn and PCS boron concentration is less than that required by the COLR for LCO 3.9.1.

ACTIONS

-----NOTE-----
Separate Condition entry is allowed for each RPS trip or bypass removal Function.

CONDITION	REQUIRED ACTION	COMPLETION TIME
A. One or more Functions with one RPS trip unit or associated instrument channel inoperable, except for Condition C (Hi Startup Rate or Loss of Load). ~~(excore channel not calibrated with incore detectors).~~	A.1 Place affected trip unit in ~~bypass or~~ trip. ~~AND~~ ~~A.2.1 Restore channel to OPERABLE status.~~ ~~OR~~ ~~A.2.2 Place affected trip unit in trip.~~	7 Days ~~1 hour~~ ~~[48] hours~~ ~~48 hours~~

(continued)

ACTIONS (continued)

CONDITION	REQUIRED ACTION	COMPLETION TIME
B. One or more Functions with two RPS trip units or associated instrument channels inoperable except for Condition D (Hi Startup Rate or Loss of Load). ~~Condition C (excore channel not calibrated with incore detectors).~~	---NOTE--- LCO 3.0.4 is not applicable.	
	B.1 Place one trip unit in ~~bypass and place the other trip unit in~~ trip.	1 hour
	AND	
	B.2 Restore one trip unit to OPERABLE status.	7 days ~~[48] hours~~
C. One Loss of Load or Hi Startup Rate trip unit or associated instrument channel inoperable. ~~C. One or more Functions with one or more power range excore channels not calibrated with the incore detectors.~~	---NOTE--- LCO 3.0.4 is not applicable.	
	C.1 Restore trip unit to OPERABLE status. ~~Perform SR 3.3.1.3.~~	Prior to entering MODE 2 following MODE 5 entry ~~24 hours~~
	~~OR~~	
	~~C.2 Restrict THERMAL POWER to ≤ 90% of the maximum allowed THERMAL POWER level.~~	~~24 hours~~

(continued)

ACTIONS (continued)

CONDITION	REQUIRED ACTION	COMPLETION TIME
D. Two Loss of Load or two Hi Startup Rate trip units or associated instrument channels inoperable ~~D. One or more Functions with one automatic bypass removal channel inoperable.~~	-------------------NOTE------------------ LCO 3.0.4 is not applicable. --- D.1 Place one affected trip unit in trip AND D.2 Restore one trip unit to OPERABLE status ~~D.1 Disable bypass channel.~~ ~~OR~~ ~~D.2.1 Place affected trip units in bypass or trip.~~ ~~AND~~ ~~D.2.2.1 Restore bypass removal channel and affected trip units to OPERABLE status.~~ ~~OR~~ ~~D.2.2.2 Place affected trip units in trip.~~	1 hour Prior to entering MODE 2 following MODE 5 entry ~~1 hour~~ ~~[48] hours~~ ~~48 hours~~

(continued)

ACTIONS

CONDITION	REQUIRED ACTION	COMPLETION TIME
E. One or more Functions with one ~~two~~ or two automatic bypass removal channels inoperable.	~~-----NOTE-----~~ ~~LCO 3.0.4 is not applicable.~~ ~~---------------~~	
	E.1 ~~Disable bypass channels.~~ Remove the bypass function	1 hour
	OR	
	E.2 Declare the affected trip units inoperable, and enter the appropriate Condition.	1 hour
	~~E.2.1 Place one affected trip unit in bypass and place the other in trip for each affected trip Function.~~	~~1 hour~~
	~~AND~~	
	~~E.2.2 Restore one bypass channel and the associated trip unit to OPERABLE status for each affected trip Function.~~	~~[48] hours~~

(continued)

ACTIONS

CONDITION	REQUIRED ACTION	COMPLETION TIME
F. Required Action and associated Completion Time not met.	F.1 Be in MODE 3. AND F.2.1 Ensure that no more than one Control Rod is capable of being withdrawn. OR F.2.2 Ensure PCS boron concentration is at least that required by the COLR for LCO 3.9.1.	6 hours 6 hours 6 hours
G. Control room temperature > 90°F.	G.1 Enter LCO 3.0.3	Immediately

SURVEILLANCE REQUIREMENTS

------------------------------------NOTE------------------------------------
Refer to Table 3.3.1-1 to determine which SR shall be performed for each RPS Function.

	SURVEILLANCE	FREQUENCY
SR 3.3.1.1	Perform a CHANNEL CHECK of each RPS instrument channel except Loss of Load and Hi Containment Pressure.	12 hours
SR 3.3.1.2	---NOTES--- 1. Not required to be performed until 12 hours after THERMAL POWER is ≥ 15% ~~≥ [20]%~~ RTP. ~~2. The daily calibration may be suspended during PHYSICS TESTS, provided the calibration is performed upon reaching each major test power plateau and prior to proceeding to the next major test power plateau.~~ --- Perform calibration (heat balance only) and adjust the excore power range and ΔT power channels to agree with calorimetric calculation if the absolute difference is ≥ [1.5]%.	24 hours
SR 3.3.1.3	~~---NOTE--- Not required to be performed until 12 hours after THERMAL POWER is ≥ [20]% RTP.~~ --- Perform a CHANNEL FUNCTIONAL TEST of each RPS channel except Loss of Load and Hi Startup Rate ~~Calibrate the power range excore channels using the incore detectors.~~	92 days ~~31 days~~

(continued)

SURVEILLANCE REQUIREMENTS (continued)

SURVEILLANCE		FREQUENCY
SR 3.3.1.4	Calibrate the Excore Power Range Channels with a test signal ~~Perform a CHANNEL FUNCTIONAL TEST of each RPS channel except Loss of Load and Power Rate of Change.~~	31 days ~~[92] days~~
SR 3.3.1.5	~~-----NOTE-----~~ ~~Neutron detectors are excluded from CHANNEL CALIBRATION.~~ --------------- Verify constants in each Thermal Margin Monitor ~~Perform a CHANNEL CALIBRATION on excore power range channels.~~	92 days
SR 3.3.1.6	Perform a CHANNEL FUNCTIONAL TEST of each Hi Startup Rate ~~Power Rate of Change Channel~~ and each Loss of Load Functional Unit.	Once within 7 days prior to each reactor startup
SR 3.3.1.7	Perform a CHANNEL CALIBRATION of each RPS instrument channel, including bypass removal functions. ~~Perform a CHANNEL FUNCTIONAL TEST on each automatic bypass removal function.~~	18 months ~~Once within 92 days prior to each reactor startup~~

(continued)

~~SR 3.3.1.8~~	~~Perform a CHANNEL CALIBRATION of each RPS instrument channel, including bypass removal functions.~~	~~[18] months~~
~~SR 3.3.1.9~~	~~Verify RPS RESPONSE TIME is within limits.~~	~~[18] months on a STAGGERED TEST BASIS~~
SR 3.3.1.8	Verify control room temperature is $\leq 90°F$.	12 hours

Table 3.3.1-1 (page 1 of 2)
Reactor Protective System Instrumentation

FUNCTION	SURVEILLANCE REQUIREMENTS	ALLOWABLE VALUE
1. Variable High Power Trip	SR 3.3.1.1 SR 3.3.1.2 SR 3.3.1.3 SR 3.3.1.4 ~~SR 3.3.1.5~~ SR 3.3.1.7 ~~SR 3.3.1.8~~ ~~SR 3.3.1.9~~	≤ 15% RTP above current THERMAL POWER but not < 30% RTP nor > 106.5% RTP ~~≤ [10]% RTP above current THERMAL POWER but not < [30]% RTP nor > [107]% RTP~~
2. Hi Startup Rate [a] ~~2. Power Rate of Change - High [a]~~	SR 3.3.1.1 SR 3.3.1.6 SR 3.3.1.7 ~~SR 3.3.1.8~~	~~≤ 2.6 dpm~~ N/A
3. Low PCS Flow ~~3. Reactor Coolant Flow - Low [b]~~	SR 3.3.1.1 SR 3.3.1.3 ~~SR 3.3.1.4~~ SR 3.3.1.7 ~~SR 3.3.1.8~~ ~~SR 3.3.1.9~~	≥ 95%
4. Low SG A Level ~~4. Pressurizer Pressure - High~~	SR 3.3.1.1 SR 3.3.1.3 ~~SR 3.3.1.4~~ SR 3.3.1.7 ~~SR 3.3.1.8~~ ~~SR 3.3.1.9~~	≥ 25.9% ~~≤ [2400] psia~~
5. Low SG B Level ~~5. Containment Pressure - High~~	SR 3.3.1.1 SR 3.3.1.3 ~~SR 3.3.1.4~~ SR 3.3.1.7 ~~SR 3.3.1.8~~ ~~SR 3.3.1.9~~	≥ 25.9% ~~≤ [4.0] psig~~

(continued)

6. Low SG-A Pressure ~~6. Steam Generator Pressure - Low(c)~~	SR 3.3.1.1 SR 3.3.1.3 ~~SR 3.3.1.4~~ SR 3.3.1.7 ~~SR 3.3.1.8~~ ~~SR 3.3.1.9~~	≥ 500 psia ~~≥ [685] psia~~
7. Low SG-B Pressure	SR 3.3.1.1 SR 3.3.1.3 SR 3.3.1.7	≥ 500 psia
~~7a. Steam Generator A Level — Low~~	~~SR 3.3.1.1~~ ~~SR 3.3.1.4~~ ~~SR 3.3.1.8~~ ~~SR 3.3.1.9~~	~~≥ [24.7]%~~
~~7b. Steam Generator B Level — Low~~	~~SR 3.3.1.1~~ ~~SR 3.3.1.4~~ ~~SR 3.3.1.8~~ ~~SR 3.3.1.9~~	~~≥ [24.7]%~~
8. High Pressurizer Pressure	SR 3.3.1.1 SR 3.3.1.3 SR 3.3.1.7	≤ 2255 psia
~~8. Axial Power Distribution — High(d)~~	~~SR 3.3.1.1~~ ~~SR 3.3.1.2~~ ~~SR 3.3.1.3~~ ~~SR 3.3.1.4~~ ~~SR 3.3.1.5~~ ~~SR 3.3.1.7~~ ~~SR 3.3.1.8~~ ~~SR 3.3.1.9~~	~~Figure 3.3.1-3~~

(continued)

Table 3.3.1-1 (page 2 of 2)
Reactor Protective System Instrumentation

FUNCTION	SURVEILLANCE REQUIREMENTS	ALLOWABLE VALUE
9. Thermal Margin/Low Pressure (TM/LP)	SR 3.3.1.1 SR 3.3.1.3 SR 3.3.1.5 SR 3.3.1.7	(c)
~~9a. Thermal Margin/Low Pressure (TM/LP)~~	~~SR 3.3.1.1~~ ~~SR 3.3.1.2~~ ~~SR 3.3.1.3~~ ~~SR 3.3.1.4~~ ~~SR 3.3.1.5~~ ~~SR 3.3.1.7~~ ~~[SR 3.3.1.8]~~ ~~SR 3.3.1.9~~	~~Figures 3.3.1-1 and 3.3.1-2~~
~~9b. Steam Generator Pressure Difference(b)~~	~~SR 3.3.1.1~~ ~~SR 3.3.1.4~~ ~~SR 3.3.1.8~~ ~~SR 3.3.1.9~~	~~≤ [135] psid~~
10. Loss of Load (~~turbine stop valve control~~auto stop oil pressure)(b)	SR 3.3.1.6 SR 3.3.1.7 ~~SR 3.3.1.8~~	N/A ~~≥ [800] psig~~
11. Containment High Pressure	SR 3.3.1.3 SR 3.3.1.7	≤ 3.70 psig

(a) Trip may be bypassed when THERMAL POWER IS $< 1X10^{-4}\%$ RTP or $> 13\%$ RTP.
Bypass shall be automatically removed when THERMAL POWER is $\geq 1X10^{-4}\%$ RTP and $\geq 13\%$ RTP.

(b) Trip may be bypassed and is not required to be OPERABLE when THERMAL POWER is $< 17\%$ RTP.
Bypass shall be automatically removed when THERMAL POWER is $\geq 17\%$ RTP.

N/A No specific allowable value required.

The pressure setpoint for the Thermal Margin/Low Pressure Trip, Ptrip, is the higher of two values, Pmin and Pvar, both in psia:

$P_{min} = 1750$
$P_{var} = 2012(QA)(QR_1) + 17.0(T_{in}) - 9493$

where:

$QA = -0.720(ASI) + 1.028$; when $-0.628 \leq ASI < -0.100$

$QA = -0.333(ASI) + 1.067$; when $-0.100 \leq ASI < +0.200$

$QA = +0.375(ASI) + 0.925$; when $+0.200 \leq ASI < +0.565$

ASI = Measured ASI when $Q \geq 0.0625$
$ASI = 0.0$ when $Q < 0.0625$

$QR_1 = 0.412(Q) + 0.588$; when $Q \leq 1.0$
$QR_1 = Q$ when $Q > 1.0$

Q = Core Power/RATED POWER
T_{in} = Maximum primary coolant inlet temperature in °F.

ASI, T_{in} and Q are the existing values as measured by the associated instrument channel.

~~(b) Trips may be bypassed when THERMAL POWER is < [1E-4]%. Bypass shall be automatically removed when THERMAL POWER is ≥ [1E-4]% RTP. During testing pursuant to LCO 3.4.17, RCS Loops — Test Exceptions, trips may be bypassed below 5% RTP. Bypass shall be automatically removed when THERMAL POWER is ≥ 5% RTP.~~

~~(c) Trip may be bypassed when steam generator pressure is < [785] psig. Bypass shall be automatically removed when steam generator pressure is ≥ [785] psig.~~

~~(d) Trip may be bypassed when THERMAL POWER is < [15]% RTP. Bypass shall be automatically removed when THERMAL POWER is ≥ [15]% RTP.~~

3.3 INSTRUMENTATION

3.3.2 Reactor Protective System (RPS) Logic and Trip Initiation ~~(Analog)~~
~~3.3.3~~

LCO 3.3.2 Six channels of RPS Matrix Logic, four channels of RPS Initiation Logic, ~~four] channels of reactor trip circuit breakers (RTCBs),~~ and two ~~four~~ channels of Manual Trip shall be OPERABLE.

APPLICABILITY: MODES 1 and 2,
MODES 3, 4, and 5, when more than one CONTROL ROD is capable of being withdrawn and PCS boron concentration is less than that required by LCO 3.9.1. ~~with any RTCBs closed and any control element assemblies capable of being withdrawn.~~

ACTIONS

CONDITION	REQUIRED ACTION	COMPLETION TIME
A. ----------------NOTE--------------- This action also applies when three Matrix Logic channels are inoperable due to a common power source failure de-energizing three matrix power supplies. -------------------------------------- One Matrix Logic channel inoperable.	A.1 Restore channel to OPERABLE status.	48 hours
~~---------NOTE---------~~ ~~RTCBs associated with one inoperable channel may be closed for up to 1 hour for the performance of an RPS CHANNEL FUNCTIONAL TEST.~~ ---------------------		
B. One channel of ~~Manual Trip, RTCBs, or~~ Initiation Logic inoperable in MODE 1 or 2.	B.1 Deenergize affected clutch power supplies. ~~B.1 Open the affected RTCBs.~~	1 hour

ACTIONS (continued)

CONDITION	REQUIRED ACTION	COMPLETION TIME
C. One channel of Manual Trip inoperable.	C.1 Restore channel to OPERABLE status.	Prior to entering MODE 2 following MODE 3 entry.
~~C. --------NOTE-------- RTCBs associated with one inoperable channel may be closed for up to 1 hour for the performance of an RPS CHANNEL FUNCTIONAL TEST. --------------------~~ ~~One channel of Manual Trip, RTCBs, or Initiation Logic inoperable in MODE 3, 4, or 5.~~	~~C.1 Open all RTCBs.~~	~~48 hours~~
D. Required Action and associated Completion Times not met.	D.1 Be in MODE 3.	6 hours
	AND	
	D.2.1 Ensure that no more than one Control Rod is capable of being withdrawn.	6 hours
	OR	
~~D. Two channels of RTCBs or Initiation Logic affecting the same trip leg inoperable.~~	D.2.2 Ensure PCS boron concentration is at least that required by the COLR for LCO 3.9.1.	6 hours ~~Immediately~~
	~~D.1 Open the affected RTCBs.~~	

ACTIONS (continued)

CONDITION	REQUIRED ACTION	COMPLETION TIME
~~E. Required Action and associated Completion Time of Condition A, B, or D not met.~~ ~~OR~~ ~~One or more Functions with two or more Manual Trip, Matrix Logic, Initiation Logic, or RTCB channels inoperable for reasons other than Condition A or D.~~	~~E.1 Be in MODE 3.~~ ~~AND~~ ~~E.2 Open all RTCBs.~~	~~6 hours~~ ~~6 hours~~

SURVEILLANCE REQUIREMENTS

SURVEILLANCE		FREQUENCY
SR 3.3.2.1	Perform a CHANNEL FUNCTIONAL TEST on each RPS Logic channel.	92 days
~~SR 3.3.3.1~~	~~Perform a CHANNEL FUNCTIONAL TEST on each RPS Logic channel and RTCB channel.~~	
SR 3.3.~~3~~2.2	Perform a CHANNEL FUNCTIONAL TEST on each RPS Manual Trip channel.	Once within 7 days prior to each reactor startup
~~SR 3.3.3.3~~	~~Perform a CHANNEL FUNCTIONAL TEST, including separate verification of the undervoltage and shunt trips, on each RTCB.~~	~~[18] months~~

SURVEILLANCE REQUIREMENTS (continued)

3.3 INSTRUMENTATION

3.3.3 Engineered Safety Features (ESF) Instrumentation
~~3.3.4 Engineered Safety Features Actuation System (ESFAS) Instrumentation (Analog)~~

LCO 3.3.3 ~~LCO 3.3.4~~ Four ESF ~~ESFAS~~ trip units and associated instrument and bypass removal channels
for each Function in Table 3.3.3-1 ~~3.3.4-1~~ shall be OPERABLE.

APPLICABILITY: MODES 1, 2, and 3

ACTIONS:

NOTE

Separate Condition entry is allowed for each ESF ~~ESFAS~~ trip or bypass removal Function.

CONDITION	REQUIRED ACTION	COMPLETION TIME
A. One or more functions with one ESF trip unit or associated instrument channel inoperable, except SIRWT level. ~~A. One Containment Spray Actuation Signal (CSAS) trip unit or associated instrument inoperable.~~	A.1 Place affected bistable ~~trip unit~~ in trip ~~bypass~~.	7 days ~~1 hour~~

(continued)

SURVEILLANCE REQUIREMENTS (continued)

CONDITION	REQUIRED ACTION	COMPLETION TIME
B. One or more Functions with two ~~one~~ ESF ~~ESFAS~~ trip units or associated instrument channels ~~(except CSAS)~~ inoperable, except SIRWT level.	----------NOTE---------- LCO 3.0.4 is not applicable. ----------------------------------	
	B.1 Place one ~~affected~~ bistable ~~trip unit~~ in ~~bypass or~~ trip.	8 hours ~~1 hour~~
	AND	
	B.2 ~~B.2.1~~ Restore one trip unit to ~~channel~~ OPERABLE status.	7 days ~~[48] hours~~
		~~1 hour~~
	~~AND~~	
	~~B.2.1 Restore channel to OPERABLE status.~~	~~[48] hours~~
	~~OR~~	
	~~B.2.2 Place affected trip unit in trip.~~	~~48 hours~~
C. One SIRWT Level switch inoperable. ~~C. One or more Functions with two ESFAS trip units or associated instrument channels (except CSAS) inoperable.~~	----------NOTE---------- LCO 3.0.4 is not applicable. ----------------------------------	
	C.1 Bypass the SIRWT Level Switch. ~~C.1 Place one trip unit in bypass and place the other trip unit in trip.~~	8 hours ~~1 hour~~
	AND	
	C.2 Restore channel ~~one trip unit~~ to OPERABLE status.	7 days ~~[48] hours~~

(continued)

SURVEILLANCE REQUIREMENTS (continued)

CONDITION	REQUIRED ACTION	COMPLETION TIME
D. One or more Functions with one or two automatic bypass removal channels inoperable.	D.1 ~~Disable bypass channels.~~ Remove the bypass function OR D.2 Declare the affected Logic Channel inoperable and enter the appropriate Condition. ~~OR~~ ~~D.2.1 Place affected trip units in bypass or trip.~~ ~~AND~~ ~~D.2.2.1 Restore bypass removal channel and affected trip units to OPERABLE status.~~ ~~OR~~ ~~D.2.2.2 Place affected trip units in trip.~~	8 hours ~~1 hour~~ 8 hours ~~1 hour~~ ~~[48] hours~~ ~~48 hours~~
E. ~~F.~~ Required Action and associated Completion Time not met.	E.1 ~~F.1~~ Be in MODE 3. AND E.2 ~~F.2~~ Be in MODE 4	6 hours 30 hours ~~[12] hours~~

(continued)

SURVEILLANCE REQUIREMENTS (continued)

CONDITION	REQUIRED ACTION	COMPLETION TIME
~~E. One or more Functions with two automatic bypass removal channels inoperable.~~	~~NOTE~~ ~~LCO 3.0.4 is not applicable.~~	
	~~E.1 Disable bypass channels.~~	~~1 hour~~
	~~OR~~	
	~~E.2.1 Place one affected trip unit in bypass and place the other in trip for each affected ESFAS Function.~~	~~1 hour~~
	~~AND~~	
	~~E.2.2 Restore one bypass channel and the associated trip unit to OPERABLE status for each affected trip Function.~~	~~48 hours~~

SURVEILLANCE REQUIREMENTS

SURVEILLANCE		FREQUENCY
SR 3.3.3.1 ~~SR 3.3.4.1~~	Perform a CHANNEL CHECK of each ESF ~~ESFAS~~ instrument channel except RAS SIRWT Level Switches and CHP Containment Pressure Switches.	12 hours
SR 3.3.3.2 ~~SR 3.3.4.2~~	Perform a CHANNEL FUNCTIONAL TEST of each ESF ~~ESFAS~~ instrument channel except SIRWT Level Switches.	92 days
~~SR 3.3.4.3~~	~~Perform a CHANNEL FUNCTIONAL TEST on each automatic bypass removal function.~~	~~Once within 92 days prior to each reactor startup~~
SR 3.3.3.3 ~~SR 3.3.4.4~~	Perform a CHANNEL CALIBRATION of each ESF ~~ESFAS~~ instrument channel, including bypass removal functions.	18 months
~~SR 3.3.4.5~~	~~Verify ESF RESPONSE TIMR is within limits.~~	~~[18] months on a STAGGERED TEST BASIS~~

Table 3.3.3-1
Engineered Safety Features Instrumentation

FUNCTION	~~MODES~~	SURVEILLANCE REQUIREMENTS	ALLOWABLE VALUE
1. Safety Injection ~~Actuation~~ Signal (SIS)~~(SIAS)~~			
~~a. Containment Pressure - High~~			
a.~~b.~~ Pressurizer Pressure - Low(a)		SR 3.3.3.1 SR 3.3.3.2 SR 3.3.3.3 ~~SR 3.3.3.4~~ ~~SR 3.3.4.5~~	≥ 1593 psia ~~≤ [19.0] psia~~
2. Containment High Pressure Signal(CHP) ~~Containment Spray Actuation~~ Signal(b)			
a. Containment Pressure - Hi, left train		~~SR 3.3.4.1~~ SR 3.3.3.2 SR 3.3.3.3 ~~SR 3.3.3.4~~ ~~SR 3.3.4.5~~	≥ 3.7 and ≤ 4.4 psig ~~≤ [19.0] psia~~
b. Containment Pressure - Hi, right train		SR 3.3.3.2 SR 3.3.3.33	≥ 3.7 and ≤ 4.4 psig
3. Containment High Radiation (CHR) ~~Isolation Actuation Signal~~			
a. Containment Area Radiation - Hi ~~Pressure - High~~		SR 3.3.3.1 SR 3.3.3.2 SR 3.3.3.3 ~~SR 3.3.3.4~~ ~~SR 3.3.4.5~~	≤ 20 R/hr ~~≤ [19.0] psia~~
~~b. Containment Radiation - High~~		~~SR 3.3.4.1~~ ~~SR 3.3.4.2~~ ~~SR 3.3.4.4~~ ~~SR 3.3.4.5~~	~~≤[2x Background]~~
4. Steam Generator Low Pressure (SGLP) ~~4. Main Steam Isolation Signal~~			
a. "A" Steam Generator Pressure - Low (b)		SR 3.3.3.1 SR 3.3.3.2 SR 3.3.4.3 ~~SR 3.3.3.4~~ ~~SR 3.3.4.5~~	≥ 500 psia ~~≥ [495] psia~~
b. "B" Steam Generator Pressure - Low (b)		SR 3.3.3.1 SR 3.3.3.2 SR 3.3.3.3	≥ 500 psia

FUNCTION	~~MODES~~	SURVEILLANCE REQUIREMENTS	ALLOWABLE VALUE
5.~~6.~~ Aux Feedwater Actuation Signal (AFAS)			
a. "A" Steam Generator Level - Low		SR 3.3.3.1 SR 3.3.3.2 SR 3.3.3.3 ~~SR 3.3.4.4~~ ~~SR 3.3.4.5~~	≥ 25.9 % ~~≥ [45.7] %~~
b. "B" Steam Generator Level - Low		SR 3.3.3.1 SR 3.3.3.2 SR 3.3.3.3~~SR3.3.4.4.4~~ ~~SR 3.3.4.5~~	≥ 25.9 % ~~≥ [45.7] %~~
~~c. Steam Generator Pressure Difference - High (A > B) or (B > A)~~		~~SR 3.3.4.1~~ ~~SR 3.3.4.2~~ ~~SR 3.3.4.4~~ ~~SR 3.3.4.5~~	~~≤ [48.3] psid~~
6.~~5.~~ Recirculation Actuation Signal (RAS)			
a. SIRWT Level Switches - Low ~~a. Refueling Water Tank Level - Low~~		SR 3.3.3.3 ~~[SR 3.3.4.1]~~ ~~SR 3.3.4.2~~ ~~SR 3.3.4.4~~ ~~SR 3.3.4.5~~	≥ 21 and ≤ 27 inches inches above SIRWT floor ~~[≥ 24 inches and ≤ 30] inches above tank bottom~~

(a) Pressurizer Pressure - Low may be manually bypassed when pressurizer pressure is < 1700 psia. The bypass shall be automatically removed whenever pressurizer pressure is ≥ 1700 psia.

(b) Steam Generator Pressure - Low may be manually bypassed when steam generator pressure is < 550 psia. The bypass shall be automatically removed whenever steam generator pressure is ≥ 550 psia.

~~(b) SIAS is also required as a permissive to initiate containment spray.]~~

~~(c) Steam Generator Pressure - Low may be manually bypassed when steam generator pressure is < [785] psia. The bypass shall be automatically removed whenever steam generator pressure is ≥ [785] psia.~~

~~(d) Only the Main Steam Isolation Signal (MSIS) Function and the Steam Generator Pressure - Low and Containment Pressure - High signals are not required to be OPERABLE when all associated valves isolated by the MSIS Function are closed and [de-activated].~~

3.3 INSTRUMENTATION

3.3.4 Engineered Safety Features (ESF) System Logic and Manual Initiation

~~3.3.5 Engineered Safety Features Actuation System (ESFAS) Logic and Manual Trip (Analog)~~

LCO 3.3.4 Two ESF ~~ESFAS~~ Manual Initiation and two ESF ~~ESFAS~~ Actuation Logic channels shall be OPERABLE for each ESF ~~ESFAS~~ Function specified in Table 3.3.4-1. ~~3.3.5-1~~

APPLICABILITY: MODES 1, 2, and 3. ~~According to Table 3.3.5-1.~~

ACTIONS

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

CONDITION	REQUIRED ACTION	COMPLETION TIME
A. One or more Functions with one Manual Initiation ~~Auxiliary Feedwater Actuation Signal (AFAS) Manual Trip or~~ Actuation Logic channel inoperable.	A.1 Restore channel to OPERABLE status.	48 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 4	6 hours 30 hours ~~[12] hours~~
~~C. One or more Functions with one Manual Trip or Actuation Logic channel inoperable except AFAS.~~	~~C.1 Restore channel to OPERABLE status.~~	~~48 hours~~

(continued)

ACTIONS (continued)

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

SURVEILLANCE REQUIREMENTS

SURVEILLANCE		FREQUENCY
	~~NOTES~~ ~~1. Testing of Actuation Logic shall include verification of the proper operation of each initiation relay.~~ ~~2. Relays associated with plant equipment that cannot be operated during plant operation are only required to be tested during each MODE 5 entry exceeding 24 hours unless tested during the previous 6 months.~~	
~~SR 3.3.5.1~~ SR 3.3.4.1	Perform a CHANNEL FUNCTIONAL TEST on the AFAS ~~ESFAS~~ Logic channels	92 days
SR 3.3.4.2	Perform a CHANNEL FUNCTIONAL TEST on the SIS Logic normal and emergency power functions using simulated signal.	92 days
SR3.3.4.3 SR 3.3.5.2	Perform a CHANNEL FUNCTIONAL TEST on each ESF ~~ESFAS~~ Manual Initiation ~~Trip~~ channel.	18 months
SR 3.3.4.4	Perform a CHANNEL FUNCTIONAL TEST on each ESF logic channel to verify all automatic actuations and automatic resetting of Low Pressure Bypasses.	18 months

Table 3.3.4-1 ~~3.3.5-1~~
Engineered Safety Features ~~Actuation System~~ Logic and Manual Channel ~~Applicability~~

FUNCTION	~~Applicable Modes~~	SURVEILLANCE REQUIREMENTS
1. Safety Injection ~~Actuation~~ Signal (SIS)	~~1,2,3,[4]~~	
a. Manual Initiation		SR 3.3.4.3
b. SIS Logic Trains (Initiation, Actuation, and Low Pressure Bypass auto reset)		SR 3.3.4.2 SR 3.3.4.4
c. CHP Signal SIS Initiation (5P Relay Output)		SR 3.3.4.4
2. Containment High Pressure Signal (CHP) ~~Spray Actuation Signal~~	~~1,2,3,[4]~~	
a. Manual Initiation (a)		SR 3.3.4.3
a. CHP Logic Trains		SR 3.3.4.4
3. Containment Hi Radiation (CHR) ~~Isolation Actuation Signal~~	~~1,2,3,~~	
a. Manual Initiation		SR 3.3.4.3
b. CHR Logic Trains		SR 3.3.4.4
4. Steam Generator Low Pressure (SGLP) ~~Main Steam Isolation Signal~~	~~1,2,3,4~~	
a. Manual Initiation (a)		SR 3.3.4.3
b. SGLP Logic Trains		SR 3.3.4.4
5. Aux Feedwater Actuation Signal (AFAS) ~~Recirculation Actuation Signal~~	~~1,2,3,4~~	
a. Manual Initiation (a)		SR 3.3.4.3
b. AFAS Logic Trains		SR 3.3.4.1
6. Recirculation Actuation Signal (RAS) ~~Auxiliary Feedwater Actuation Signal~~		
a. Manual Initiation (a)	~~1,2,34~~	
b. RAS Logic Trains		SR 3.3.4.3 SR 3.3.4.4

(a) manual initiation achieved by individual component controls

~~3.3 INSTRUMENTATION~~

~~3.3.5 Diesel Generator (DG) - Undervoltage Start (UV Start)~~
~~3.3.6 Diesel Generator (DG) - Loss of Voltage Start (LOVS) (Analog)~~

LCO 3.3.5 Three Loss of Voltage and Three Degraded Voltage sensors and associated auto start logic channels shall be OPERABLE for each DG.
~~[Four] channels of Loss of Voltage Function and [four] channels of Degraded Voltage Function auto initiation instrumentation per DG shall be OPERABLE.~~

APPLICABILITY: ~~Modes 1, 2, 3, and 4~~
When associated DG is required to be OPERABLE. ~~by LCO 3.8.2, "AC Sources - Shutdown."~~

ACTIONS

~~NOTE~~
~~Separate Condition entry is allowed for each Function.~~

CONDITION	REQUIRED ACTION	COMPLETION TIME
A. One or more Functions with one or more sensors or logic channels per DG inoperable.	A.1 Declare the affected DG inoperable and enter the appropriate Condition.	Immediately
	~~Place channel in bypass or trip.~~	~~1 hour~~
	~~AND~~	
	~~A.2.1 Restore channel to OPERABLE status.~~	~~[48] hours~~
	~~OR~~	
	~~A.2.2 Place the channel in trip.~~	~~48 hours~~

~~B. One or more Functions with two channels per DG inoperable.~~	~~B.1 Enter applicable Conditions and Required Actions for the associated DG made inoperable by DG — LOVS instrumentation.~~ ~~OR~~ ~~B.2.1 ———NOTE——— LCO 3.0.4 is not applicable.~~ ——————— ~~Place one channel in bypass and the other channel in trip.~~ ~~AND~~ ~~B.2.2 Restore one channel to OPERABLE status.~~	~~1 hour~~ ~~1 hour~~ ~~[48] hours~~
~~C. One or more Functions with more than two channels inoperable.~~	~~C.1 Restore all but two channels to OPERABLE status.~~	~~1 hour~~
~~D. Required Action and associated Completion Time not met.~~	~~D.1 Enter applicable Conditions and Required Actions for the associated DG made inoperable by DG — LOVS instrumentation.~~	~~Immediately~~

SURVEILLANCE REQUIREMENTS

SURVEILLANCE		FREQUENCY
SR 3.3.5.1	Perform CHANNEL CALIBRATION with setpoint Allowable Values as follows: a. Loss of Voltage Function ≥ 1860 V dropout; and time delays of: ≤8.15 seconds at 1400 Volts; and ≤ 4.2 seconds at 930 Volts. b. Degraded Voltage Function ≥ 2184 Volts and Time delay of: ≤ 0.8 seconds.	18 months
~~SR 3.3.6.1~~	~~Perform CHANNEL CHECK.~~	~~12 hours~~
~~SR 3.3.6.2~~	~~Perform CHANNEL FUNCTIONAL TEST.~~	~~[92] days~~
~~SR 3.3.6.3~~	~~Perform CHANNEL CALIBRATION with setpoint Allowable Values as follows:~~ ~~a. Degraded Voltage Function ≥ [3180] V and ≤ [3220] V~~ ~~Time delay: ≥ [ ] seconds and ≤ [ ] seconds at [ ] V; and~~ ~~b. Loss of Voltage Function ≥ [3180] V and ≤ [3220] V~~ ~~Time delay: ≥ [ ] seconds and ≤ [ ] seconds at [ ] V.~~	~~[18] months~~

3.3 INSTRUMENTATION

3.3.6 Refueling Containment High Radiation (CHR) Initiation ~~7 Containment Purge Isolation Signal (CPIS) (Analog)~~

LCO 3.3.6 Two Refueling CHR channels shall be OPERABLE. ~~7 [Four] CPIS containment radiation monitor channels and one CPIS automatic Actuation Logic and one Manual Trip train shall be OPERABLE.~~

APPLICABILITY: During CORE ALTERATIONS,
During movement of irradiated fuel assemblies within containment.

ACTIONS

CONDITION	REQUIRED ACTION	COMPLETION TIME
A. One or Two Refueling CHR channels inoperable. ~~One radiation monitor channel inoperable.~~	A. ~~A.1 Place the affected channel in trip.~~	Immediately
	~~OR~~	
	~~A.2.~~1 Suspend CORE ALTERATIONS.	Immediately
	AND	
	A.~~2.~~2 Suspend movement of irradiated fuel assemblies within containment.	~~4 hours~~
		~~Immediately~~
		~~Immediately~~

ACTIONS

CONDITION	REQUIRED ACTION	COMPLETION TIME
~~B. One required Manual Trip or automatic Actuation Logic train inoperable.~~ ~~OR~~	~~B.1 Place and maintain containment purge and exhaust valves in closed position.~~ ~~AND~~	~~Immediately~~ ~~(continued)~~

SURVEILLANCE REQUIREMENTS

SURVEILLANCE		FREQUENCY
SR 3.3.6.1 ~~7.1~~	Perform a CHANNEL CHECK on each refueling CHR channel. ~~Perform a CHANNEL CHECK on each containment radiation monitor channel.~~	24 hours ~~12 hours~~
SR 3.3.6.2	Perform a CHANNEL FUNCTIONAL TEST on each refueling CHR channel. Verify Containment refueling Radiation Monitor Channel - high radiation setpoint is $\leq$ 15 mRem/hr above background.	31 days ~~[92] days~~
~~SR 3.3.7.2~~	~~Perform a CHANNEL FUNCTIONAL TEST on each containment radiation monitor channel.~~ ~~Verify CPIS high radiation setpoint Allowable Value is $\leq$ [220 mR/hr].~~	~~(continued)~~

SURVEILLANCE REQUIREMENTS (continued)

SURVEILLANCE		FREQUENCY
SR 3.3.6.3~~SR 3.3.7.4~~	Perform a CHANNEL CALIBRATION on each containment refueling radiation monitor channel.	18 months
~~SR 3.3.7.3~~	~~------NOTE------~~ ~~Testing of Actuation Logic shall include verification of the proper operation of each initiation relay.~~ ~~------~~ ~~Perform a CHANNEL FUNCTIONAL TEST on each CPIS Actuation Logic channel.~~	~~[31] days~~

~~SR 3.3.7.5 Perform a CHANNEL FUNCTIONAL TEST on each CPIS Manual Trip channel. [18] months~~

~~SR 3.3.7.6 Verify CPIS response time of each containment radiation channel is within limits.~~

~~[18] months on a STAGGERED TEST BASIS~~

3.3 INSTRUMENTATION

3.3.7 ~~3.3.11 Post~~ Accident Monitoring ~~(PAM)~~ Instrumentation ~~(Analog)~~

LCO 3.3.7 ~~3.3.11~~ The accident monitoring instrumentation for each Function in Table 3.3.7-1 shall be OPERABLE.
~~The PAM instrumentation for each Function in Table 3.3.11-1 shall be OPERABLE.~~

APPLICABILITY: MODES 1, 2, and 3.

ACTIONS

---NOTES---

1. LCO 3.0.4 is not applicable.

2. Separate Condition entry is allowed for each Function.

CONDITION	REQUIRED ACTION	COMPLETION TIME
A. One or more Functions with one required channel inoperable.	A.1 Restore required channel to OPERABLE status.	7 days ~~30 days~~
B. One or more Functions with two required channels inoperable. ~~Required Action and associated Completion Time of Condition A not met.~~	B.1 Restore one channel to OPERABLE status. ~~Initiate action in accordance with Specification 5.6.8.~~	48 hours ~~Immediatley~~

(continued)

ACTIONS (continued)

CONDITION	REQUIRED ACTION	COMPLETION TIME
~~-----NOTE-----~~ ~~Not applicable to hydrogen monitor channels.~~ ~~-----~~ C. Required Action and associated Completion Time of Condition A not met for Functions 1 through 15. ~~One or more Functions with two required channels inoperable.~~ OR Required Action and associated Completion Time of Condition B not met for Functions 1 through 19.	C.1 Be in MODE 3. ~~Restore one channel to OPERABLE status~~ AND C.2 Be in MODE 4.	6 hours ~~7 days~~ 30 hours
D. Required Action and associated Completion Time of Condition A not met for Functions 16 through 21 ~~Two hydrogen monitor channels inoperable.~~ OR Required Action and associated Completion Time of Condition B not met for Functions 20 or 21.	D.1 Initiate action in accordance with Specification 5.6.7. (Report to NRC) ~~Restore one hydrogen monitor channel to OPERABLE status.~~ AND D.2 Restore channel to OPERABLE status	Immediately 7~~2~~ ~~hours~~ Prior to entering MODE 2 following the next MODE 6 entry
~~E. Required Action and associated Completion Time of Condition C or D not met.~~	~~E.1 Enter the Condition referenced in Table 3.3.11-1 for the channel.~~	~~Immediately~~

~~F. As required by Required Action E.1 and referenced in Table 3.3.11-1.~~	~~F.1 Be in MODE 3.~~ ~~AND~~ ~~F.2 Be in MODE 4.~~	~~6 hours~~ ~~12 hours~~
~~G. As required by Required Action E.1 and referenced in Table 3.3.11-1.~~	~~G.1 Initiate action in accordance with Specification 5.6.8.~~	~~Immediately~~

SURVEILLANCE REQUIREMENTS

~~NOTE~~
~~These SRs apply to each PAM instrumentation Function in Table 3.3.7-1~~

SURVEILLANCE		FREQUENCY
SR 3.3.7.1 ~~3.3.11.1~~	Perform CHANNEL CHECK for each required instrumentation channel except valve position ~~that is normally energized.~~	31 days
SR 3.3.7.2~~3.3.11.2~~	NOTE ~~1. Neutron detectors are excluded from CHANNEL CALIBRATION.~~ 1. Calibrate Core Exit Thermocouple circuitry by substituting a known voltage for thermocouple voltage. Perform CHANNEL CALIBRATION.	18 ~~[18]~~ months

Table 3.3.7-1
Accident Monitoring Instrumentation

FUNCTION	REQUIRED CHANNELS	~~CONDITIONS REFERENCED FROM REQUIRED ACTION D.1~~
1. PCS Wide Range Hot Leg Temperature	2	
2. PCS Wide Range Cold Leg Temperature	2	
3. Wide Range Flux	2	
4. Containment Floor Water Level	2	
5. Subcooled Margin Monitor	2	
6. Wide Range Pressurizer Level	2	
7. Containment H_2 Concentration	2	
8. Condensate Storage Tank Level	2	
9. Wide Range Pressurizer Pressure	2	
10. Wide Range Containment Pressure	2	
11. Wide Range "A" SG Level	2	
12. Wide Range "B" SG Level	2	
13. Narrow Range "A" SG Pressure	2	
14. Narrow Range "B" SG Pressure	2	
15. Position Indication for each Containment Isolation Valve [a]	1/valve	
16. Core Exit Thermocouples - Quadrant 1	4	
17. Core Exit Thermocouples - Quadrant 2	4	
18. Core Exit Thermocouples - Quadrant 3	4	
19. Core Exit Thermocouples - Quadrant 4	4	
20. Reactor Vessel Level Monitoring Sys.	2	
21. High Range Containment Radiation	2	

(a) Not required for isolation valves whose associated penetration is isolated by at least one closed and de-activated automatic valve, closed manual valve, blind flange or check valve, with flow through the valve secured.

~~Table 3.3.11-1 (page 1 of 1)~~
~~Post Accident Monitoring Instrumentation~~

~~FUNCTION~~	~~REQUIRED CHANNELS~~	~~CONDITIONS REFERENCED FROM REQUIRED ACTION D.1~~
~~1. [Logarithmic] Neutron Flux~~	~~2~~	~~F~~
~~2. Reactor Coolant System Hot Leg Temperature~~	~~2 per loop~~	~~F~~
~~3. Reactor Coolant System Cold Leg Temperature~~	~~2 per loop~~	~~F~~
~~4. Reactor Coolant System Pressure (wide range)~~	~~2~~	~~F~~
~~5. Reactor Vessel Water Level~~	~~2~~	~~[G]~~
~~6. Containment Sump Water Level (wide range)~~	~~2~~	~~F~~
~~7. Containment Pressure (wide range)~~	~~2~~	~~F~~
~~8. Containment Isolation Valve Position~~	~~2 per penetration flow path~~(a)(b)	~~F~~
~~9. Containment Area Radiation (high range)~~	~~2~~	~~[G]~~
~~10. Containment Hydrogen Monitors~~	~~2~~	~~F~~
~~11. Pressurizer Level~~	~~2~~	~~F~~
~~12. Steam Generator Water Level (wide range)~~	~~2 per steam generator~~	~~F~~
~~13. Condensate Storage Tank Level~~	~~2~~(c)	~~F~~
~~14. Core Exit Temperature - Quadrant [1]~~	~~2~~(c)	~~F~~
~~15. Core Exit Temperature - Quadrant [2]~~	~~2~~(c)	~~F~~
~~16. Core Exit Temperature - Quadrant [3]~~	~~2~~(c)	~~F~~
~~17. Core Exit Temperature - Quadrant [4]~~	~~2~~(c)	~~F~~
~~18. Auxiliary Feedwater Flow~~	~~2~~	~~F~~

~~(a) Not required for isolation valves whose associated penetration is isolated by at least one closed and de-activated automatic valve, closed manual valve, blind flange, or check valve with flow through the valve secured.~~

~~(b) Only one position indication channel is required for penetration flow paths with only one installed control room indication channel.~~

~~(c) A channel consists of two or more core exit thermocouples.~~

~~Note:Table 3.3.11-1 shall be amended for each unit as necessary to list:~~

~~(1) all Regulatory Guide 1.97, Type A instruments, and~~
~~(2) all Regulatory Guide 1.97, Category I, non-Type A instruments specified in the unit's Regulatory Guide 1.97, Safety Evaluation Report.~~

3.3 INSTRUMENTATION

3.3.8 Alternate Shutdown System
~~3.3.12 Remote Shutdown System (Analog)~~

LCO 3.3.8~~3.3.12~~ The Alternate Shutdown System Functions in Table 3.3.8-1 shall be OPERABLE.
~~The Remote Shutdown System Functions in Table 3.3.12-1 shall be OPERABLE.~~

APPLICABILITY: MODES 1, 2, and 3.

ACTIONS

-----NOTES-----

1. LCOs 3.0.3 and 3.0.4 are ~~is~~ not applicable.

2. Separate Condition entry is allowed for each Function.

CONDITION	REQUIRED ACTION	COMPLETION TIME
A. One or more required Channels ~~Functions~~ inoperable.	A.1 Provide equivalent shutdown capability. ~~Restore required Functions to OPERABLE status.~~ AND A.2 Restore Channel to OPERABLE status.	7 days ~~30 days~~ 60 days
B. Required Action and associated Completion Time not met.	B.1 Be in MODE 3. AND B.2 Be in MODE 4	6 hours 30 hours

SURVEILLANCE REQUIREMENTS

SURVEILLANCE		FREQUENCY
SR 3.3.8.1~~3.3.12.1~~	Perform CHANNEL CHECK for each required instrumentation Function 2 through 12 in Table 3.3.8-1. ~~channel that is normally energized.~~	92 days ~~31 days~~
SR 3.3.8.2~~3.3.12.2~~	Perform a CHANNEL CHECK of Function 1 in Table 3.3.8-1 (Neutron Flux). ~~Verify each required control circuit and transfer switch is capable of performing the intended function.~~	Once within 7 days prior to each Reactor Startup ~~[18] months~~
SR 3.3.8.3~~3.3.12.3~~	Perform a CHANNEL CHECK of Functions 13 and 14 in Table 3.3.8-1. (P-8B flow to SGs) ~~-----NOTE-----~~ ~~Neutron detectors are excluded from the CHANNEL CALIBRATION.~~ ~~Perform CHANNEL CALIBRATION for each required instrumentation channel.~~	18 months
SR 3.3.8.4~~3.3.12.4~~	Perform a CHANNEL FUNCTIONAL TEST on Functions 13 through 18 in Table 3.3.8-1. ~~Perform CHANNEL FUNCTIONAL TEST of the reactor trip circuit breaker open/closed indication.~~	18 months
SR 3.3.8.5	Perform CHANNEL CALIBRATION for each required instrumentation channel of Functions 1 through 15 in Table 3.3.8-1.	18 months

Table 3.3.8-1 (page 1 of 1)
Alternate Shutdown System Instrumentation and Controls

FUNCTION/INSTRUMENT OR CONTROL PARAMETER	SURVEILLANCE REQUIREMENTS	REQUIRED CHANNELS
1. Neutron Flux	SR 3.3.8.2 SR 3.3.8.5	1
2. Pressurizer Pressure	SR 3.3.8.1 SR 3.3.8.5	1
3. Pressurizer Level	SR 3.3.8.1 SR 3.3.8.5	1
4. PCS #1 Hot Leg Temperature	SR 3.3.8.1 SR 3.3.8.5	1
5. PCS #2 Hot Leg Temperature	SR 3.3.8.1 SR 3.3.8.5	1
6. PCS #1 Cold Leg Temperature	SR 3.3.8.1 SR 3.3.8.5	1
7. PCS #2 Cold Leg Temperature	SR 3.3.8.1 SR 3.3.8.5	1
8. "A" SG Pressure	SR 3.3.8.1 SR 3.3.8.5	1
9. "B" SG Pressure	SR 3.3.8.1 SR 3.3.8.5	1
10. "A" SG Level	SR 3.3.8.1 SR 3.3.8.5	1
11. "B" SG Level	SR 3.3.8.1 SR 3.3.8.5	1
12. SIRW Tank Level	SR 3.3.8.1 SR 3.3.8.5	1
13. AFW Pump P-8B Flow to "A" SG	SR 3.3.8.3 SR 3.3.8.4 SR 3.3.8.5	1
14. AFW Pump P-8B Flow to "B" SG	SR 3.3.8.3 SR 3.3.8.4 SR 3.3.8.5	1
15. AFW Pump P-8B Suction Pressure Alarm	SR 3.3.8.4 SR 3.3.8.5	1
16. AFW Pump P-8B Steam Valve Control	SR 3.3.8.4	1
17. AFW Flow Control "A" SG	SR 3.3.8.4	1
18. AFW Flow Control "B" SG	SR 3.3.8.4	1

~~Table 3.3.12-1 (page 1 of 1)~~
~~Remote Shutdown System Instrumentation and Controls~~

~~NOTE~~
~~This table is for illustration purposes only. It does not attempt to encompass every Function used at every unit, but does contain the types of Functions commonly found.~~

~~FUNCTION/INSTRUMENT OR CONTROL PARAMETER~~	~~REQUIRED NUMBER OF DIVISIONS~~
~~1. Reactivity Control~~	
~~a. Log Power Neutron Flux~~	~~[1]~~
~~b. Source Range Neutron Flux~~	~~[1]~~
~~c. Reactor Trip Circuit Breaker Position~~	~~[1 per trip breaker]~~
~~d. Manual Reactor Trip~~	~~[2]~~
~~2. Reactor Coolant System Pressure Control~~	
~~a. Pressurizer Pressure or RCS Wide Range Pressure~~	~~[1]~~
~~b. Pressurizer Power Operated Relief Valve Control and Block Valve Control~~	~~[1, controls must be for power operated relief valve and block valves on same line]~~
~~3. Decay Heat Removal via Steam Generators~~	
~~a. Reactor Coolant Hot Leg Temperature~~	~~[1 per loop]~~
~~b. Reactor Coolant Cold Leg Temperature~~	~~[1 per loop]~~
~~c. Auxiliary Feedwater Controls~~	~~[1]~~
~~d. Steam Generator Pressure~~	~~[1 per steam generator]~~
~~e. Steam Generator Level or Auxiliary Feedwater Flow~~	~~[1 per steam generator]~~
~~f. Condensate Storage Tank Level~~	~~[1]~~
~~4. Reactor Coolant System Inventory Control~~	
~~a. Pressurizer Level~~	~~[1]~~
~~b. Reactor Coolant Charging Pump Controls~~	~~[1]~~

3.3 INSTRUMENTATION

3.3.9 Neutron Flux Monitoring Channels
~~3.3.13 [Logarithmic] Power Monitoring Channels (Analog)~~

LCO 3.3.9 Two channels of Neutron Flux monitoring instrumentation shall be OPERABLE.

~~LCO 3.3.13 Two channels of [logarithmic] power level monitoring instrumentation shall be OPERABLE.~~

APPLICABILITY: MODES 3, 4, and 5 with no more than one Control Rod capable of withdrawal.
~~MODES 3, 4, and 5, with the reactor trip circuit breakers open or Control Element Assembly (CEA) Drive System not capable of CEA withdrawal.~~

ACTIONS

CONDITION	REQUIRED ACTION	COMPLETION TIME
A. One or more channels inoperable.	A.1 Suspend all operations involving positive reactivity additions.	Immediately
	AND	
	A.2 Perform SDM verification in accordance with SR 3.1.1.1, if T_{avg} > 525°F, or SR 3.1.2.1, if T_{avg} ≤ 525°F. ~~if T_{avg} > 200°F, or SR 3.1.2.1, if T_{avg} ≤ 200°F~~	4 hours AND Once per 12 hours thereafter

SURVEILLANCE REQUIREMENTS

SURVEILLANCE		FREQUENCY
SR 3.3.9.1 ~~SR 3.3.12.1~~	Perform CHANNEL CHECK on each required neutron flux channel.	12 hours
SR 3.3.9.2 ~~SR 3.3.12.2~~	Perform CHANNEL CALIBRATION on each required neutron flux channel. ~~Perform CHANNEL FUNCTIONAL TEST.~~	18 months ~~[92] days~~
~~SR 3.3.13.3~~	~~NOTE~~ ~~Neutron detectors are excluded from CHANNEL CALIBRATION.~~ ~~Perform CHANNEL CALIBRATION.~~	~~[18] months~~

3.3 INSTRUMENTATION

3.3.10 Spent Fuel Pool Radiation Monitor

LCO 3.3.10 Two Spent Fuel Pool (SFP) Radiation Monitors shall be OPERABLE.

APPLICABILITY: Whenever fuel is in the SFP area.

-----------------------------------NOTE-----------------------------------
LCOs 3.0.3 and 3.0.4 are not Applicable

ACTIONS

CONDITION	REQUIRED ACTION	COMPLETION TIME
A. One or Two Spent Fuel Pool Radiation Monitors inoperable.	A.1 Suspend fuel movement in the SFP area.	Immediately
	AND	
	A.2.1 Restore Monitors to Operable Status	72 hours
	OR	
	A.2.2 Provide equivalent monitoring capability	72 hours

(continued)

SURVEILLANCE REQUIREMENTS

SURVEILLANCE		FREQUENCY
SR 3.3.10.1	Perform a CHANNEL CHECK on each SFP Radiation Monitoring channel.	24 hours
SR 3.3.10.2	Perform a CHANNEL FUNCTIONAL TEST on each SFP Radiation Monitoring channel.	31 days
SR 3.3.10.3	Perform a CHANNEL CALIBRATION on each SFP Radiation Monitoring channel.	18 months

ATTACHMENT 5

CONSUMERS POWER COMPANY
PALISADES PLANT
DOCKET 50-255

STS CONVERSION TECHNICAL SPECIFICATION CHANGE REQUEST

3.3 INSTRUMENTATION PART

STS Bases Pages Marked to Show the Differences Between RTS and STS

B 3.3 INSTRUMENTATION

B 3.3.1 Reactor Protective System (RPS) Instrumentation ~~- Operating (Analog)~~

BASES

BACKGROUND

The RPS initiates a reactor trip to protect against violating the core specified acceptable fuel design limits and breaching the reactor coolant pressure boundary during anticipated operational occurrences (AOOs). By tripping the reactor, the RPS also assists the Engineered Safety Features systems in mitigating accidents.

The protection and monitoring systems have been designed to ensure safe operation of the reactor. This is achieved by specifying limiting safety system settings (LSSS) in terms of parameters directly monitored by the RPS, as well as LCOs on other reactor system parameters and equipment performance.

The LSSS, defined in this Specification as the Allowable Value, in conjunction with the LCOs, establish the threshold for protective system action to prevent exceeding acceptable limits during Design Basis Accidents (DBAs).

During AOOs, which are those events expected to occur one or more times during the plant life, the acceptable limits are:

- The departure from nucleate boiling ratio (DNBR) shall be maintained above the Safety Limit (SL) value to prevent departure from nucleate boiling;
- Fuel centerline melting shall not occur; and
- The Primary ~~Reactor~~ Coolant System (PCS) ~~(RCS)~~ pressure SL of 2750 psia shall not be exceeded.

Maintaining the parameters within the above values ensures that the offsite dose will be within the 10 CFR 50 (Ref. 1) and 10 CFR 100 (Ref. 2) criteria during AOOs.

Accidents are events that are analyzed even though they are not expected to occur during the plant life. The acceptable limit during accidents is that the offsite dose shall be maintained within an acceptable fraction of 10 CFR 100 (Ref. 2) limits. Different accident categories allow a different fraction of these limits based on probability of occurrence. Meeting the acceptable dose limit for an accident category is considered having acceptable consequences for that event.

The RPS is segmented into three ~~fou~~r interconnected modules. These modules are:

- Measurement channels;
- Bistable trip units ; and
- RPS Logic;

~~and~~

- ~~Reactor trip circuit breakers (RTCBs).~~

This LCO addresses measurement channels and bistable trip units. It also addresses the automatic bypass removal feature for those trips with operating bypasses. The RPS Logic is addressed in LCO 3.3.2, ~~The RPS Logic and RTCBs are addressed in LCO 3.3.3,~~ "Reactor Protective System (RPS) Logic and Trip Initiation."

The role of each of these modules in the RPS, including those associated with the logic, ~~and RTCBs,~~ is discussed below.

Measurement Channels

Measurement channels, consisting of field transmitters or process sensors and associated instrumentation, provide a measurable electronic signal based upon the physical characteristics of the parameter being measured.

The excore nuclear instrumentation (wide range and power range) and the thermal margin monitor are considered components in the measurement channels.

The wide range nuclear instruments (NIs) provide a Hi Startup Rate Trip. There are only two wide range NI channels. The wide range channel signal processing electronics is physically mounted in RPS cabinet channels C (NI-003) and D (NI-004). Separate bistables mounted within the Channel C wide range channel drawer supply High Startup Rate trip signals to RPS channels A and C. Separate bistables mounted within the Channel D wide range channel drawer provide High Startup Rate trip signals to RPS channels B and D.

Two RPS trips use a power level designated as Q power as an input. Q power is the higher of NI power from the power range NI drawer and primary calorimetric power (ΔT power) based on RCS hot leg and cold leg temperatures. Trips using Q power as an input include the Variable High Power Trip (VHPT) and the Thermal Margin/Low Pressure (TM/LP) trips

~~BASES~~

both of which employ the thermal margin monitor for trip generation.

The thermal margin monitor provides the complex signal processing necessary to calculate the TM/LP trip setpoint, VHPT trip setpoint and trip comparison.
~~The excore nuclear instrumentation and the analog core protection calculators (CPCs) are considered components in the measurement channels. The wide range nuclear instruments (NIs) provide a Power Rate of Change - High Trip. Three RPS trips use a power level designated as Q power as an input. Q power is the higher of NI power and primary calorimetric power (ΔT power) based on RCS hot leg and cold leg temperatures. Trips using Q power as an input include the Variable High Power Trip (VHPT) - High, Thermal Margin/Low Pressure (TM/LP), and the Axial Power Distribution (APD) - High trips.~~

~~The analog CPCs provide the complex signal processing necessary to calculate the TM/LP trip setpoint, APD trip setpoint, VHPT trip setpoint,~~ and Q power calculation.

The excore power range NIs (NI 005 through NI 008) and the thermal margin monitors are mounted in the RPS cabinet,

~~The excore NIs (wide range and power range) and the analog CPCs (TM/LP and APD calculators) are mounted in the RPS cabinet,~~ with one channel of each in each of the four RPS bays.

With the exception of the wide range NIs, which employ two channels, and Loss of Load, which employs a single pressure sensor, four identical measurement channels with electrical and physical separation are provided for each parameter used in the direct generation of trip signals.

~~Four identical measurement channels with electrical and physical separation are provided for each parameter used in the direct generation of trip signals.~~ These are designated channels A through D. Measurement channels provide input to one or more RPS bistables within the same RPS channel. In addition, some measurement channels are used as inputs to Engineered Safety Features System (ESF) bistables, ~~some measurement channels may also be used as inputs to Engineered Safety Features Actuation System (ESFAS) bistables,~~ and most provide indication in the control room. ~~Measurement channels used as an input to the RPS are never used for control functions.~~

~~BASES~~

When a channel monitoring a parameter exceeds a predetermined setpoint, indicating an unsafe condition, the bistable monitoring the parameter in that channel will trip. Tripping two or more channels of bistables monitoring the same parameter de-energizes Matrix Logic, which in turn de-energizes the Initiation Logic. This causes all four DC clutch power supplies to deenergize, interrupting power to the control rod drive mechanism dc clutches, allowing the full length control rods to insert into the core. ~~This causes all eight RTCBs to open, interrupting power to the control element assemblies (CEAs), allowing them to fall into the core.~~

Three of the four measurement and bistable channels are necessary to meet the redundancy and testability of GDC 21 in 10 CFR 50, Appendix A (Ref. 1). The fourth channel provides additional flexibility by allowing one channel to be removed from service (trip channel bypass) for maintenance or testing while still maintaining a minimum two-out-of-three logic. Thus, even with a channel inoperable, no single additional failure in the RPS can either cause an inadvertent trip or prevent a required trip from occurring.

Since no single failure will either cause or prevent a protective system actuation~~, and no protective channel feeds a control channel,~~ this arrangement meets the requirements of IEEE 279-1971 (Ref.~~-~~ 3).

In the case of wide range power and loss of load, where fewer than four sensor channels are employed, the reactor trips provided are not required by the plant Safety Analysis. As such, they need not meet the above criteria. In these cases, however, the sensor channels provide trip input signals to all four RPS channels.

Most of the RPS trips are generated by comparing a single measurement to a fixed bistable setpoint. ~~Many of the RPS trips are generated by comparing a single measurement to a fixed bistable setpoint.~~ Certain Functions, however, make use of more than one measurement to provide a trip. The following trips use multiple measurement channel inputs:

~~Steam Generator Level — Low~~

~~This trip uses the lower of the two steam generator levels as an input to a common bistable.~~

~~• Steam Generator Pressure — Low~~

~~BASES~~

~~This trip uses the lower of the two steam generator pressures as an input to a common bistable.~~

• Variable High Power Trip (VHPT)

• ~~Variable High Power Trip (VHPT) High~~

The VHPT uses Q power as its only input. Q power is the higher of NI power and ΔT power. It has a trip setpoint that tracks power levels downward so that it is always within a fixed increment above current power, subject to a minimum value.

On power increases, the trip setpoint remains fixed unless manually reset, at which point it increases to the new setpoint, a fixed increment above Q power at the time of reset, subject to a maximum value. Thus, during power escalation, the trip setpoint must be repeatedly reset to avoid a reactor trip.

• Thermal Margin/Low Pressure (TM/LP) ~~and Steam Generator Pressure Difference~~

Q power is only one of several inputs to the TM/LP trip. Other inputs include internal ASI and cold leg temperature based on the higher of two cold leg resistance temperature detectors. The TM/LP trip setpoint is a complex function of these inputs and represents a minimum acceptable RCS pressure to be compared to actual RCS pressure in the TM/LP trip unit.

~~Thermal Margin/Low Pressure (TM/LP) and Steam Generator Pressure Difference (continued)~~

~~Steam generator pressure is also an indirect input to the TM/LP trip via the Steam Generator Pressure Difference. This Function provides a reactor trip when the secondary pressure in either steam generator exceeds that of the other generator by greater than a fixed amount. The trip is implemented by biasing the TM/LP trip setpoint upward so as to ensure TM/LP trip if an asymmetric steam generator transient is detected.~~

~~Axial Power Distribution (APD) High~~

~~Q Power and ASI are inputs to the APD trip. The APD trip setpoint is a function of Q power, being more restrictive at higher power levels. It provides a reactor trip if actual ASI exceeds the APD trip setpoint.~~

~~BASES~~

Bistable Trip Units

Bistable trip units, mounted in the RPS cabinet, receive an analog input from the measurement channels, compare the analog input to trip setpoints, and provide contact output to the Matrix Logic. They also provide local trip indication and remote annunciation.

There are four channels of bistable trip units, designated A through D, for each RPS Function, one for each measurement channel. Bistable output relays de-energize when a trip occurs.

The contacts from these bistable relays are arranged into six coincidence matrices, comprising the Matrix Logic. If bistables monitoring the same parameter in at least two channels trip, the Matrix Logic will generate a reactor trip (two-out-of-four logic).

Four of the RPS trip Function ~~Some of the RPS~~ measurement channels provide contact outputs to the RPS, so the comparison of an analog input to a trip setpoint is not necessary. In these cases, the bistable trip unit is replaced with an auxiliary trip unit. The auxiliary trip units provide contact multiplication so the single input contact opening can provide multiple contact outputs to the coincidence logic as well as trip indication and annunciation.

Trips employing auxiliary trip units include the Variable High Power Trip, which receives contact inputs from the thermal margin monitors; the High Startup Rate trip which employs contact inputs from bistables mounted in the two wide range drawers; the Loss of Load trip which receives contact inputs from one of two auxiliary relays which are operated by a single relay sensing turbine EHC auto stop oil pressure; and the Containment High Pressure (CHP) trip, which employs CHP pressure switch contacts.

~~Trips employing auxiliary trip units include the Loss of Load trip and the APD — High trip. The Loss of Load trip is a contact input from the Electro Hydraulic Control System control oil pressure on each of the four high pressure stop valves.~~

~~The APD trip, described above, is a complex function in which the actual trip comparison is performed within the CPC. Therefore the APD — High trip unit employs a contact input from the CPC.~~

~~BASES~~

All RPS trips, with the exception of the Loss of Load and CHP trip, ~~with the exception of the Loss of Load trip,~~ generate a pretrip alarm as the trip setpoint is approached.

The trip setpoints used in the bistable trip units are based on the analytical limits stated in Reference 4. The selection of these trip setpoints is such that adequate protection is provided when all sensor and processing time delays are taken into account. To allow for calibration tolerances, instrumentation uncertainties, and , instrument drift, ~~and severe environment errors for those RPS channels that must function in harsh environments, as defined by 10 CFR 50.49 (Ref. 5)~~ - Allowable Values specified in Table 3..3.1-1, in the accompanying LCO, are conservatively adjusted with respect to the analytical limits. A detailed description of the methodology used to calculate the trip setpoints, including their explicit uncertainties, is provided in the CPCo EGAD "Setpoint Methodology" ~~the "Plant Protection System Selection of Trip Setpoint Values"~~ (Ref. 6). The nominal trip setpoint entered into the bistable is normally still more conservative than that specified by the Allowable Value, to account for changes in random measurement errors detectable by a CHANNEL FUNCTIONAL TEST. One example of such a change in measurement error is drift during the interval between surveillances. A channel is inoperable if its actual setpoint is not within its required Allowable Value.

Setpoints in accordance with the Allowable Value will ensure that SLs of Chapter 2.0 are not violated during AOOs and the consequences of DBAs will be acceptable, providing the plant is operated from within the LCOs at the onset of the AOO or DBA and the equipment functions as designed.

Note that in the accompanying LCO 3.3.1, the Allowable Values of Table 3.3.1-1 are the LSSS.

RPS Logic

The RPS Logic, addressed in LCO 3.3.2, ~~3,~~ consists of both Matrix and Initiation Logic and employs a scheme that provides a reactor trip when bistables in any two out of the four channels sense the same input parameter trip. This is called a two-out-of-four trip logic. This logic and the clutch power supply configuration configuration are shown in FSAR Figure 7-1 (Ref. 9). ~~This logic and the RTCB configuration are shown in Figure B 3.~~3.1-1.

Bistable relay contact outputs from the four channels are configured into six logic matrices. Each logic matrix

~~BASES~~

checks for a coincident trip in the same parameter in two bistable channels. The matrices are designated the AB, AC, AD, BC, BD, and CD matrices to reflect the bistable channels being monitored. Each logic matrix contains four normally energized matrix relays. When a coincidence is detected, consisting of a trip in the same Function in the two channels being monitored by the logic matrix, all four matrix relays de-energize.

The matrix relay contacts are arranged into trip paths, with one of the four matrix relays in each matrix opening a contact in one of the four trip paths.

The trip paths thus have six contacts in series, ~~with one of the four matrix relays in each matrix opening contacts in one of the four trip paths. Each trip path provides power to one of the four normally energized RTCB control relays (K1, K2, K3, and K4). The trip paths thus each have six contacts in series,~~ one from each matrix, and perform a logical OR function, deenergizing the M contactors if any one or more of the six logic matrices indicate a coincidence condition.

Deenergizing the M contactors removes AC power to the four clutch power supply inputs. Contacts from M Contactors M1 and M2 are in series with each other and in the AC power supply path to clutch power supplies PS1 and PS3. M3 and M4 are similarly arranged with respect to clutch power supplies PS2 and PS4. Approximately half of the control rods receive clutch power from auctioneered clutch power supplies 1 and 2. The remaining control rods receive clutch power from auctioneered clutch power supplies 3 and 4.

Manual reactor trip capability is afforded by two main control board-mounted pushbuttons. One of these (CO-1) opens contacts in series with each of the four trip paths, denergizing all M contactors. The other pushbutton (CO-2) opens circuit breakers which provide AC input power to the M contactor contacts and downstream clutch power supplies. Thus depressing either pushbutton will cause a reactor trip by diverse means. ~~and perform a logical OR function, opening the RTCBs if any one or more of the six logic matrices indicate a coincidence condition.~~

~~Each trip path is responsible for opening one set of two of the eight RTCBs. The RTCB control relays (K relays), when de-energized, interrupt power to the breaker undervoltage trip attachments and simultaneously apply power to the shunt trip attachments on each of the two breakers. Actuation of either the undervoltage or shunt trip attachment is~~

~~BASES~~

~~sufficient to open the RTCB and interrupt power from the motor generator (MG) sets to the control element drive mechanisms (CEDMs).~~

When a coincidence occurs in two RPS channels, all four matrix relays in the affected matrix de-energize. This in turn de-energizes all four M contactors, which interrupt AC input power to the four clutch power supplies, allowing the control rods to insert by gravity. ~~This in turn de-energizes all four RTCB control relays, which simultaneously de-energize the undervoltage and energize the shunt trip attachments in all eight RTCBs, tripping them open.~~

Matrix Logic refers to the matrix power supplies, trip channel bypass contacts, and interconnecting matrix wiring between bistable and auxiliary trip units, up to but not including the matrix relays. Contacts in the bistable and auxiliary trip units are excluded from the Matrix Logic definition, since they are addressed as part of the measurement channel.

The Initiation Logic consists of the matrix relays and their associated contacts, ~~The Initiation Logic consists of the trip path power source, matrix relays and their associated contacts,~~ all interconnecting wiring, CO-1 manual trip contacts, and M contactors.

Neither the clutch power supplies nor the AC input power source to these supplies is considered as Safety Related, and are not subject to Technical Specifications, other than as addressed by the RPS Logic and trip initiation specification, LCO 3.3.2. Operation may continue with one or two selective clutch power supplies deenergized. ~~and solid state (auxiliary) relays through the K relay contacts in the RTCB control circuitry.~~

It is possible to change the two-out-of-four RPS Logic to a two-out-of-three logic for a given input parameter in one channel at a time by trip channel bypassing select portions of the Matrix Logic. Trip channel bypassing a bistable effectively shorts the bistable relay contacts in the three matrices associated with that channel. Thus, the bistables will function normally, producing normal trip indication and annunciation, but a reactor trip will not occur unless two additional channels indicate a trip condition. Trip channel bypassing can be simultaneously performed on any number of parameters in any number of channels, providing each parameter is bypassed in only one channel at a time. A bypass key ~~An~~ interlock prevents simultaneous trip channel

~~BASES~~

bypassing of the same parameter in more than one channel. Trip channel bypassing is normally employed during maintenance or testing.

~~For those plants that have demonstrated sufficient channel to channel independence, two out of three logic is the minimum that is required to provide adequate plant protection, since a failure of one channel still ensures a~~

~~reactor trip would be generated by the two remaining OPERABLE channels. Two out of three logic also prevents inadvertent trips caused by any single channel failure in a trip condition.~~

In addition to the trip channel bypasses, there are also operating bypasses on select RPS trips. Some of these bypasses are enabled manually, others automatically, in all four RPS channels when plant conditions do not warrant the specific trip protection. All operating bypasses are automatically removed when enabling bypass conditions are no longer satisfied. Trips with operating bypasses include the High Startup Rate, Low PCS flow, Low SG Pressure,TM/LP and Loss of Load. The Loss of Load trip and High Startup Rate trip operating bypasses are automatically enabled and disabled.

~~Reactor Trip Circuit Breakers (RTCBs)~~

~~The reactor trip switchgear, addressed in LCO 3.3.3 and shown in Figure B 3.3.1-1, consists of eight RTCBs, which are operated in four sets of two breakers (four channels). Power input to the reactor trip switchgear comes from two full capacity MG sets operated in parallel such that the loss of either MG set does not de energize the CEDMs. There are two separate CEDM power supply buses, each bus powering half of the CEDMs. Power is supplied from the MG sets to each bus via two redundant paths (trip legs). Trip legs 1A and 1B supply power to CEDM bus 1. Trip legs 2A and 2B supply power to CEDM bus 2. This ensures that a fault or the opening of a breaker in one trip leg (i.e., for testing purposes) will not interrupt power to the CEDM buses.~~

~~Each of the four trip legs consists of two RTCBs in series. The two RTCBs within a trip leg are actuated by separate initiation circuits.~~

~~The eight RTCBs are operated as four sets of two breakers (four channels). For example, if a breaker receives an open signal in trip leg A (for CEDM bus 1), an identical breaker in trip leg B (for CEDM bus 2) will also receive an open~~

~~BASES~~

~~signal. This arrangement ensures that power is interrupted to both CEDM buses, thus preventing trip of only half of the CEAs (a half trip). Any one inoperable breaker in a channel will make the entire channel inoperable.~~

~~Each set of RTCBs is operated by either a Manual Trip push button or an RPS actuated K relay. There are four Manual Trip push buttons, arranged in two sets of two, as shown in Figure B 3.3.1-1. Depressing both push buttons in either set will result in a reactor trip.~~

~~When a Manual Trip is initiated using the control room push buttons, the RPS trip paths and K relays are bypassed, and the RTCB undervoltage and shunt trip attachments are actuated independent of the RPS.~~

~~Manual Trip circuitry includes the push button and interconnecting wiring to both RTCBs necessary to actuate both the undervoltage and shunt trip attachments but excludes the K relay contacts and their interconnecting wiring to the RTCBs, which are considered part of the Initiation Logic.~~

~~Functional testing of the entire RPS, from bistable input through the opening of individual sets of RTCBs, can be performed either at power or shutdown and is normally performed on a quarterly basis. FSAR, Section [7.2] (Ref. 7), explains RPS testing in more detail.~~

Several instrument channels provide more than one required function. Table B 3.3.1-1 provides a listing of these channels and the specifications which they affect.

~~BASES~~

Table B 3.3.1-1
Instruments Affecting Multiple Specifications

Required Instrument channels	Affected Specifications
Source Range NI 01/03 & 02/04 Count Rate Signal	**3.8.E**
Source Range NI 01/03 & 02/04 Count Rate Signal	3.3.9
Source Range NI-01/03 & 02/04 Count Rate Indication @ C-150	3.3.8 #1
Wide Range NI-01/03 & 02/04 Flux level 10^{-4} interlock	3.3.1 #2, 3, 6, 7, & 9
Wide Range NI-01/03 & 02/04 Start-up Rate	3.3.1 #2
Wide Range NI-01/03 & 02/04 Flux Level Indication	3.3.8
Wide Range NI-01/03 & 02/04 Flux Level Indication	3.3.7 #3
Power Range NI-05 - 08, Power level signal	**Reloc/Del?3.17.6 #12, 15, & 18**
Power Range NI-05 - 08, Power level signal	**RTS PDIST 3.23.1 #A.2**
Power Range NI-05 - 08, Q-power	3.3.1 #1 & 9
Power Range NI-05 - 08, ASI	3.3.1 #1 & 9
Power Range NI-05 - 08, ASI	**RTS (PDIL Alarm)3.17.6 #18**
Power Range NI-05 - 08, ASI	**RTS (PCS ASI) 3.1.1 #e**
Power Range NI-05 & 06; 15% interlock	3.3.1 #2 & 10
Power Range NI-05 & 06; 15% interlock	**RTS (PDIL Alarm) 3.17.6 #18**
PCS TC, Temperature signal	3.3.1 #9
PCS TC, Temperature indication	3.3.7 #6 &7
PCS TC, Q-power	3.3.1 #1 & 9
PCS TH, Temperature indication	3.3.7 #4 & 5?
PCS TH, Q-power	3.3.1 #1 & 9
Pressurizer Pressure PI-0102 A, B, C, D Pressure signal	3.3.1 #8 & 9
Pressurizer Pressure PI-0102 A, B, C, D Pressure signal	3.3.3 #1.a
Pressurizer Pressure PI-0110, Pressure indication	3.3.6 #2
Steam Generator Level LI-0751 and 0752 A, B, C, D, Level Signal	3.3.1 #4 & 5
Steam Generator Level LI-0751 and 0752 A, B, C, D, Level Signal	3.3.3 #5 a & b
Steam Generator Level LI-0751A, 0752A, Level indication	3.3.7 # 10 & 11
Steam Generator Pressure PI 0751 and 0752 A, B, C, D Pressure Signal	3.3.1 #6 & 7
Steam Generator Pressure PI 0751 and 0752 A, B, C D Pressure Signal	3.3.3 #4 a & b
Steam Generator Pressure PI 0751 and 0752 A, B, C, D Pressure Signal	3.3.6 #13 & 14
Steam Generator Pressure (WR) PI-0757 and 0758 A, B Pressure Signal	3.3.7 #8 & 9
Containment Pressure PS-1801, 2, 3, & 4, switch output	3.3.1 # 11
Containment Pressure PS-1801, 2, 3, & 4, switch output	3.3.3 #2.a & b

APPLICABLE SAFETY ANALYSES

Each of the analyzed accidents and transients can be detected by one or more RPS Functions. The accident analysis contained in Reference 4 ~~Reference 3~~ takes credit for most RPS trip Functions. The High Startup Rate and Loss of Load Functions, which are not specifically credited in the accident analysis are part of the NRC approved licensing basis for the plant. The High Startup Rate and Loss of Load trip are purely equipment protective. ~~Functions not specifically credited in the accident analysis are part of the NRC approved licensing basis for the plant. These Functions may provide protection for conditions that do not require dynamic transient analysis to demonstrate Function performance. Other Functions, such as the Loss of Load trip, are purely equipment protective,~~ and their use minimizes the potential for equipment damage.

The specific safety analyses applicable to each protective Function are identified below:

1. Variable High Power Trip (VHPT)

The VHPT provides reactor core protection against positive reactivity excursions. The Safety Analysis assumes that this trip is OPERABLE to terminate excessive positive reactivity insertions during power operation and while shutdown.

2. Hi Startup Rate

The High Startup Rate trip is used to trip the reactor when excore wide range power indicates an excessive rate of change. The High Startup Rate trip minimizes transients for events such as a continuous control rod withdrawal or a boron dilution event from low power levels.

~~1. Variable High Power Trip (VHPT) High~~

~~The VHPT provides reactor core protection against positive reactivity excursions that are too rapid for a Pressurizer Pressure High or TM/LP trip to protect against. The following events require VHPT protection:~~

- ~~Uncontrolled CEA withdrawal event;~~
- ~~Excess load;~~
- ~~Excess feedwater heat removal event;~~
- ~~CEA ejection event; and~~
- ~~Main steam line break (MSLB) (outside containment).~~

~~BASES~~

~~The first three events are AOOs, and fuel integrity is maintained. The fourth and fifth are accidents, and limited fuel damage may occur.~~

~~2. Power Rate of Change—High~~

~~The Power Rate of Change—High trip is used to trip the reactor when excore [logarithmic] power indicates an excessive rate of change. The Power Rate of Change—High Function minimizes transients for events such as a continuous CEA withdrawal or a boron dilution event from low power levels.~~ The trip may be bypassed when THERMAL POWER is < 1 x 10^{-4}% RTP, when poor counting statistics may lead to erroneous indication. It is also bypassed at > 13% RTP, where moderator temperature coefficient and fuel temperature coefficient make high rate of change of power unlikely. ~~With the RTCBs open, the Power Rate of Change—High trip is not required to be OPERABLE; however, the indication and alarm Functions of at least two channels are required by LCO 3.3.13, "[Logarithmic] Power Monitoring Channels,~~

In MODES 3, 4, and 5 when no more than one control rod is capable of being withdrawn, the High Startup Rate trip is not required to be OPERABLE; however, the indication and alarm functions of both channels is required by LCO 3.3.9, "Neutron Flux Monitoring Channels, ~~and 5, the emphasis is placed on return to power events. The reactor is protected in these MODES by ensuring adequate SDM.~~

" to be OPERABLE. LCO 3.3.9 ensures the wide range ~~[logarithmic]~~ channels are available to detect and alert the operator to a boron dilution event.

There are only two wide range drawers, with each supplying contact input to auxiliary trip units in two RPS channels.

3. Low PCS Flow -

The Low PCS Flow trip provides protection during events which suddenly reduce the PCS flow rate during power operation, such as loss of power to, or seizure of, a Primary Coolant Pump.

~~APPLICABLE SAFETY ANALYSES (continued)~~

~~3. Reactor Coolant Flow—Low~~

~~The Reactor Coolant Flow—Low trip provides protection during the following events:~~

~~BASES~~

- ~~Loss of RCS flow;~~
- ~~Loss of nonemergency AC power;~~
- ~~Reactor coolant pump (RCP) seized shaft;~~
- ~~RCP sheared shaft; and~~
- ~~Certain MSLB events.~~

~~The loss of RCS flow and of nonemergency AC power events are AOOs where fuel integrity is maintained. The RCP seized shaft, sheared shaft, and MSLBs are accidents where fuel damage may result.~~

4,5. Low Steam Generator A and B Level

The low steam generator level trips are provided to trip the reactor in the event of excessive steam demand and loss of feedwater events.

6,7. Low SG Pressure

The Low Steam Generator Pressure trips provide protection against excessive rates of heat extraction from the steam generators which result in a rapid uncontrolled cooldown of the PCS. These trips are needed to shutdown the reactor and assist the ESF System in the event of a steam or feedwater line break.

8. High Pressurizer Pressure

The High Pressurizer Pressure trip, in conjunction with pressurizer safety valves and main steam safety valves, provides protection against over pressure conditions in the Primary Coolant System (PCS) when at operating temperature. The safety analyses assume the High Pressurizer Pressure trip is OPERABLE during accidents and transients which suddenly reduce PCS cooling (Loss of load, MSIV closure, etc) or which suddenly increase reactor power (Rod Ejection).

~~4. Pressurizer Pressure—High~~

~~The Pressurizer Pressure—High trip, in conjunction with pressurizer safety valves and main steam safety valves (MSSVs), provides protection against overpressure conditions in the RCS during the following events:~~

~~BASES~~

- ~~Loss of condenser vacuum with a concurrent loss of offsite power;~~
- ~~Loss of condenser vacuum with a concurrent loss of one 6.9 kV bus;~~
- ~~Isolation of turbine at 102% power;~~
- ~~Feedwater System pipe breaks between the steam generator and check valve;~~
- ~~CEA withdrawal; and~~
- ~~Loss of feedwater flow.~~

~~APPLICABLE SAFETY ANALYSES (continued)~~

~~5. Containment Pressure—High~~

~~The Containment Pressure—High trip prevents exceeding the containment design pressure during certain loss of coolant accidents (LOCAs) or feedwater line break accidents. It ensures a reactor trip prior to, or concurrent with, a LOCA, thus assisting the ESFAS in the event of a LOCA or MSLB. Since these are accidents, SLs may be violated. However, the consequences of the accident will be acceptable.~~

~~6. Steam Generator Pressure—Low~~

~~The Steam Generator Pressure—Low trip provides protection against an excessive rate of heat extraction from the steam generators, which would result in a rapid uncontrolled cooldown of the RCS. This trip is needed to shut down the reactor and assist the ESFAS in the event of an MSLB. Since these are accidents, SLs may be violated. However, the consequences of the accident will be acceptable.~~

~~7a, 7b. Steam Generator A and B Level—Low~~

~~The Steam Generator A Level—Low and Steam Generator B Level—Low trips are required for the following events:~~

- ~~Steam System piping failures;~~
- ~~Steam System piping failures;~~
- ~~Steam System piping failures;~~
- ~~Feedwater System pipe breaks;~~
- ~~Inadvertent opening of a steam generator atmospheric dump valve (ADV);~~
- ~~Loss of normal feedwater; and~~
- ~~Asymmetric loss of feedwater.~~

~~BASES~~

~~The Steam Generator Level—Low trip ensures that low DNBR, high local power density, and the RCS pressure SLs are maintained during normal operation and AOOs, and, in conjunction with the ESFAS, the consequences of the Feedwater System pipe break accident will be acceptable.~~

~~8. Axial Power Distribution (APD)—High~~

~~The APD—High trip ensures that excessive axial peaking, such as that due to axial xenon oscillations, will not cause fuel damage. It ensures that neither a DNBR less than the SL nor a peak linear heat rate that corresponds to the temperature for fuel centerline melting will occur. This trip is the primary protection against fuel centerline melting.~~

9. Thermal Margin/Low Pressure (TM/LP)

The TM/LP trip is provided to prevent reactor operation when the Departure from Nucleate Boiling Ratio (DNBR) is insufficient. The TM/LP trip protects against slow reactivity or temperature increases, and against pressure decreases.

~~9. Thermal Margin~~

~~a. Thermal Margin/Low Pressure (TM/LP)~~

~~The TM/LP trip prevents exceeding the DNBR SL during AOOs and aids the ESFAS during certain accidents. The following events require TM/LP protection:~~

- ~~Excess load (inadvertent opening of a steam generator ADV);~~
- ~~RCS depressurization (inadvertent safety or power operated relief valves (PORVs) opening);~~
- ~~Steam generator tube rupture; and~~
- ~~LOCA accident.~~

~~The first two events are AOOs, and fuel integrity is maintained. The third and fourth are accidents, and limited fuel damage may occur although only the LOCA is expected to result in fuel damage~~. The trip is initiated whenever the PCS ~~RCS~~ pressure signal drops below a minimum value (P_{min}) or a computed value (P_{var}) as described below, whichever is higher.

~~BASES~~

The TM/LP trip uses Q Power, ~~The computed value is a Function Q power,~~ ASI, and Tc as inputs. Q Power, is the higher of core thermal power (ΔT Power) or nuclear power. ΔT power uses hot leg and cold leg RTDs as inputs. Nuclear power uses the power range nuclear instruments as inputs. Both the ΔT and Excore Power signals have provisions for calibration by calorimetric calculations.

ASI, AXIAL SHAPE INDEX, is calculated from the upper and lower power range excore detector signals, as explained in the definition section. The signal is corrected for the difference between the flux at the core periphery and the flux at the detectors.

Tc, cold leg temperature, is the higher of the two cold leg signals.

The TM/LP trip setpoint is a complex function of these inputs and represents a minimum acceptable PCS Pressure for the existing temperature and power conditions. It is compared to actual PCS Pressure in the TM/LP Trip Unit.

~~as determined from the axially split excore detectors, reactor inlet (cold leg) temperature, and the number of RCPs operating.~~

~~The minimum value of reactor coolant flow rate, the maximum T_{q}, and the maximum CEA deviation permitted for continuous operation are assumed in the generation of this trip Function. In addition, CEA group sequencing in accordance with LCO 3.1.7, "Regulating Control Element Assembly (CEA) Insertion Limits," is assumed. Finally, the maximum insertion of CEA banks that can occur during any AOO prior to a VHPT is assumed.~~

~~b. Steam Generator Pressure Difference~~

~~The Steam Generator Pressure Difference provides protection for those AOOs associated with secondary system malfunctions that result in asymmetric primary coolant temperatures. The most limiting event is closure of a single main steam isolation valve. Steam Generator Pressure Difference is provided by comparing the secondary pressure in both steam generators in the TM/LP calculator. If the pressure in either exceeds that in the other by the trip setpoint, a TM/LP trip will result.~~

10. Loss of Load

The Loss of Load trip is provided to prevent lifting the pressurizer and main steam safety valves in the event of a turbine generator trip while at power. The trip is

~~BASES~~

equipment protective. The safety analyses do not assume that this trip functions during any accident or transient. The Loss of Load trip uses a single pressure switch in the turbine Auto Stop Oil circuit to sense a turbine trip for input to all four RPS auxiliary trip units.

~~10. Loss of Load~~

~~The Loss of Load (turbine stop valve (TSV) control oil pressure) trip is anticipatory for the loss of heat removal capabilities of the secondary system following a turbine trip. The Loss of Load trip prevents lifting the pressurizer safety valves, PORVs, and MSSVs in the event of a turbine generator trip. Thus, the trip minimizes the pressure and temperature transients on the reactor by initiating a trip well before reaching the Pressurizer Pressure—High trip and pressurizer safety valve setpoints. The four RPS Loss of Load reactor trip channels receive their input from sensors mounted on the high pressure TSV actuators. Since there are four high pressure TSVs, one actuator per valve and one sensor per actuator, each sensor sends its signal to a different RPS channel. When the turbine trips, control oil is dumped from the high pressure TSVs. When the control oil pressure drops to the appropriate setpoint, a reactor trip signal is generated.~~

11. Containment High Pressure

The Containment High Pressure trip provides a backup reactor trip in the event of a Loss of Coolant Accident, Main Steam Line Break, or Main Feedwater Line Break. The High Containment Pressure trip shares sensors with the Containment High Pressure sensing logic for Safety Injection, Containment Isolation, and Containment Spray. Each of these sensors has a single bellows which actuates two micro-switches. One micro switch on each of four sensors provides an input to the RPS.

Interlocks/Bypasses

The bypasses and their Allowable Values are addressed in footnotes to Table 3.3.1-1. ~~They are not otherwise addressed as specific Table entries.~~

~~The automatic bypass removal features must function as a backup to manual actions for all safety related trips to ensure the trip Functions are not operationally bypassed when the safety analysis assumes the Functions are not bypassed.~~ The RPS operating bypasses are:

~~BASES~~

~~a) Zero power mode bypass (ZPMB) removal on the TM/LP, Steam Generator Pressure Difference, and reactor coolant low flow trips when THERMAL POWER is < 1E-4% RTP. This bypass is manually enabled below the specified setpoint to permit low power testing.~~

~~The wide range NI Level 1 bistable in the wide range drawer permits manual bypassing below the setpoint and removes the bypass above the setpoint.~~

a) High Startup Rate bypass. The High Startup Rate trip is automatically bypassed at < 1 X 10^{-4}% RTP, as sensed by wide range NI bistables, and at > 13% RTP by the power range NI Level 1 bistable.

~~Power rate of change bypass removal. The Power Rate of Change — High trip is automatically bypassed at < 1E-4% RTP, as sensed by the wide range NI Level 2 bistable, and at > 12% RTP by the power range NI Level 1 bistable, mounted in their respective NI drawers. Automatic bypass removal is also effected by these bistables when conditions are no longer satisfied.~~

~~c~~b) Loss of Load ~~and APD — High~~ bypass removal. The Loss of Load ~~and APD High trips~~ trip is ~~are~~ automatically bypassed when at < 17% ~~15%~~ RTP as sensed by the power range NI Level 1 bistable.—

The bypass is automatically removed by this bistable above the setpoint. This same bistable is used to bypass the High Startup Rate trip. The difference in specified setpoint is to allow for bistable hysteresis.

One other bypass is provided in the RPS design, but it cannot be used when the RPS is required to be operable. The Zero Power Mode Bypass (ZPMB) is manually actuated. Manual actuation is enabled when both wide range NI channels are below 10^{-4}%, and the bypass is automatically removed when either channel is above that set point. The ZPMB disables the TM/LP, Low SG Pressure, and PCS low flow trips. This bypass allows control rod testing when PCS perssure, flow, or temperature is too low to allow resetting the trips. The Low Flow trip provides protection against the occurance of a control rod withdrawal accident occuring when less than four primary coolant pumps are in service. That accident has only been analysed under four pump flow. If only one control rod is capable of withdrawal, or is PCS boron concentration assures criticality cannot occur even with all rods withdrawn (as required by LCO 3.9.1), the RPS is not required to be OPERABLE. The SHUTDOWN MARGIN requirements

~~BASES~~

of LCOs 3.1.1 and 3.1.2 assure that criticality will not occur upon withdrawal of a single control rod.

The wide range flux level indication actuates bistables which actuate the permissive signal for the Zero Power Mode Bypass (for the TM/LP, Low PCS Flow, and Low SG Pressure trips), and bypass the startup rate trip. Wide range channel NI-03 provides the bypass permissive for RPS channels "A" and "C"; NI-04, for "B" and "D". A separate bistable trip unit is provided for each RPS channel.

The same bistables that provide the Zero Power Mode Bypass permissive also automatically bypass the High Startup Rate trips below the setpoint and enable them above. When at very low power levels, the nuclear instrument signals are not steady; if the Startup Rate trips were not bypassed, spurious trips could occur during start up operations.

The High Startup Rate trip is automatically bypassed when power range indicated power exceeds a nominal 15% RATED POWER. Allowing for hysteresis, this bypass may be as low as 13%. The trip is not useful above that power level since reactivity insertions at power would induce an immediate change in power level and eventually be terminated by the VHPT without attaining any significant startup rate. This bypass is automatically removed when the associated power range indication decreases below the bistable setpoint. Power range NI-05 provides the bistable for RPS channel "A", NI-06 for "B", NI-07 for "C", and NI-08 for "D". These same power range bistable amplifiers also bypass the Loss of Load trip below the setpoint and enable the ASI alarm function above the setpoint. In addition, these bistables in NI-05 and NI-06 bypass the Turbine Trip on Generator Trip function below setpoint.

~~This same bistable is used to bypass the Power Rate of Change High trip.~~

~~Steam Generator Pressure—Low bypass removal. The Steam Generator Pressure—Low trip is manually enabled below the pretrip setpoint. The permissive is removed, and the bypass automatically removed, when the Steam Generator Pressure—Low pretrip clears.~~

~~The RPS instrumentation satisfies Criterion 3 of the NRC Policy Statement.~~

LCO

The LCO requires all instrumentation performing an RPS Function to be OPERABLE. Failure of any required portion of the instrument channel renders the affected channel(s) inoperable and reduces the reliability of the affected Functions. The

~~BASES~~

specific criteria for determining channel OPERABILITY differ slightly between Functions. These criteria are discussed on a Function by Function basis below.

Actions allow maintenance (trip channel) bypass of individual channels, but the bypass key used to bypass a single channel cannot be simultaneously used to bypass that same parameter in other channels. This interlock prevents ~~activates interlocks that prevent~~ operation with a second channel in the same Function bypassed. Plants are restricted to 7 days in a trip channel bypass or otherwise untripped condition before either restoring the Function to four channel operation (two-out-of-four logic) or placing the channel in trip (one-out-of-three logic).

~~Plants are restricted to 48 hours in a trip channel bypass condition before either restoring the Function to four channel operation (two out of four logic) or placing the channel in trip (one out of three logic). At plants where adequate channel to channel independence has been demonstrated, specific exceptions may be approved by the NRC staff to permit one of the two out of four channels to be bypassed for an extended period of time.~~

Only the Allowable Values are specified for each RPS trip Function in the LCO. Nominal trip setpoints are specified in the ~~plant specific~~ setpoint calculations. The nominal setpoints are selected to ensure the setpoints measured by CHANNEL FUNCTIONAL TESTS do not exceed the Allowable Value if the bistable is performing as required. Operation with a trip setpoint less conservative than the nominal trip setpoint, but within its Allowable Value, is acceptable, provided that operation and testing are consistent with the assumptions of the ~~plant specific~~ setpoint calculations. Each Allowable Value specified is more conservative than the analytical limit assumed in the safety analysis in order to account for instrument uncertainties appropriate to the trip Function. These uncertainties are defined in ~~the "Plant Protection System Selection of Trip Setpoint Values" (Ref. 6).~~ Reference 6.

~~The following Bases for each trip Function identify the above RPS trip Function criteria items that are applicable to establish the trip Function OPERABILITY.~~

This LCO requires that all four channels of all trip functions be OPERABLE when in MODES 1 and 2, and in MODES 3, 4, and 5 whenever more than one control rod is capable of being withdrawn. Exceptions are noted in the individual LCO bases below:

~~BASES~~

1. Variable High Power Trip (VHPT)

The Allowable Value is high enough to provide an operating envelope that prevents unnecessary Variable High Power trips during normal plant operations. The Allowable Value is low enough for the system to function adequately during reactivity addition events.

The VHPT is designed to limit maximum reactor power to its maximum design and to terminate power excursions initiating at lower powers without power reaching this full power limit. During a plant startup, the VHPT trip setpoint is initially at its minimum value, 30%. It remains fixed until manually reset, at which point it increases to ≤ 15% above existing Q Power.

The power increase may then continue until the new setpoint is approached at which time the VHPT setpoint is again reset to 15% above the existing Q Power. This pattern continues until the VHPT setpoint reaches its maximum setting of 106.5%. Thus, during power escalation, the VHPT trip setpoint is never more than 15% above existing power. This limits the magnitude of any inadvertent reactivity insertion or power increase. On a power decrease, the VHPT trip setpoint automatically tracks power levels downwards so that it is always a nominal 15% above the existing power.

During normal plant operation a VHPT is initiated when the reactor power level reaches its maximum value of 106.5% of indicated rated power. Adding to this the possible variation in trip point due to calibration and instrument errors, the maximum actual steady state power at which a trip would be actuated is 115%, which was used for the purpose of safety analysis.

~~1. Variable High Power Trip (VHPT)—High~~

~~This LCO requires all four channels of the VHPT to be OPERABLE in MODES 1 and 2.~~

~~The Allowable Value is high enough to provide an operating envelope that prevents unnecessary Linear Power Level—High reactor VHPT—High trips during normal plant operations. The Allowable Value is low enough for the system to maintain a margin to unacceptable fuel cladding damage should a CEA ejection accident occur.~~

~~The VHPT setpoint is operator adjustable and can be set at a fixed increment above the indicated THERMAL POWER level.~~

~~BASES~~

~~Operator action is required to increase the trip setpoint as THERMAL POWER is increased. The trip setpoint is automatically decreased as THERMAL POWER decreases. The trip setpoint has a maximum and a minimum setpoint.~~

~~Adding to this maximum value the possible variation in trip setpoint due to calibration and instrument errors, the maximum actual steady state THERMAL POWER level at which a trip would be actuated is 112% RTP, which is the value used in the safety analyses.~~

~~To account for these errors, the safety analysis minimum value is 40% RTP. The 10% step is a maximum value assumed in the safety analysis. There is no uncertainty applied to the step.~~

2. High Startup Rate

This LCO requires four channels of High Startup Rate to be OPERABLE.

The high startup rate trip serves as a backup to the administratively enforced startup rate limit.

~~2. Power Rate of Change—High~~

~~This LCO requires four channels of Power Rate of Change—High to be OPERABLE in MODES 1 and 2, as well as in MODES 3, 4, and 5 when the RTCBs are closed and the CEA Drive System is capable of CEA withdrawal.~~

~~The high power rate of change trip serves as a backup to the administratively enforced startup rate limit.~~ The Function is not credited in the accident analyses; therefore, the Allowable Value for the trip or bypass Functions is not derived from analytical limits.

The four channels of High Startup Rate RPS trips are derived from two wide range NI signal processing drawers. Thus, a failure in one wide range channel may render two RPS channels inoperable. It is acceptable to continue operation under this condition because the High Startup Rate trip is not required by the Safety Analysis.

3. Low PCS Flow

~~BASES~~

A reactor trip is provided to protect the core against DNB should the coolant flow suddenly decrease significantly.

~~APPLICABLE SAFETY ANALYSES (continued)~~

~~3. Reactor Coolant Flow—Low~~

~~This LCO requires four channels of Reactor Coolant Flow—Low to be OPERABLE in MODES 1 and 2.~~

~~The trip may be manually bypassed when THERMAL POWER falls below 1E-4% RTP. This bypass is part of the ZPMB circuitry, which also bypasses the TM/LP trip and provides a ΔT power block signal to the Q power select logic. This ZPMB allows low power physics testing at reduced RCS temperatures and pressures. It also allows heatup and cooldown with shutdown CEAs withdrawn.~~

This trip is set high enough to maintain fuel integrity during a loss of flow condition. The setting is low enough to allow for normal operating fluctuations from offsite power. ~~To account for analysis uncertainty, the value in the safety analysis is 93% RTP.~~

Flow in each of the four coolant loops is determined from pressure drop from inlet to outlet of the steam generators. The total flow through the reactor core is determined, for the RPS flow channels, by summing the loop pressure drops across the steam generators and correlating this pressure sum with the sum of steam generator differential pressures which exists at 100% flow (four pump operation at full power t_{ave}). Full PCS flow is that flow which exists at RATED POWER, at full power T_{ave}, with four pumps operating.

(continued)

~~BASES~~

LCO
(continued)

The Low Flow Trip setting of 95% insures that the reactor cannot operate when the flow rate is less than 93% of the nominal value considering instrument errors.

The trip may be manually bypassed, for testing, when the reactor is shutdown and only one rod is capable of withdrawal. This bypass is part of the ZPMB circuitry, which also bypasses the TM/LP and SG Pressure-Low trips. Use of this bypass is restricted to those situations in which no more than one control rod is capable of withdrawal in order that the RPS continue to provide lower mode protection in the event of a control rod withdrawal with fewer than four PCPs operating.

4,5. Low Steam Generator Level

The Allowable Value assures that there will be sufficient water inventory in the steam generator at the time of trip to allow a safe and orderly plant shutdown and to prevent steam generator dryout assuming minimum auxiliary feedwater capacity.

The 25.9% narrow range minimum setting listed in Table 3.3.1-1 assures that the heat transfer surface (tubes) is covered with water when the reactor is critical. The 25.9% indicated level corresponds to the location of the feed ring, at 46.7" above the lower instrument tap. The narrow range instrument spans 180" for its 100% range.

Each steam generator level is sensed by measuring the differential pressure between the top and bottom of the downcomer annulus in the steam generator. These trips share four level sensing channels on each steam generator with the Auxiliary Feedwater Actuation Signal.

~~7a, 7b. Steam Generator Level—Low~~

~~This LCO requires four channels of Steam Generator Level—Low per steam generator to be OPERABLE in MODES 1 and 2.~~

~~The Allowable Value is sufficiently below the normal operating level for the steam generators so as not to cause a reactor trip during normal plant operations. The trip setpoint is high enough to ensure a reactor trip signal is generated before water level drops below the top of the feed ring. The difference between the Allowable Value and the measurement value includes 10 inches of~~

~~BASES~~

~~measurement uncertainty. The specified setpoint ensures there will be sufficient water inventory to provide a 10 minute margin before auxiliary feedwater is required for the removal of decay heat.~~

6,7. Low Steam Generator Pressure

~~6. Steam Generator Pressure Low~~

~~This LCO requires four channels of Steam Generator Pressure—Low per steam generator to be OPERABLE in MODES 1 and 2.~~

The Allowable Value of 500 psia is sufficiently below the rated full load operating point ~~value~~ of 739 psia so as not to interfere with normal operation, but still high enough to provide the required protection in the event of excessively high steam flow ~~excessive steam demand~~. This setting was used in the accident analysis.

Since excessive steam demand causes the PCS ~~RCS~~ to cool down, resulting in positive reactivity addition to the core, a reactor trip is required to offset that effect.

(continued)

~~BASES~~

LCO
(continued)

The trip may be manually bypassed, for testing, when the reactor is shutdown and only one rod is capable of withdrawal. This bypass is part of the ZPMB circuitry, which also bypasses the TM/LP and Low Flow trips. Use of this bypass is restricted to those situations in which no more than one control rod is capable of withdrawal in order that the RPS continue to provide lower mode protection in the event of a control rod withdrawal with fewer than four PCPs operating.

The SG pressure channels are shared with the Steam Generator Low Pressure signals which isolate the steam and feedwater lines.

The safety analysis includes a ± 22 psi uncertainty allowance.

~~The difference between the Allowable Value and the safety analysis value of 600 psia includes harsh environment uncertainties.~~

~~The Function may be manually bypassed as steam generator pressure is reduced during controlled plant shutdowns. This bypass is permitted at a preset steam generator pressure. The bypass, in conjunction with the ZPMB, allows testing at low temperatures and pressures, and heatup and cooldown with the shutdown CEAs withdrawn. From a bypass condition the trip will be reinstated automatically as steam generator pressure increases above the preset pressure.~~

8. High Pressurizer Pressure ~~4. Pressurizer Pressure High~~

~~This LCO requires four channels of Pressurizer Pressure High to be OPERABLE in MODES 1 and 2.~~

The Allowable Value is set high enough to allow for pressure increases in the PCS ~~RCS~~ during normal operation (i.e., plant transients) not indicative of an abnormal condition. The setting is below the lift setpoint of the pressurizer safety valves and low enough to initiate a reactor trip when an abnormal condition is indicated. ~~The difference between the Allowable Value and the analysis setpoint of 2470 psia includes allowance for harsh environment.~~

~~BASES~~

~~The High Pressurizer Pressure trip concurrent with PORV operation avoids unnecessary operation of the pressurizer safety valves.~~

The High Pressurizer pressure trip shares four safety grade instrument channels with the TM/LP trip and the low pressurizer pressure Safety Injection Signal.

The safety analysis includes a ± 22 psi uncertainty allowance.

~~8. Axial Power Distribution (APD)—High~~

~~This LCO requires four channels of APD—High to be OPERABLE in MODE 1.~~

~~The Allowable Value curve was derived from an analysis of many axial power shapes with allowances for instrumentation inaccuracies and the uncertainty associated with the excore to incore ASI relationship.~~

~~The APD trip is automatically bypassed at < 15% RTP, where it is not required for reactor protection.~~

9. Thermal Margin/Low Pressure (TM/LP)

The TM/LP trip system monitors core power, reactor coolant maximum inlet temperature, (T_c), core coolant system pressure and axial shape index. The Low Pressure Trip limit (P_{var}) is calculated using the equations given in Table 3.3.1-1.

(continued)

~~BASES~~

LCO (continued)

The calculated limit (P_{var}) is then compared to a fixed Low Pressure Trip limit (p_{min}). The auctioneered highest of these signals becomes the trip limit (P_{trip}). P_{trip} is compared to the measured PCS pressure and a trip signal is generated when the measured pressure for that channel is less than or equal to P_{trip}. A pre-trip alarm is also generated when P is less than or equal to the pre-trip setting $P_{trip} + \Delta P$.

The TM/LP trip set points are derived from the 4-pump operation core thermal limits through application of appropriate allowances for measurement uncertainties and processing errors. A pressure allowance of 165 psi is assumed to account for instrument drift in both power and inlet temperatures, calorimetric power measurement, inlet temperature measurement, and primary system pressure measurement. Uncertainties accounted for that are not a part of the 165 psi term include allowances for assembly power tilt, fuel pellet manufacturing tolerances, core flow measurement uncertainty and core bypass flow, inlet temperature measurement time delays, and ASI measurement. Each of these allowances and uncertainties are included in the development of the TM/LP trip set point used in the accident analysis.

The trip may be manually bypassed, for testing, when the reactor is shutdown and only one rod is capable of withdrawal. This bypass is part of the ZPMB circuitry, which also bypasses the Low Flow and SG Pressure-Low trips. Use of this bypass is restricted to those situations in which no more than one control rod is capable of withdrawal in order that the RPS continue to provide lower mode protection in the event of a control rod withdrawal with fewer than four PCPs operating.

~~9. Thermal Margin~~

~~a. Thermal Margin/Low Pressure (TM/LP)~~

~~This LCO requires four channels of TM/LP to be OPERABLE in MODES 1 and 2.~~

~~The Allowable Value includes allowances for equipment response time, measurement uncertainties, processing error, and a further allowance to compensate for te time delay associated with providing effective termination of the occurrence that exhibits the most rapid decrease in margin to the SL.~~

~~BASES~~

~~This trip may be manually bypassed when THERMAL POWER falls below E 4% RTP. This trip ay be manually bypassed when THERMAL POWER falls below 1E 4% RTP. This bypass is part of the ZPMB circuitry, which also bypasses the Reactor Coolant Flow—Low trip and provides a ΔT power block signal to the Q power select logic. This ZPMB allows low power physics testing at reduced RCS temperatures and pressures. It also allows heatup and cooldown with shutdown CEAs withdrawn.~~

~~b. Steam Generator Pressure Difference~~

~~This LCO requires four channels of Steam Generator Pressure Difference to be OPERABLE in MODES 1 and 2.~~

~~The Allowable Value is high enough to avoid trips caused by normal operation and minor transients, but ensures DNBR protection in the event of Design Basis Events. The difference between the Allowable Value and the 175 psia analysis setpoint allows for 40 psia of measurement uncertainty.~~

~~The trip may be bypassed when THERMAL POWER falls below 1E 4% RTP. The Steam Generator Pressure Difference is subject to the ZPMB, since it is an input to the TM/LP trip and is not required for protection at low power levels.~~

10. Loss of Load

The LCO requires four Loss of Load trip channels to be OPERABLE in MODE 1, above 17% power.

The Loss of Load trip is automatically disabled when power is below a nominal 15% RATED POWER, or 17% power allowing for bistable hysteresis, to allow startup and shutdown of the turbine generator. At low power the transient from a turbine trip would not cause safety valve operation. The Loss of load trip is automatically enabled and bypassed by the same power range bistable amplifiers that disable and enable the High Startup Rate trip. When power range channel NI-005

(continued)

~~BASES~~

LCO (continued)

exceeds the setpoint, Loss of Load channels "A" and "C" are automatically enabled and High Startup Rate channels "A" and"C" are automatically disabled. Power range NI-006 bistable controls RPS channels "B" and "D" trips similarly.

The discrepancy between the nominal bypass power level of <15% and the >17% power APPLICABILITY statement in Table 3.3.1-1 accounts for bistable hysteresis.

The Loss of Load trip uses a single pressure switch in the turbine Auto Stop Oil circuit to sense a turbine trip for input to all four RPS auxiliary trip units.

~~10. Loss of Load~~

~~The LCO requires four Loss of Load trip channels to be OPERABLE in MODE 1.~~

~~The Loss of Load trip may be bypassed when THERMAL POWER falls below 15%, since it is no longer needed to prevent lifting of the pressurizer safety valves, steam generator safety valves, or PORVs in the event of a Loss of Load. The Nuclear Steam Supply System~~

~~and the Steam Dump System are capable of accommodating the Loss of Load without requiring the use of the above equipment.~~

11. High Containment Pressure

~~5. Containment Pressure—High~~

~~This LCO requires four channels of Containment Pressure—High to be OPERABLE in MODES 1 and 2.~~

~~BASES~~

The Allowable Value is high enough to allow for small pressure increases in containment expected during normal operation (i.e., plant heatup) that are not indicative of an abnormal condition. The High Containment Pressure trip provides a backup reactor trip in the event of a Loss of Coolant Accident, Main Steam Line Break, or Main Feedwater Line Break. The High Containment Pressure trip shares sensors with the Containment High Pressure sensing logic for Safety Injection, Containment Isolation, and Containment Spray. ~~The setting is low enough to initiate a reactor trip to prevent containment pressure from exceeding design pressure following a DBA. The 4 psig setpoint is also assumed in the safety analysis and includes an uncertainty of +0.75 and -0.25 psig.~~

Interlocks/Bypasses

The LCO on bypass permissive removal channels requires that the automatic bypass removal feature of all four operating bypass channels be OPERABLE for each RPS Function with an operating bypass. in the MODES addressed in the specific LCO for each Function. All four bypass removal channels must be OPERABLE to ensure that none of the four RPS channels are inadvertently bypassed.

The LCO applies to the bypass removal feature only. If the bypass enable Function is failed so as to prevent entering a bypass condition, operation may continue.

(continued)

~~BASES~~

LCO (continued)

The interlock Allowable Values are based on analysis requirements for the
bypassed functions.. These are discussed above as part of the LCO discussion for the affected Functions.

APPLICABILITY

This LCO is applicable in MODES 1 and 2, and in MODES 3, 4, and 5 when more than one control rod is capable of withdrawal and PCS boron concentration is less than that required by LCO 3.9.1. Loss of Load is only applicable in MODE 1 because it may be automatically bypassed at < 17% RTP, where it is no longer needed.

The trips are designed to take the reactor subcritical, maintaining the SLs during AOOs and assisting the ESF in providing acceptable consequences during accidents.

If no more than one control rod can be withdrawn the RPS function is already fulfilled (the safety analyses and the SHUTDOWN MARGIN definition both use the assumption that the highest worth withdrawn control rod will fail to insert on a trip) and the safety analyses assumptions and SHUTDOWN MARGIN requirements will be met without the RPS trip function.

~~APPLICABILITY~~

~~This LCO is applicable in MODES 1 and 2. Most RPS trips are required to be OPERABLE in MODES 1 and 2 because the reactor is critical in these MODES. The trips are designed to take the reactor subcritical, maintaining the SLs during AOOs and assisting the ESFAS in providing acceptable consequences during accidents. Exceptions are addressed in footnotes to the table. Exceptions to this APPLICABILITY are:~~

- ~~The APD—High Trip and Loss of Load are only applicable in MODE 1 because they may be automatically bypassed at ≤ 15% RTP, where they are no longer needed.~~

- ~~The Power Rate of Change—High trip, RPS Logic, RTCBs, and Manual Trip are also required in MODES 3, 4, and 5, with the RTCBs closed, to provide protection for boron dilution and CEA withdrawal events. The Power Rate of Change—High trip in these lower MODES is addressed in LCO 3.3.2, "Reactor Protective System~~

~~BASES~~

~~APPLICABILITY (continued)~~ ~~(RPS) Instrumentation—Shutdown." The RPS Logic in MODES 1, 2, 3, 4, and 5 is addressed in LCO 3.3.3.~~

~~Most trips are not required to be OPERABLE in MODES 3, 4, and 5.~~

ACTIONS

The most common causes of channel inoperability are outright failure or drift of the bistable or process module sufficient to exceed the tolerance allowed by the plant specific setpoint analysis. Typically, the drift is found to be small and results in a delay of actuation rather than a total loss of function. This determination is generally made during the performance of a CHANNEL FUNCTIONAL TEST when the process instrument is set up for adjustment to bring it to within specification. If the trip setpoint is less conservative than the Allowable Value in Table 3.3.1-1, the channel is declared inoperable immediately, and the appropriate Condition(s) must be entered immediately.

In the event a channel's trip setpoint is found nonconservative with respect to the Allowable Value, or the transmitter, instrument loop, signal processing electronics, or RPS bistable trip unit is found inoperable, then all affected Functions provided by that channel must be declared inoperable, and the plant must enter the Condition for the particular protection Function affected.

(continued)

~~BASES~~

ACTIONS (continued)

When the number of inoperable channels in a trip Function exceeds that specified in any related Condition associated with the same trip Function,—then the plant is outside the safety analysis. Therefore, LCO 3.0.3 is immediately entered if applicable in the current MODE of operation.

A Note has been added to the ACTIONS to clarify the application of the Completion Time rules. The Conditions of this Specification may be entered independently for each Function. The Completion Times of each inoperable Function will be tracked separately for each Function, starting from the time the Condition was entered.

A.1.

Condition A applies to the failure of a single channel in any RPS automatic trip Function, except High Startup Rate or Loss of Load. RPS coincidence logic is normally two-out-of-four.

This action does not apply to the High Startup Rate or Loss of Load trips because the safety analyses take no credit for the functioning of these trips, they are installed for equipment protection only. In addition, there are fewer than four instrument channels for these functions, so that a single failure may defeat the Function in multiple RPS channels.

~~A.1, A.2.1, and A.2.2~~

~~Condition A applies to the failure of a single channel in any RPS automatic trip Function. RPS coincidence logic is normally two out of four.~~

If one RPS bistable trip unit or associated instrument channel is inoperable, startup or power operation is allowed to continue. Though not explicitly required, the inoperable channel should be bypassed or tripped. If it is neither bypassed nor tripped, leaving the inoperable trip function in an untripped condition, then the operator must be careful not to inadvertently bypass the same Function in another channel. The provision of four trip channels allows one channel to be bypassed (removed from service) during operations. ~~, providing the inoperable trip unit is placed in bypass or trip within 1 hour (Required Action A.1). By specifying either option, the possibility of inadvertently bypassing a redundant channel is eliminated. The provision of four trip channels allows one channel to be bypassed (removed from service) during operations,~~ placing the RPS in two-out-of-three coincidence logic. It is preferable to place an inoperable channel in bypass rather than

~~BASES~~

trip, since no additional random failure of a single channel can either spuriously trip the reactor or prevent it from tripping.

The failed channel is restored to OPERABLE status or is placed in trip within 7 days. Restoring the channel to OPERABLE status restores the full capability of the Function.

(continued)

~~BASES~~

ACTIONS (continued)

Required Action A.1 places the Function in a one-out-of-three configuration. In this configuration,

~~The Completion Time of 1 hour allotted to restore, bypass, or trip the channel is sufficient to allow the operator to take all appropriate actions for the failed channel while ensuring that the risk involved in operating with the failed channel is acceptable.~~

~~The failed channel is restored to OPERABLE status or is placed in trip within [48] hours (Required Action A.2.1 or Required Action A.2.2). Required Action A.2.1 restores the full capability of the Function.~~

~~Required Action A.2.2 places the Function in a one out of three configuration. In this configuration,~~ common cause failure of dependent channels cannot prevent trip.

The Completion Time of 7 days ~~[48] hours~~ is based on operating experience, which has demonstrated that a random failure of a second channel occurring during the 7 day ~~[48] hour~~ period is a low probability event.

B.1 and B.2

Condition B applies to the failure of two channels in any RPS automatic trip Function except High Startup Rate or Loss of Load.
~~Condition B applies to the failure of two channels in any RPS automatic trip Function.~~
Condition B does not apply to the High Startup Rate or Loss of Load trips. The safety analyses take no credit for the functioning of these trips, they are installed for equipment protection only. If Condition B were applicable to these non-safety grade trips, failure of one Startup Rate instrument during power operation, for instance, would limit plant operation to 7 days even though the trips are automatically bypassed. In addition, there are fewer than four instrument channels for these functions, so that a single failure may defeat the Function in multiple RPS channels. Post maintenance CHANNEL FUNCTIONAL TESTS of the inoperable channel would likely result in a reactor trip if performed at power.

~~BASES~~

The Required Action is modified by a Note stating that LCO 3.0.4 is not applicable. The Note was added to allow the changing of MODES even though two channels are inoperable, with one channel tripped. MODE changes in this configuration are allowed to permit maintenance and testing on one of the inoperable channels. In this configuration, the protection system is in a one-out-of-two logic, and the probability of a common cause failure affecting both of the OPERABLE channels during the 7 days permitted is remote.

(continued)

~~BASES~~

ACTIONS (continued)

Required Action B.1 provides for placing one inoperable channel in ~~bypass and the other channel in trip~~ trip within the Completion Time of 1 hour. Though not explicitly required, the other inoperable channel should be bypassed. If it is not bypassed, leaving one inoperable trip function in an untripped condition, then the operator must be careful not to inadvertently bypass the same Function in another channel. This could defeat three of the four RPS channels, rendering the RPS inoperable.

This Completion Time is sufficient to allow the operator to take all appropriate actions for the failed channels while ensuring that the risk involved in operating with the failed channels is acceptable. With one channel of protective instrumentation bypassed or inoperable in an untripped condition, the RPS is in a two-out-of-three logic; but with another channel failed, the RPS may be operating in a two-out-of-two logic. This is outside the assumptions made in the analyses and should be corrected. To correct the problem, the second channel is placed in trip. This places the RPS in a one-out-of-two logic. If any of the other OPERABLE channels receives a trip signal, the reactor will trip.

One channel should be restored to OPERABLE status within 7 days ~~[48] hours~~ for reasons similar to those stated under Condition A. After one channel is restored to OPERABLE status, the provisions of Condition A still apply to the remaining inoperable channel. Therefore, the channel that is still inoperable after completion of Required Action B.2 must be placed in trip if more than 7 days ~~[48] hours~~ have elapsed since the initial channel failure

C.1

Condition C applies to the failure of a single Loss of Load or High Startup Rate trip unit or associated instrument channel. RPS coincidence logic is normally two-out-of-four.

The Required Action is modified by a Note stating that LCO 3.0.4 is not applicable. The Note was added to allow the changing of MODES even though one channel is inoperable. MODE changes in this configuration are allowed to permit maintenance and testing on one of the inoperable channels. In this configuration, the protection system may be in a one-out-of-three or two out of three logic.

~~BASES~~

(continued)

~~BASES~~

ACTIONS (continued)

If one channel fails it must be restored to OPERABLE status prior to entering MODE 2 following the next MODE 5 entry. If the plant is in MODE 5 at the time the channel becomes inoperable, then the failed channel must be restored to OPERABLE status prior to startup. The Completion Time is based on the fact that the safety analyses take no credit for the functioning of these trips. In addition, there are fewer than four instrument channels for these functions, so that Post maintenance CHANNEL FUNCTIONAL TESTS of the inoperable channel would likely result in a reactor trip if performed at power.~~1 and C.2~~

~~The excore detectors are used to generate the internal ASI used as an input to the TM/LP and APD—High trips. Incore detectors provide a more accurate measurement of ASI. If one or more excore detectors cannot be calibrated to match incore detectors, power is restricted or reduced during subsequent operations because of increased uncertainty associated with using uncalibrated excore detectors.~~

~~The Completion Time of 24 hours is adequate to perform the SR while minimizing the risk of operating in an unsafe condition.~~

D.1, ~~D.2.1, D.2.2.1,~~ and D.2

Condition D applies to two Loss of Load or two High Startup Rate trip units or associated instrument channels inoperable.

The Required Action is modified by a Note stating that LCO 3.0.4 is not applicable. The Note was added to allow the changing of MODES even though two channels are inoperable, with one channel tripped. MODE changes in this configuration are allowed to permit maintenance and testing on one of the inoperable channels. In this configuration, the protection system is in a one-out-of-two logic, and the probability of a common cause failure affecting both of the OPERABLE channels during the 7 days permitted is remote.

Required Action D.1 provides for placing one inoperable channel in trip within the Completion Time of 1 hour. Though not explicitly required, the other inoperable channel should be bypassed. If it is not bypassed, leaving one inoperable trip function in an untripped condition, then the operator must be careful not to inadvertently bypass the same Function in another channel. This could defeat three of the four RPS channels, rendering the RPS inoperable.

This Completion Time is sufficient to allow the operator to take all appropriate actions for the failed channels while ensuring

~~BASES~~

that the risk involved in operating with the failed channels is acceptable. With one channel bypassed or inoperable in an untripped condition, the RPS is in a two-out-of-three logic; but with another channel failed, the RPS may be operating in a two-out-of-two logic. This should be corrected. To correct the problem, the second channel is placed in trip. This places the RPS in a one-out-of-two logic. If any of the other OPERABLE channels receives a trip signal, the reactor will trip.

(continued)

~~BASES~~

ACTIONS (continued)

One channel should be restored to OPERABLE status prior to entering MODE 2 following MODE 5 entry for reasons similar to those stated under Condition C. After one channel is restored to OPERABLE status, the provisions of Condition C still apply to the remaining inoperable channel. Therefore, the channel that is still inoperable after completion of Required Action D.2 must also be restored to OPERABLE before startup.~~2.2.2~~

~~Condition D applies to one automatic bypass removal channel inoperable.~~

E.1, and E.2

Condition E applies to one or two automatic bypass removal channels inoperable.~~E.2.1, and E.2.2~~

~~Condition E applies to two inoperable automatic bypass removal channels. If the bypass removal channels cannot be restored to OPERABLE status, the associated RPS channel may be considered OPERABLE only if the bypass is not in effect. Otherwise,~~

If the bypass removal channel for any operating bypass cannot be restored to OPERABLE status, the associated RPS channel may be considered OPERABLE only if the bypass is not in effect. Otherwise,~~the affected RPS channel must be declared inoperable, as in Condition A, and the bypass either removed or the bypass removal channel repaired. The Bases for Required Actions and Completion Times are the same as discussed for Condition A.~~ the affected RPS channels must be declared inoperable, and the bypass either removed or the bypass removal channel repaired. This is addressed by requiring entry into the appropriate CONDITION for the channels rendered inoperable by the bypass channel failure.

The Required Action is modified by a Note stating that LCO 3.0.4 is not applicable. The Note was added to allow the changing of MODES even though two channels are inoperable, with one channel bypassed and one tripped. MODE changes in this configuration are allowed to permit maintenance and testing on one of the inoperable channels.
~~as in Condition B, and the bypass either removed or the bypass removal channel repaired. Also, Required Action E.2.2 provides for the restoration of the one affected automatic trip channel to OPERABLE status within the rules of Completion Time specified under Condition B. Completion Times are consistent with Condition B.~~

~~BASES~~

~~The Required Action is modified by a Note stating that LCO 3.0.4 is not applicable. The Note was added to allow the changing of MODES even though two channels are inoperable, with one channel bypassed and one tripped. MODE changes in this configuration are allowed to permit maintenance and testing on one of the inoperable channels. In this configuration, the protection system is in a one out of two logic, and the probability of a common cause~~

~~failure affecting both of the OPERABLE channels during the [48] hours permitted is remote.~~

F.1 and F.2

Condition F is entered when the Required Action and associated Completion Time of Condition A, B, C, D, or E are not met.

(continued)

~~BASES~~

ACTIONS (continued)

If the Required Actions associated with these Conditions cannot be completed within the required Completion Times, ~~If the Required Actions associated with these Conditions cannot be completed within the required Completion Times,~~ the reactor must be brought to a MODE in which the Required Actions do not apply. The Required Action F.1 allowed Completion Time of 6 hours to be in MODE 3 is reasonable, ~~The allowed Completion Time of 6 hours to be in MODE 3 is reasonable,~~ based on operating experience, for reaching the required MODE from full power conditions in an orderly manner and without challenging plant systems.

Required Action F.2 allows 6 hours to ensure that no more than one control rod is capable of being withdrawn. This completion time is reasonable to place the plant in a MODE where the Required Actions do not apply.

SURVEILLANCE REQUIREMENTS

The SRs for any particular RPS Function are found in the SR column of Table 3.3.1-1 for that Function. Most Functions are subject to CHANNEL CHECK, CHANNEL FUNCTIONAL TEST, and CHANNEL CALIBRATION. ~~CHANNEL CALIBRATION, and response time testing.~~

~~Reviewer's Note: In order for a plant to take credit for topical reports as the basis for justifying Frequencies, topical reports must be supported by an NRC staff SER that establishes the acceptability of each topical report for that plant (Ref. 8).~~

SR 3.3.1.1

Performance of the CHANNEL CHECK once every 12 hours ensures that gross failure of instrumentation has not occurred. A CHANNEL CHECK is normally a comparison of the parameter indicated on one channel to a similar parameter on other channels. It is based on the assumption that instrument channels monitoring the same parameter should read approximately the same value. Significant deviations between the two instrument channels could be an indicationof excessive instrument drift in one of the channels or of something even more serious. A . CHANNEL CHECK will detect gross channel failure; thus, it is key to verifying that the instrumentation continues to operate properly between each CHANNEL CALIBRATION.

Agreement criteria are determined by the plant staff based on a combination of the channel instrument uncertainties, including

~~BASES~~

indication and readability. If a channel is outside the criteria, it may be an indication that the transmitter or the signal processing equipment has drifted outside its limits.

The Containment Pressure and Loss of Load channels are pressure switch actuated; they have no associated control room indicator and do not require a CHANNEL CHECK.

(continued)

~~BASES~~

SURVEILLANCE REQUIREMENTS (continued)

The RPS input channels consist of the following instruments:

Power Range Nuclear Power and Axial Shape Index
ΔT Power and associated PCS temperature channels.
Start Up Rate and Wide Range Power
Pressurizer Pressure
Primary Coolant System Flow
Turbine Generator Auto Stop Oil Pressure
Steam Generator Level
Steam Generator Pressure
Containment Pressure

A CHANNEL CHECK is also required each 12 hours for the TM/LP calculated setpoint indicator channels.

The Frequency, about once every shift, is based on operating experience that demonstrates the rarity of channel failure. Since the probability of two random failures in redundant channels in any 12 hour period is extremely low, the CHANNEL CHECK minimizes the chance of loss of protective function due to failure of redundant channels. The CHANNEL CHECK supplements less formal, but more frequent, checks of channel OPERABILITY during normal operational use of the displays associated with the LCO required channels.

SR 3.3.1.2

A daily calibration (heat balance) is performed when THERMAL POWER is ≥ 15%. ~~≥ 20%.~~ The daily calibration shall consist of adjusting the "nuclear power calibrate" potentiometers to agree with the calorimetric calculation if the absolute difference is > ~~1.5~~ 2.0%. The "ΔT power calibrate" potentiometers are then used to null the "nuclear power—ΔT power" indicators on the RPS Reactor Power Calibration and Indication panel. Performance of the daily calibration ensures that the two inputs to the Q power measurement are indicating accurately with respect to the much more accurate secondary calorimetric calculation.

(continued)

~~BASES~~

SURVEILLANCE REQUIREMENTS (continued)

The Frequency of 24 hours is based on plant operating experience and takes into account indications and alarms located in the control room to detect deviations in channel outputs.

The Frequency is modified by a Note indicating this Surveillance must be performed within 12 hours after THERMAL POWER is ≥15 % ~~20%~~ RTP. The secondary calorimetric is inaccurate at lower power levels. The 12 hours allows time for plant stabilization, data taking, and instrument calibration. –

~~A second Note indicates the daily calibration may be suspended during PHYSICS TESTS. This ensures that calibration is proper preceding and following physics testing at each plateau, recognizing that during testing, changes in power distribution and RCS temperature may render the calorimetric inaccurate.~~

SR 3.3.1.3

~~It is necessary to calibrate the excore power range channel upper and lower subchannel amplifiers such that the internal ASI used in the TM/LP and APD—High trips reflects the true core power distribution as determined by the incore detectors. A Note to the Frequency indicates the Surveillance is required within 12 hours after THERMAL POWER is ≥ [20]% RTP. Uncertainties in the excore and incore measurement process make it impractical to calibrate when THERMAL POWER is < [20]% RTP. The Completion Time of 12 hours allows time for plant stabilization, data taking, and instrument calibration. If the excore detectors are not properly calibrated to agree with the incore detectors, power is restricted during subsequent operations because of increased uncertainty associated with using uncalibrated excore detectors. The 31 day Frequency is adequate, based on operating experience of the excore linear amplifiers and the slow burnup of the detectors. The excore readings are a strong function of the power produced in the peripheral fuel bundles and do not represent an integrated reading across the core. Slow changes in neutron flux during the fuel cycle can also be detected at this Frequency.~~

A CHANNEL FUNCTIONAL TEST is performed on each RPS instrument channel, except Loss of Load and Power Rate of Change, every 92

~~BASES~~

~~[92]~~ days to ensure the entire channel will perform its intended function when needed.-

In addition to power supply tests, The RPS CHANNEL FUNCTIONAL TEST consists of three overlapping tests as described in Reference 7. These tests verify that the RPS is capable of performing its intended function, from bistable input through the deenergization of the clutch power supplies. ~~from bistable input through the RTCBs.~~ They include:

Bistable Tests

The bistable setpoint must be found to trip within the Allowable Values specified in the LCO and left set consistent with the assumptions of the plant specific setpoint analysis (Ref. 5).

A test signal is superimposed on the input in one channel at a time to verify that the bistable trips within the specified tolerance around the setpoint. This is done with the affected RPS channel trip channel bypassed. Any setpoint adjustment shall be consistent with the assumptions of the current plant specific setpoint analysis.

The as found and as left values must also be recorded and reviewed for consistency with the assumptions of the Frequency extension analysis. The requirements for this review are outlined in Reference [9]. ~~[6]~~

(continued)

~~BASES~~

SURVEILLANCE REQUIREMENTS (continued)

Matrix Logic Tests

Matrix Logic tests are addressed in LCO 3.3.2.

~~Matrix Logic Tests~~

~~Matrix Logic tests are addressed in LCO 3.3.3.~~ This test is performed one matrix at a time. It verifies that a coincidence in the two input channels for each Function removes power from the matrix relays. During testing, power is applied to the matrix relay test coils and prevents the matrix relay contacts from assuming their de-energized state. This test will detect any short circuits around the bistable contacts in the coincidence logic, such as may be caused by faulty bistable relay or trip channel bypass contacts.

Trip Path Tests

Trip Path (Initiation Logic) tests are addressed in LCO 3.3.2.

~~Trip Path (Initiation Logic) tests are addressed in LCO 3.3.3.~~ These tests are similar to the Matrix Logic tests, except that test power is withheld from one matrix relay at a time, allowing the initiation circuit to de-energize, deenergizing selected clutch power supplies.

The Frequency of 92 days is based on the reliability analysis presented in topical report CEN-327, "RPS/ESFAS Extended Test Interval Evaluation" (Ref. 9). ~~opening the affected set of RTCBs. The RTCBs must then be closed prior to testing the other three initiation circuits, or a reactor trip may result.~~

The Frequency of [92] days is based on the reliability analysis presented in topical report CEN-327, "RPS/ESFAS Extended Test Interval Evaluation" (Ref. 8 ~~9).~~

SR 3.3.1.4

A calibration of the excore nuclear instrumentation power range channels using the internal test circuitry must be performed every 31 days. The internal test circuitry excludes the detectors from calibration, but ensures that the channels are reading accurately and within tolerance. The Surveillance verifies that the channel responds to a measured parameter within the necessary range and accuracy. This leaves the channel adjusted to account for instrument drift between

~~BASES~~

successive calibrations to ensure that the channel remains operational between successive tests.

The as found and as left values must also be recorded and reviewed for consistency with the assumptions of the frequency extension analysis. The requirements for this review are outlined in Reference 9.

(continued)

~~BASES~~

SURVEILLANCE REQUIREMENTS (continued)

The neutron detectors are excluded from calibration because they are passive devices with minimal drift and because of the difficulty of simulating a meaningful signal. Slow changes in detector sensitivity are compensated for by performing the daily calorimetric calibration (SR 3.3.1.2).

In addition, associated control room indications are continuously monitored by the operators.

The Frequency of 31 days is acceptable, ~~The Frequency of 92 days is acceptable,~~ based on plant operating experience, and takes into account indications and alarms available to the operator in the control room.

SR 3.3.1.5

The constants in each thermal margin monitor must be verified every 92 days. This test verifies that the programmable constants used to calculate the setpoints generated by the digital circuitry of the TMM are correct. It is nearly equivalent to a CHANNEL FUNCTIONAL TEST on an analog circuit. Because the constants are entered digitally, there is no setpoint drift. For this reason, a 92 day frequency is adequate.

~~SR 3.3.1.5~~

~~A CHANNEL CALIBRATION of the excore power range channels every 92 days ensures that the channels are reading accurately and within tolerance. The Surveillance verifies that the channel responds to a measured parameter within the necessary range and accuracy. CHANNEL CALIBRATION leaves the channel adjusted to account for instrument drift between successive calibrations to ensure that the channel remains operational between successive tests. CHANNEL CALIBRATIONS must be performed consistent with the plant specific setpoint analysis.~~

~~The as found and as left values must also be recorded and reviewed for consistency with the assumptions of the frequency extension analysis. The requirements for this review are outlined in Reference [9].~~

~~A Note is added stating that the neutron detectors are excluded from CHANNEL CALIBRATION because they are passive devices with~~

~~BASES~~

~~minimal drift and because of the difficulty of simulating a meaningful signal. Slow changes in detector sensitivity are compensated for by performing the daily calorimetric calibration (SR 3.3.1.2) and the monthly linear subchannel gain check (SR 3.3.1.3).~~

SR 3.3.1.6

A CHANNEL FUNCTIONAL TEST on the Loss of Load, and High Startup Rate channels is performed prior to a reactor startup to ensure the entire channel will perform its intended function if required.

The High Startup Rate Trip is actuated by either of the Wide Range Nuclear Instrument Startup Rate channels. NI-01/03 sends a trip signal to RPS channels "A" and "C"; NI-02/04 to "B" and "D". Since each Startup Rate channel would cause a trip on two RPS channels, the Startup Rate Trip is not tested when the reactor is critical. The High Startup Rate trip Function is required during startup operation and is bypassed when shut down or above a nominal 15% RTP (13% allowing for bistable hysteresis..

The four Loss of Load Trip channels are all actuated by a single pressure switch monitoring Turbine Auto Stop Oil pressure. It is not testable with the reactor critical.

(continued)

~~BASES~~

SURVEILLANCE REQUIREMENTS (continued)	Operating experience has shown that these components usually pass the Surveillance when performed at a Frequency of once per 7 days prior to each reactor startup.

SR 3.3.1.7

SR 3.3.1.7 is the performance of a CHANNEL CALIBRATION on the RPS masurement channels every 18 months.

~~REQUIREMENTS (continued)~~

~~A CHANNEL FUNCTIONAL TEST on the Loss of Load, Power Rate of Change, and Manual Trip channels is performed prior to a reactor startup to ensure the entire channel will perform its intended function if required. The Loss of Load pressure sensor cannot be tested during reactor operation without closing the high pressure TSV, which would result in a turbine trip or reactor trip. The Power Rate of Change High trip Function is required during startup operation and is bypassed when shut down or > 15% RTP. The Manual Trip Function can either be tested at power or shutdown; however, the simplicity of this circuitry and the absence of drift concern makes this Frequency adequate. Additionally, operating experience has shown that these components usually pass the Surveillance when performed at a Frequency of once per 7 days prior to each reactor startup.~~

~~SR 3.3.1.7~~

~~SR 3.3.1.7 is a CHANNEL FUNCTIONAL TEST similar to SR 3.3.1.4, except SR 3.3.1.7 is applicable only to bypass Functions and is performed once within 92 days prior to each startup. Proper operation of bypass permissives is critical during plant startup because the bypasses must be in place to allow startup operation and must be removed at the appropriate points during power ascent to enable certain reactor trips. Consequently, the appropriate time to verify bypass removal function OPERABILITY is just prior to startup. The allowance to conduct this test within 92 days of startup is based on the reliability analysis presented in topical report CEN 327, "RPS/ESFAS Extended Test Interval Evaluation" (Ref. 9). Once the operating bypasses are removed, the bypasses must not fail in such a way that the associated trip Function gets inadvertently bypassed. This feature is verified by the trip Function CHANNEL FUNCTIONAL TEST, SR 3.3.1.4. Therefore, further testing of the bypass function after startup is unnecessary.~~

~~BASES~~

~~SR 3.3.1.8~~

~~SR 3.3.1.8 is the performance of a CHANNEL CALIBRATION every [18] months.~~

CHANNEL CALIBRATION is a complete check of the instrument channel including the sensor. The Surveillance verifies that the channel responds to a measured parameter within the necessary range and accuracy. CHANNEL CALIBRATION leaves the channel adjusted to account for instrument drift between successive calibrations to ensure that the channel remains operational between successive tests. CHANNEL CALIBRATIONS must be performed consistent with the setpoint analysis.

The as found and as left values must also be recorded and reviewed for consistency with the assumptions of the frequency extension analysis. The requirements for this review are outlined in Reference [8].

The Frequency is based upon the assumption of an 18 month calibration interval for the determination of the magnitude of equipment drift.

The RPS input channels consist of the following instruments:

Power Range Nuclear Power and Axial Shape Index
ΔT Power and associated PCS temperature channels.
Start Up Rate and Wide Range Power
Pressurizer Pressure
Primary Coolant System Flow
Turbine Generator Auto Stop Oil Pressure
Steam Generator Level
Steam Generator Pressure
Containment Pressure

(continued)

~~BASES~~

SURVEILLANCE REQUIREMENTS (continued)

As part of the CHANNEL CALIBRATION of the Wide Range Nuclear Instrumentation, the automatic removal of the Zero Power Mode Bypass of Low PCS Flow, TM/LP, and Low SG Pressure trips, and of the automatic bypassing of the Loss of Load and High Startup Rate trips must be verified to assure that these trips are available when required.

~~The Surveillance is modified by a Note to indicate that the~~ The neutron detectors are excluded from CHANNEL CALIBRATION because they are passive devices with minimal drift and because of the difficulty of simulating a meaningful signal. Slow changes in detector sensitivity are compensated for by performing the daily calorimetric calibration (SR 3.3.1.2). ~~and the monthly linear subchannel gain check (SR 3.3.1.3).~~

~~SR 3. SR 3.3.1.9~~

~~This SR ensures that the RPS RESPONSE TIMES are verified to be less than or equal to the maximum values assumed in the safety analysis. Individual component response times are not modeled in the analyses. The analyses model the overall or total elapsed time from the point at which the parameter exceeds the trip setpoint value at the sensor to the point at which the RTCBs open. Response times are conducted on an [18] month STAGGERED TEST BASIS. This results in the interval between successive surveillances of a given channel of n x 18 months, where n is the number of channels in the function. The Frequency of [18] months is based upon operating experience, which has shown that random failures of instrumentation components causing serious response time degradation, but not channel failure, are infrequent~~

~~SURVEILLANCE REQUIREMENTS~~ ~~SR 3.3.1.9 (continued)~~

~~occurrences. Also, response times cannot be determined at power, since equipment operation is required. Testing may be performed in one measurement or in overlapping segments, with verification that all components are tested.~~

~~BASES~~

REFERENCES

1. 10 CFR 50, Appendix A, GDC 21.

2. 10 CFR 100.

3. IEEE Standard 279-1971, April 5, 1972.

4. FSAR, Chapter [14].

5. 10 CFR 50.49.

6. CPCO EGAD, "Setpoint Methodology" ~~"Plant Protection System Selection of Trip Setpoint Values."~~

7. FSAR, Section [7.2].

8. ~~NRC Safety Evaluation Report, [Date].~~

~~9.~~ CEN-327, June 2, 1986, including Supplement 1, March 3, 1989.

9. FSAR Figure 7-1

B 3.3 INSTRUMENTATION

B 3.3.2 ~~3~~ Reactor Protective System (RPS) Logic and Trip Initiation ~~(Analog)~~

BASES

BACKGROUND

The RPS initiates a reactor trip to protect against violating the core specified acceptable fuel design limits and reactor coolant pressure boundary integrity during anticipated operational occurrences (AOOs). By tripping the reactor, the RPS also assists the Engineered Safety Features (ESF) systems in mitigating accidents.

The protection and monitoring systems have been designed to ensure safe operation of the reactor. This is achieved by specifying limiting safety system settings (LSSS) in terms of parameters directly monitored by the RPS, as well as LCOs on other reactor system parameters and equipment performance.

The LSSS, defined in this Specification as the Allowable Value, in conjunction with the LCOs, establish the threshold for protective system action to prevent exceeding acceptable limits during Design Basis Accidents.

During AOOs, which are those events expected to occur one or more times during the plant life, the acceptable limits are:

- The departure from nucleate boiling ratio shall be maintained above the Safety Limit (SL) value to prevent departure from nucleate boiling;
- Fuel centerline melting shall not occur; and
- The Reactor Coolant System pressure SL of 2750 psia shall not be exceeded.

Maintaining the parameters within the above values ensures that the offsite dose will be within the 10 CFR 50 (Ref. 1) and 10 CFR 100 (Ref. 2) criteria during AOOs.

Accidents are events that are analyzed even though they are not expected to occur during the plant life. The acceptable limit during accidents is that the offsite dose shall be maintained within an acceptable fraction of 10 CFR 100 (Ref. 2) limits. Different accident categories allow a different fraction of these limits based on probability of occurrence.

Meeting the acceptable dose limit for an accident category is considered having acceptable consequences for that event.

(continued)

BACKGROUND (continued)

The RPS is segmented into three interconnected modules. These modules are:

- Measurement channels;
- Bistable trip units; and
- RPS Logic;

~~and~~

- ~~Reactor trip circuit breakers (RTCBs).~~

This LCO addresses the RPS Logic~~ and RTCBs,~~ including Manual Trip capability. LCO 3.3.1, "Reactor Protective System (RPS) Instrumentation ~~Operating,~~ ," provides a description of the role of this equipment in the RPS. This is summarized below:

RPS Logic

The RPS Logic consists of both Matrix and Initiation Logic and employs a scheme that provides a reactor trip when bistables in any two out of the four channels sense the same input parameter trip. This is called a two-out-of-four trip logic. This logic and the clutch power supply configuration configuration are shown in FSAR Figure 7-1 (Ref 5). ~~This logic and the RTCB configuration are shown in Figure B 3.3.1 1.~~

Bistable relay contact outputs from the four channels are configured into six logic matrices. Each logic matrix checks for a coincident trip in the same parameter in two bistable channels. The matrices are designated the AB, AC, AD, BC, BD, and CD matrices to reflect the bistable channels being monitored. Each logic matrix contains four normally energized matrix relays. When a coincidence is detected, consisting of a trip in the same Function in the two channels being monitored by the logic matrix, all four matrix relays de-energize.

The matrix relay contacts are arranged into trip paths, with one of the four matrix relays in each matrix opening contacts in one of the four trip paths. Each trip path provides power to one of the four normally energized clutch power supply "M contactors" (M1, M2, M3, and M4).

~~BASES~~

The trip paths thus have six contacts in series from each matrix, ~~with one of the four matrix relays in each matrix opening~~
~~RPS Logic~~

~~contacts in one of the four trip paths. Each trip path provides power to one~~
~~of the four normally energized RTCB control relays (K1, K2, K3, and K4). The trip paths thus each have six contacts in series, one from each matrix,~~ and perform a logical OR function, deenergizing the M contactors if any one or more of the six logic matrices indicate a coincidence condition.

(continued)

BACKGROUND (continued)

Deenergizing the M contactors removes AC power to the four clutch power supply inputs. Contacts from M Contactors M1 and M2 are in series with each other and in the AC power supply path to clutch power supplies PS1 and PS3. M3 and M4 are similarly arranged with respect to clutch power supplies PS2 and PS4. Approximately half of the control rods receive power from auctioneered clutch power supplies 1 and 2. The remaining control rods receive clutch power from auctioneered clutch power supplies 3 and 4.

Manual reactor trip capability is afforded by two main control board-mounted pushbuttons. One of these (CO-1) opens contacts in series with each of the four trip paths, denergizing all M contactors. The other pushbutton (CO-2) opens circuit breakers which provide AC input power to the M contactor contacts and downstream clutch power supplies. Thus depressing either pushbutton will cause a reactor trip.

~~opening the RTCBs if any one or more of the six logic matrices indicate a coincidence condition.~~

~~Each trip path is responsible for opening one set of two of the eight RTCBs. The RTCB control relays (K relays), when de energized, interrupt power to the breaker undervoltage trip attachments and simultaneously apply power to the shunt trip attachments on each of the two breakers. Actuation of either the undervoltage or shunt trip attachment is sufficient to open the RTCB and interrupt power from the motor generator (MG) sets to the control element drive mechanisms (CEDMs).~~

When a coincidence occurs in two RPS channels, all four matrix relays in the affected matrix de-energize. This in

~~BASES~~

turn de-energizes all four M contactors, which interrupt AC input power to the four clutch power supplies, allowing the control rods to insert by gravity.

Matrix Logic refers to the matrix power supplies, trip channel bypass contacts, and interconnecting matrix wiring between bistable and auxiliary trip units, up to but not including the matrix relays. Contacts in the bistable and auxiliary trip units are excluded from the Matrix Logic definition, since they are addressed as part of the measurement channel.

The Initiation Logic consists of the matrix relays and their associated contacts. ~~This in turn de energizes all four breaker control relays, which simultaneously de energize the undervoltage and energize the shunt trip attachments in all eight RTCBs, tripping them open.~~

~~The Initiation Logic consists of the trip path power source, matrix relays and their associated contacts,~~ all interconnecting wiring, CO-1 manual trip contacts, and M contactors.

Manual trip circuitry includes both manual reactor trip pushbuttons CO-1 and CO-2, and the interconnecting wiring necessary to effect deenergization of the clutch power supplies.

Neither the clutch power supplies nor the AC input power source to these supplies is considered as Safety Related other than as addressed by this LCO.. Operation may continue with one or two selective clutch power supplies deenergized. ~~and solid state (auxiliary) relays through the K relay contacts in the RTCB control circuitry.~~

It is possible to change the two-out-of-four RPS Logic to a two-out-of-three logic for a given input parameter in one channel at a time by trip channel bypassing select portions of the matrix logic. Trip channel bypassing a bistable effectively shorts the bistable relay contacts in the three matrices associated with that channel. Thus, the bistables will function normally, producing normal trip indication and annunciation, but a reactor trip will not

(continued)

~~BASES~~

BACKGROUND (continued)

occur unless two additional channels indicate a trip condition. Trip channel
bypassing can be simultaneously performed on any number of parameters in any number of channels, providing each parameter is bypassed in only one channel at a time. A bypass key ~~An~~ interlock prevents simultaneous trip channel bypassing of the same parameter in more than one channel. Trip channel
bypassing is normally employed during maintenance or testing.

~~Reactor Trip Circuit Breakers (RTCBs)~~

~~The reactor trip switchgear, shown in Figure B 3.3.1-1, consists of eight RTCBs, which are operated in four sets of two breakers (four channels). Power input to the reactor trip switchgear comes from two full capacity MG sets operated in parallel such that the loss of either MG set does not de-energize the CEDMs. There are two separate CEDM power supply buses, each bus powering half of the CEDMs. Power is supplied from the MG sets to each bus via two redundant paths (trip legs). Trip legs 1A and 1B supply power to CEDM bus 1. Trip legs 2A and 2B supply power to CEDM bus 2. This ensures that a fault or the opening of a breaker in one trip leg (i.e., for testing purposes) will not interrupt power to the CEDM buses.~~

~~Each of the four trip legs consists of two RTCBs in series. The two RTCBs within a trip leg are actuated by separate initiation circuits.~~

~~The eight RTCBs are operated as four sets of two breakers (four channels). For example, if a breaker receives an open signal in trip leg A (for CEDM bus 1), an identical breaker in trip leg B (for CEDM bus 2) will also receive an open signal. This arrangement ensures that power is interrupted to both CEDM buses, thus preventing trip of only half of the control element assemblies (CEAs) (a half trip). Any one inoperable breaker in a channel will make the entire channel inoperable.~~

~~Each set of RTCBs is operated by either a Manual Trip push button or an RPS actuated K relay. There are four Manual Trip push buttons, arranged in two sets of two, as shown in Figure B 3.3.1-1. Depressing both push buttons in either set will result in a reactor trip.~~

~~BASES~~

~~When a Manual Trip is initiated using the control room push buttons, the RPS trip paths and K relays are bypassed, and the RTCB undervoltage and shunt trip attachments are actuated independent of the RPS.~~

~~Reactor Trip Circuit Breakers (RTCBs) (continued)~~

~~Manual Trip circuitry includes the push button and interconnecting wiring to both RTCBs necessary to actuate both the undervoltage and shunt trip attachments, but excludes the K relay contacts and their interconnecting wiring to the RTCBs, which are considered part of the Initiation Logic.~~

Functional testing of the entire RPS, from the bistable input through the deenergization of individual sets of clutch power supplies can be performed either at power or shutdown and is normally performed on a quarterly basis.~~input opening of individual sets of RTCBs, can be performed either at power or shutdown and is normally performed on a quarterly basis.~~ FSAR, Section 7.2 (Ref. ~~Section [7.2] (Ref.~~ 3), explains RPS testing in more detail.

APPLICABLE SAFETY ANALYSES

Reactor Protective System (RPS) Logic

The RPS Logic provides for automatic trip initiation to maintain the SLs during AOOs and assist the ESF systems in ensuring acceptable consequences during accidents. All transients and accidents that call for a reactor trip assume the RPS Logic is functioning as designed.

~~Reactor Trip Circuit Breakers (RTCBs)~~

~~All of the transient and accident analyses that call for a reactor trip assume that the RTCBs operate and interrupt power to the CEDMs.~~

Manual Trip

There are no accident analyses that take credit for the Manual Trip; however, the Manual Trip is part of the RPS circuitry. It is used by the operator to shut down the reactor whenever any parameter is rapidly trending toward its trip setpoint. A Manual Trip accomplishes the same results as any one of the automatic trip Functions.

~~BASES~~

~~The RPS Logic and initiation satisfy Criterion 3 of the NRC Policy Statement.~~

LCO

Reactor Protective System (RPS) Logic

Failures of individual bistable relays and their contacts are addressed in LCO 3.3.1. This Specification addresses failures of the Matrix Logic not addressed in the above, such as the failure of matrix relay power supplies or the failure of the trip channel bypass contact in the bypass condition.

(continued)

LCO

(continued)

Loss of a single vital bus will de-energize one of the two power supplies in each of three matrices. Because of power supply auctioneering, all four matrix relays will remain energized in each affected matrix. This deenergization of up to three matrix power supplies due to a single failure is to be treated as a single channel failure.

Each of the four Initiation Logic channels deenergizes one set of clutch power supplies if any of the six coincidence matrices de-energize their associated matrix ~~. This will result in four RTCBs opening; however, the remaining four closed RTCBs will prevent a reactor trip. For the purposes of this LCO, de-energizing up to three matrix power supplies due to a single failure is to be treated as a single channel failure, providing the affected matrix relays de-energize as designed, opening the affected RTCBs.~~

~~Each of the four Initiation Logic channels opens one set of RTCBs if any of the six coincidence matrices de-energize their associated matrix relays.~~ They thus perform a logical OR function. Initiation Logic channels 1 and 2 receive AC power from Vital bus 3. Initiation Logic channels 3 and 4 receive AC input power from Vital bus 4. Because of clutch power supply output auctioneering, it is possible to deenergize either input bus without deenergizing control rod clutches.

~~BASES~~

1. ~~Each Initiation Logic channel has its own power supply and is independent of the others. An Initiation Logic channel includes the matrix relay through to the K relay contacts, which open the RTCB.~~

~~It is possible for two Initiation Logic channels affecting the same trip leg to de energize if a matrix power supply or vital instrument bus fails. This will result in opening the two affected sets of RTCBs.~~

~~If one set of RTCBs has been opened in response to a single RTCB channel, Initiation Logic channel, or Manual Trip channel failure, the affected set of RTCBs may be closed for up to 1 hour for Surveillance on the OPERABLE Initiation Logic, RTCB, and Manual Trip channels. In this case, the redundant set of RTCBs will provide protection if a trip should be required. It is unlikely that a trip will be required during the Surveillance, coincident with a failure of the remaining series RTCB channel. If a single matrix power supply or vital bus failure has opened two sets of RTCBs, Manual Trip and RTCB testing on the closed breakers cannot be performed without causing a trip.~~

Matrix Logic

This LCO requires six channels of Matrix Logic to be OPERABLE in MODES 1 and 2, and in MODES 3, 4, and 5 more than one control rod is capable of being withdrawn. ~~and 5 when any RTCB is closed and any CEA is capable of being withdrawn.~~

2. Initiation Logic

This LCO requires four channels of Initiation Logic to be OPERABLE in MODES 1 and 2, and in MODES 3, 4, and 5 when more than one control rod is capable of being withdrawn.

3. Manual Trip

The LCO requires both Manual Trip channels to be OPERABLE in MODES 1 and 2, and in MODES 3, 4, and 5 when more than one control rod is capable of being withdrawn.

~~BASES~~

~~3. Reactor Trip Circuit Breakers (RTCBs)~~

~~The LCO requires four RTCB channels to be OPERABLE in MODES 1 and 2, as well as in MODES 3, 4, and 5 when any RTCB is closed and any CEA is capable of being withdrawn.~~

~~Each channel consists of two breakers operated in a single set by the Initiation Logic or Manual Trip circuitry. This ensures that power is interrupted at identical locations in the trip legs for both CEDM buses, thus preventing power removal to only one CEDM bus (a half trip).~~

~~Failure of a single breaker affects the entire channel, and both breakers in the set must be opened. Without reliable RTCBs and associated support circuitry, a reactor trip cannot occur whether initiated automatically or manually.~~

~~Each channel of RTCBs starts at the contacts actuated by the K relay, and the contacts actuated by the Manual Trip, for each set of breakers. The K relay actuated contacts and the upstream circuitry are considered to be RPS Logic. Manual Trip contacts and upstream circuitry are considered to be Manual Trip circuitry.~~

~~A Note associated with the ACTIONS states that if one set of RTCBs has been opened in response to a single RTCB channel, Initiation Logic channel, or Manual Trip channel failure, the affected set of RTCBs may be closed for up to 1 hour for Surveillance on the OPERABLE Initiation Logic, RTCB, and Manual Trip channels. In this case, the redundant set of RTCBs will provide protection. If a single matrix power supply or vital bus failure has opened two sets of RTCBs, Manual Trip and RTCB testing on the closed breakers cannot be performed without causing a trip. This Note is not applicable to Condition A, with one Matrix Logic channel inoperable.~~

~~4. Manual Trip~~

~~The LCO requires all four Manual Trip channels to be OPERABLE in MODES 1 and 2, and MODES 3, 4, and 5 when any RTCB is closed and any CEA is capable of being withdrawn.~~

~~BASES~~

Two independent pushbuttons are provided. Each pushbutton is considerecd a channel. Depressing either pushbutton interrupts power to all four clutch power supplies, tripping the reactor.
~~Two independent sets of two adjacent push buttons are provided at separate locations. Each push button is considered a channel and operates two of the eight RTCBs. Depressing both push buttons in either channel will cause an interruption of power to the CEDMs, allowing the CEAs to fall into the core. This design ensures that no single failure in any push button circuit can either cause or prevent a reactor trip.~~

APPLICABILITY

The RPS Matrix Logic,, and Manual Trip are required to be OPERABLE in ~~any MODE when~~ in MODES 1 and 2, and in MODES 3, 4, and 5, when more than one control rod is capable of being withdrawn from the core and PCS boron concentration is less than that required by LCO 3.9.1. ~~any CEA is capable of being withdrawn from the core (i.e., RTCBs closed and power available to the CEDMs).~~ This ensures the reactor can be tripped when necessary, but allows for maintenance and testing when the reactor trip is not needed.

(continued)

APPLICABLILTY (continued)

In MODES 3, 4, and 5 with no more than one control rod capable of withdrawal, or with PCS boron concentration at least than that required by LCO 3.9.1, these Functions do not have to be OPERABLE. However, two wide range neutron flux monitoring channels must be OPERABLE to ensure proper indication of neutron population and to indicate a boron dilution event.

~~In MODES 3, 4, and 5 with all the RTCBs open, the CEAs are not capable of withdrawal and these Functions do not have to be OPERABLE. However, two [logarithmic] power level channels must be OPERABLE to ensure proper indication of neutron population and to indicate a boron dilution event.~~ This is addressed in LCO 3.3.9, "Neutron Flux Monitoring Channels.~~13, "[Logarithmic] Power Monitoring Channels.~~"

ACTIONS

When the number of inoperable channels in a trip Function exceeds that specified in any related Condition associated with the same trip Function, then the plant is outside the safety analysis. Therefore, LCO 3.0.3 is immediately entered if applicable in the current MODE of operation.

~~BASES~~

A.1

Condition A applies if one Matrix Logic channel is inoperable in any applicable MODE. Loss of a single vital instrument bus will de-energize one of the two matrix power supplies in up to three matrices. This is considered a single matrix failure. The auctioneered matrix relays will remain energized. ~~This is considered a single matrix failure, providing the matrix relays associated with the failed power supplies de-energize as required.~~ The above statement is supported by a Note.

~~Failure of the matrix relays to de-energize in all three affected matrices could, when combined with trip channel bypassing of bistable relay contacts in the other matrices, result in loss of RPS function.~~

The channel must be restored to OPERABLE status within 48 hours. The Completion Time of 48 hours provides the operator time to take appropriate actions and still ensures that any risk involved in operating with a failed channel is acceptable. Operating experience has demonstrated that the probability of a random failure of a second Matrix Logic channel is low during any given 48 hour interval. If the channel cannot be restored to OPERABLE status within 48 hours, Condition D is entered. ~~Condition E is entered~~

B.1

Condition B applies to one Initiation Logic channel inoperable in all applicable MODES. These Required Actions require deenergizing the affected clutch power supplies. ~~.~~

~~B.1~~

~~Condition B applies to one Initiation Logic channel, RTCB channel, or Manual Trip channel in MODES 1 and 2, since they have the same actions. MODES 3, 4, and 5, with the RTCBs shut, are addressed in Condition C. These Required Actions require opening the affected RTCBs.~~ This removes the need for the affected channel by performing its associated safety function. With the clutch power supplies associated with one initiation logic channel deenergized, the remaining auctioneered clutch power supplies prevent control rod clutches from deenergizing. The remaining clutch power supplies are in a one out of two logic with respect to the remaining initiation logic channels in the clutch power

~~BASES~~

supply path. This meets redundancy requirements, but testing on the OPERABLE channels cannot be performed without causing a reactor trip.

(continued)

ACTIONS (continued)

Loss of AC power to the two trip paths associated with a single pair of clutch power supplies is not considered a trip path failure, as the associated clutch power supplies will deenergize. ~~With the RTCB open, the affected Functions are in one out of two logic, which meets redundancy requirements, but testing on the OPERABLE channels cannot be performed without causing a reactor trip unless the RTCBs in the inoperable channels are closed to permit testing.~~

~~B.1 (continued)~~

~~ACTIONS (continued)~~

~~Therefore, a Note has been added specifying that the RTCBs associated with one inoperable channel may be closed for up to 1 hour for the performance of an RPS CHANNEL FUNCTIONAL TEST.~~

Required Action B.1 provides for deenergizing the affected clutch power supplies associated with the inoperable channel within a Completion Time of 1 hour. ~~1 provides for opening the RTCBs associated with the inoperable channel within a Completion Time of 1 hour.~~ This Required Action is conservative, since the redundant initiation logic channel will deenergize the affected clutch power supplies if required during the one hour completion time. ~~since depressing the Manual Trip push button associated with either set of breakers in the other trip leg will cause a reactor trip. With this configuration, a single channel failure will not prevent a reactor trip. The allotted Completion Time is adequate to open the affected RTCBs while maintaining the risk of having them closed at an acceptable level.~~

C.1

Condition C applies to the failure of one manual reactor trip channel. With one manual reactor trip channel inoperable operation may continue until the reactor is shut down for other reasons. Repair during operation is not required because one OIPERABLE channel is all that is required for safe operation. No safety analyses assume

~~BASES~~

operation of the Manual trip. In addition, the Manual Trip channels are not testable without actually causing a reactor trip, so even if the difficulty were corrected, the post maintenance testing necessary to declare the channel OPERABLE could not be completed during operation.

~~Condition C applies to the failure of one Initiation Logic channel, RTCB channel, or Manual Trip channel affecting the same trip leg in MODE 3, 4, or 5 with the RTCBs closed. The channel must be restored to OPERABLE status within 48 hours. If the inoperable channel cannot be restored to OPERABLE status within 48 hours, all RTCBs must be opened, placing the plant in a MODE in which the LCO does not apply and ensuring no CEA withdrawal occurs.~~

~~The Completion Time of 48 hours is consistent with that of other RPS instrumentation and should be adequate to repair most failures.~~

~~Testing on the OPERABLE channels cannot be performed without causing a reactor trip unless the RTCBs in the inoperable channels are closed to permit testing. Therefore, a Note has been added specifying that the RTCBs associated with one inoperable channel may be closed for up to 1 hour for the performance of an RPS CHANNEL FUNCTIONAL TEST.~~

D.1 and D.2

Condition D is entered if Required Actions associated with Condition A,~~-~~

~~D.1~~

~~Condition D applies to the failure of both Initiation Logic channels affecting the same trip leg. Since this will open two channels of RTCBs, this Condition is also applicable to the two affected RTCBs. This Condition allows for loss of a single vital instrument bus or matrix power supply, which will de energize both Initiation Logic channels in the same trip leg. This will open both sets of RTCBs in the affected trip leg, satisfying the Required Action of opening the affected RTCBs.~~

~~Of greater concern is the failure of the initiation circuit in a nontrip condition (e.g., due to two initiation K relay failures). With only one Initiation Logic channel failed in a nontrip condition, there is still the redundant set of RTCBs in the trip leg. With both failed in a nontrip condition, the reactor will not trip automatically when~~

~~BASES~~

~~required. In either case, the affected RTCBs must be opened immediately by using the appropriate Manual Trip push buttons, since each of the four push buttons opens one set of RTCBs, independent of the initiation circuitry. Caution must be exercised, since depressing the wrong push buttons may result in a reactor trip.~~

~~If the affected RTCB(s) cannot be opened, Condition E is entered. This would only occur if there is a failure in the Manual Trip circuitry or the RTCB(s).~~

~~E.1 and E.2~~

~~Condition E is entered if Required Actions associated with Condition A,~~ B, or C are not met within the required Completion Time or if for one or more Functions more than one Manual Trip, ~~or D are not met within the required Completion Time or if for one or more Functions more than one Manual Trip,~~ Matrix Logic, or Initiation Logic is inoperable.

If the Required Actions and associated Completion Times cannot be met, the reactor must be shut down within 6 hours and it must be ensured that no more than one control rod is capable of withdrawal. Generally, this will involve deenergizing clutch power supplies. ~~Initiation Logic, or RTCB channel is inoperable for reasons other than Condition A or D.~~

~~If the RTCBs associated with the inoperable channel cannot be opened, the reactor must be shut down within 6 hours and all the RTCBs opened.~~ A Completion Time of 6 hours is reasonable, based on operating experience, to reach the required MODE from full power conditions in an orderly manner and without challenging plant systems. ~~systems and to open RTCBs. All RTCBs should then be opened, placing the plant in a MODE where the LCO does not apply and ensuring no CEA withdrawal occurs.~~

(continued)

~~BASES~~

~~(continued)~~

SURVEILLANCE ~~REQUIREMENTS~~

~~**Reviewer's Note: In order for a plant to take credit for topical reports as the basis for justifying Frequencies, topical reports must be supported by an NRC staff Safety Evaluation Report that establishes the acceptability of each topical report for that unit (Ref. 4).**~~

SR 3.3.2.1

A CHANNEL FUNCTIONAL TEST on each RPS Logic channel is performed every 92 days to ensure the entire channel will perform its intended function when needed.

~~SR 3.3.3.1~~

~~A CHANNEL FUNCTIONAL TEST on each RPS Logic channel and RTCB channel is performed every [92] days to ensure the entire channel will perform its intended function when needed.~~

In addition to power supply tests, the RPS CHANNEL FUNCTIONAL TEST consists of three overlapping tests as described in Reference 3. These tests verify that the RPS is capable of performing its intended function, from bistable input through the RTCBs. The first test, the bistable test, is addressed by SR 3.3.1.3 in LCO 3.~~4 in LCO 3.~~3.1.

This SR addresses the two tests associated with the RPS Logic: Matrix Logic and Trip Path.

Matrix Logic Tests

These tests are performed one matrix at a time. They verify that a coincidence in the two input channels for each Function removes power from the matrix relays. During testing, power is applied to the matrix relay test coils and prevents the matrix relay contacts from assuming their de-energized state. The Matrix Logic tests will detect any short circuits around the bistable contacts in the coincidence logic such as may be caused by faulty bistable relay or trip channel bypass contacts.

Trip Path Tests

These tests are similar to the Matrix Logic tests, except that test power is withheld from one matrix relay at a time,

~~BASES~~

allowing the initiation circuit to de-energize, deenergizing the affected set of clutch power supplies.

(continued)

SURVEILLANCE REQUIREMENTS (continued)

The Frequency of 92 days is based on the reliability analysis presented in topical report CEN-327, "RPS/ESFAS Extended Test Interval Evaluation" (Ref. ~~opening the affected set of RTCBs. The RTCBs must then be closed prior to testing the other three initiation circuits, or a reactor trip may result.~~

~~The Frequency of [92] days is based on the reliability analysis presented in topical report CEN 327, "RPS/ESFAS Extended Test Interval Evaluation" (Ref.~~ 5).

SR 3.3.2.~~3.~~2

A CHANNEL FUNCTIONAL TEST on the Manual Trip channels is performed prior to a reactor startup to ensure the entire channel will perform its intended function if required. The Manual Trip Function can only be tested when the plant is shutdown. The the simplicity of this circuitry and the absence of drift concern makes this Frequency adequate. ~~The Manual Trip Function can be tested either at power or shutdown. However, the simplicity of this circuitry and the absence of drift concern makes this Frequency adequate.~~ Additionally, operating experience has shown that these components usually pass the Surveillance when performed once within 7 days prior to each reactor startup.

~~SR 3.3.3.3~~

~~Each RTCB is actuated by an undervoltage coil and a shunt trip coil. The system is designed so that either de-energizing the undervoltage coil or energizing the shunt trip coil will cause the circuit breaker to open. When an RTCB is opened, either during an automatic reactor trip or by using the manual push buttons in the control room, the undervoltage coil is de energized and the shunt trip coil is energized. This makes it impossible to determine if one of the coils or associated circuitry is defective.~~

~~Therefore, once every 18 months, a CHANNEL FUNCTIONAL TEST is performed that individually tests all four sets of undervoltage coils and all four sets of shunt trip coils.~~

~~BASES~~

~~During undervoltage coil testing, the shunt trip coils shall remain de energized, preventing their operation. Conversely, during shunt trip coil testing, the undervoltage coils shall remain energized, preventing their operation. This Surveillance ensures that every undervoltage coil and every shunt trip coil is capable of performing its intended function and that no single active failure of any RTCB component will prevent a reactor trip. The 18 month Frequency is based on the need to perform this Surveillance under the conditions that apply during a plant outage and the potential for an unplanned transient if the Surveillance~~

~~were performed with the reactor at power. Operating experience has shown these components usually pass the Surveillance when performed at the Frequency of once every 18 months.~~

~~If one set of RTCBs has been opened in response to a single RTCB channel, Initiation Logic channel, or Manual Trip channel failure, the affected set of RTCBs may be closed for up to 1 hour for Surveillance on the OPERABLE Initiation Logic, RTCB, and Manual Trip channels. In this case, the redundant set of RTCBs will provide protection if a trip should be required. It is unlikely that a trip will be required during the Surveillance, coincident with a failure of the remaining series RTCB channel. If a single matrix power supply or vital bus failure has opened two sets of RTCBs, Manual Trip and RTCB testing on the closed breakers cannot be performed without causing a trip.~~

REFERENCES

1. 10 CFR 50, Appendix A

2. 10 CFR 100

3. FSAR, Section 7.2 ~~Section [7.2].~~

4. ~~NRC Safety Evaluation Report, [Date].~~

~~5.~~ CEN-327, June 2, 1986, including Supplement 1, March 3, 1989

5. FSAR Figure 7-1

B 3.3 INSTRUMENTATION

B 3.3.3 Engineered Safety Features Instrumentation (ESFI)

~~4 Engineered Safety Features Actuation System (ESFAS) Instrumentation (Analog)~~

BASES

BACKGROUND

The ESF Instrumentation initiates necessary safety systems,

~~BACKGROUND~~

~~The ESFAS initiates necessary safety systems,~~ based upon the values of selected unit parameters, to protect against violating core design limits and the Primary Coolant System (PCS) ~~Reactor Coolant System (RCS)~~ pressure boundary and to mitigate accidents.

The ESFI ~~ESFAS~~ contains devices and circuitry that generate the following signals when the monitored variables reach levels that are indicative of conditions requiring protective action. Also listed are the inputs to each ESFI Actuation Signal:

1. Safety Injection Actuation Signal (SIS);
   a. Containment High pressure (CHP)
   b. Pressurizer Pressure-Low

2. Containment High pressure;
   a. Containment Pressure - High-Left Train
   b. Containment Pressure High-Right Train

3. Containment High Radiation (CHR)
   a. Containment Area Radiation-Hi

4. Steam Generator Low Pressure (SGLP)
   a. "A" SG Pressure-Low
   b. "B" SG Pressure-Low

5. Auxiliary Feedwater Actuation
   a. "A" SG Level-Low
   b. "B" SG Level-Low

6.-

~~1. Safety Injection Actuation Signal (SIAS);~~

~~2. Containment Spray Actuation Signal (CSAS);~~

~~3. Containment Isolation Actuation Signal (CIAS);~~

~~4. Main Steam Isolation Signal (MSIS);~~

~~5.~~ Recirculation Actuation Signal (RAS);
a. Safety Injection Refueling Water Tank (SIRWT) Level -Low

In the above list of actuation signals, the CHP and SIRWT Level signals are derived from pressure switches.

Equipment actuated by each of the above signals is identified in the FSAR Section 7.3 (Ref. ~~and~~

~~6. Auxiliary Feedwater Actuation Signal (AFAS).~~

~~Equipment actuated by each of the above signals is identified in the FSAR (Ref.~~ 1).

(continued)

~~BASES~~

BACKGROUND (continued)

The ESF circuitry, with the exception of Recirculation Actuation Signal (RAS), employs 2 out of 4 logic. Four independent measurement channels are provided for each function used to generate ESF actuation signals. When any two channels of the same function reach their setpoint, actuating relays are energized which, in turn, initiate the protective actions. Two separate and redundant trains of actuating relays, each powered from separate power supplies, are utilized. These separate relay trains operate redundant trains of ESF equipment.

RAS logic consists of output contacts of the relays actuated by the SIRWT level switches arranged in a "1 out of 2 taken twice" logic. The contacts are arranged so that at least one low level signal powered from each station battery is required to initiate RAS. Loss of a single battery, therefore, cannot either cause or prevent RAS initiation.

~~Each of the above ESFAS actuation systems is segmented into four sensor subsystems and two actuation subsystems. Each sensor subsystem includes measurement channels and bistables. The actuation subsystems include two logic subsystems for sequentially loading the diesel generators.~~

~~Each of the four sensor subsystem channels monitors redundant and independent process measurement channels. Each sensor is monitored by at least one bistable. The bistable associated with each ESFAS Function will trip when the monitored variable exceeds the trip setpoint. When tripped, the sensor subsystems provide outputs to the two actuation subsystems.~~

~~BACKGROUND (continued)~~

~~The two independent actuation subsystems compare the four sensor subsystem outputs. If a trip occurs in the same parameter in two or more sensor subsystem channels, the two-out-of-four logic in each actuation subsystem will initiate one train of ESFAS. Each train can provide protection to the public in the case of a Design Basis Event. Actuation Logic is addressed in LCO 3.3.5, "Engineered Safety Features Actuation System (ESFAS) Logic and Manual Trip."~~

~~Each of the four sensor subsystems is mounted in a separate cabinet, excluding the sensors and field wiring.~~

~~The role of the sensor subsystem (measurement channels and bistables) is discussed below; actuation subsystems are discussed in LCO 3.3.5.~~

Measurement Channels

Measurement channels, consisting of field transmitters or process sensors and associated instrumentation, provide a measurable electronic signal based upon the physical characteristics of the parameter being measured.

Four identical measurement channels ~~with electrical and physical separation~~ are provided for each parameter used in the generation of trip signals.

~~BASES~~

These are designated Channels A through D. Measurement channels provide input to ESF bistable trip units within the same ESFI channel. In addition, some measurement channels are also be used as inputs to Reactor Protective System (RPS) bistables. ~~Measurement channels provide input to ESFAS bistables within the same ESFAS channel. In addition, some measurement channels may also be used as inputs to Reactor Protective System (RPS) bistables,~~ and most provide indication in the control room. Measurement channels used as an input to the RPS or ESFI ~~ESFAS~~ are not used for control Functions. Those ESFI sensors shared with the RPS are identified in Table B 3.3.1-1.

When a channel monitoring a parameter indicates an unsafe condition, the bistable ~~trip unit~~ monitoring the parameter in that channel will trip. In the case of SIRWT and CHP, the sensors are latching auxiliary relays from level and pressure switches, respectively, which do not develop an analog input to separate bistables. ~~which do no develop analog input to a separate bistable.~~ Tripping two or more channels of bistables monitoring the same parameter will de-energize both ~~channels~~ trains of Actuation Logic of the associated Engineered Safety Features (ESF) equipment.

Three of the four measurement and bistable channels are necessary to meet the redundancy and testability of GDC 21 in Appendix A to 10 CFR 50 (Ref. 2). The fourth channel provides additional flexibility by allowing one channel to be removed from service in a bypass condition for maintenance or testing while still maintaining a minimum two-out-of-three logic. There are, however, no built-in provisions for channel bypasses in the ESFI design.

~~In order to take full advantage of the four channel design, adequate channel to channel independence must be demonstrated, and approved by the NRC staff. Plants not currently licensed as to credit four channel independence that may desire this capability must have approval of the NRC staff documented by an NRC Safety Evaluation Report (Ref. 3). Adequate channel to channel independence includes physical and electrical independence of each channel from the others. Furthermore, each channel must be energized from separate inverters and station batteries. Plants not demonstrating four channel independence may operate in a two-out-of-three logic configuration for 48 hours.~~

(continued)

~~BASES~~

BACKGROUND (continued)

Since no single failure will either cause or prevent a protective system actuation and no protective channel feeds a control channel, this arrangement meets the requirements of IEEE Standard 279-1971 (Ref. 4).

Bistable Trip Units

Bistable trip units receive an analog input from the measurement channels, compare the analog input to trip setpoints, and provide contact output to the Actuation Logic. They also provide local trip indication and remote annunciation.

There are four channels of bistables, designated A through D, for each ESF Function, one for each measurement channel.

~~In cases where two ESF Functions share the same input and trip setpoint (e.g., containment pressure input to CSAS, CIAS, and SIAS and a Pressurizer Pressure — Low input to the RPS and SIAS), the same bistable may be used to satisfy both Functions.~~

The trip setpoints and Allowable Values used in the bistables are based on the analytical limits stated in Reference 5. The selection of these trip setpoints is such that adequate protection is provided when all sensor and

~~BASES~~

processing time delays are taken into account. . To allow for calibration tolerances and instrumentation uncertainties, ~~instrument drift, and severe environment effects, for those ESFAS channels that must function in harsh environments as defined by 10 CFR 50..49 (Ref. 6)~~, Allowable Values specified in Table 3.3.3-1,~~4-1~~, in the accompanying LCO, are conservatively adjusted with respect to the analytical limits. A detailed description of the method used to calculate the trip setpoints, including their explicit uncertainties, is provided in CPCO EGAD "Setpoint Methodology ~~the "Plant Protection System Selection of Trip Setpoint Values"~~ **(Ref. 7)**. The actual nominal trip setpoint entered into the bistable is normally still more conservative than that specified by the Allowable Value to account for changes in random measurement errors detectable by a CHANNEL FUNCTIONAL TEST and CHANNEL CALIBRATION. If the measured setpoint does not exceed the Allowable Value, the bistable is considered OPERABLE.

Setpoints in accordance with the Allowable Value will ensure that Safety Limits of Chapter 2.0, "SAFETY LIMITS (SLs)," are not violated during anticipated operational occurrences (AOOs) and that the consequences of Design Basis Accidents (DBAs) will be acceptable, providing the plant is operated from within the LCOs at the onset of the AOO or DBA and the equipment functions as designed.

(continued)

~~BASES~~

BACKGROUND (continued)

ESF Logic

Each of the six ESF actuating signals in Table 3 operates two trains of actuating relays. Each train is capable of initiating the safeguards equipment load groups to meet the minimum requirements to provide all functions necessary to operate the system associated with the plant's capability to cope with abnormal events. ~~Each train is capable of initiating the safeguards equipment load groups to meet the minimum requirements to provide all functions necessary to operate the system associated with the plant's capability to cope with abnormal events.~~

The logic circuitry includes bypass provisions such that the SGLP function may be bypassed if three out of four SG pressure channels are below a bypass permissive setpoint. Similarly, the SIS on Pressurizer Pressure -Low may be bypassed when three out of four channels are below a permissive setpoint.

~~ESFAS Logic~~

~~It is possible to change the two-out-of-four ESFAS logic to a two-out-of-three logic for a given input parameter in one channel at a time by disabling one channel input to the logic. Thus, the bistables will function normally, producing normal trip indication and annunciation, but ESFAS actuation will not occur since the bypassed channel is effectively removed from the coincidence logic. Trip channel bypassing can be simultaneously performed on any number of parameters in any number of channels, providing each parameter is bypassed in only one channel at a time. At some plants an interlock prevents simultaneous trip channel bypassing of the same parameter in more than one channel. Trip channel bypassing is normally employed during maintenance or testing.~~

~~ESFAS Logic is addressed in LCO 3.3.5.~~

APPLICABLE SAFETY ANALYSES

Each of the analyzed accidents can be detected by one or more ESFI ~~ESFAS~~ Functions. One of the ESFI ~~ESFAS~~ Functions is the primary actuation signal for that accident. An ESFI ~~ESFAS~~ Function may be the primary actuation signal for more than one type of accident. An ESFI ~~ESFAS~~ Function may also be a secondary, or backup signal for one or more other accidents. Functions such as Manual Initiation, not specifically

~~BASES~~

credited in the accident analysis, serve as backups to Functions and are part of the NRC approved licensing basis for the plant.

ESF Instrumentation ~~ESFAS~~ protective Functions are as follows:

1. Safety Injection Signal

The SIS ensures acceptable consequences during loss of coolant accident (LOCA) events,

~~Safety Injection Actuation Signal~~

~~The SIAS ensures acceptable consequences during loss of coolant accident (LOCA) events,~~ including steam generator tube rupture, and main steam line breaks (MSLBs) or feedwater line breaks (FWLBs) (inside containment). To provide the required protection, SIS is actuated by manual initiation, by a CHP signal, or by 2 out of 4 Pressurizer Pressure channels decreasing below the setpoint. SIS initiates the following actions:

a) Start HPSI & LPSI pumps

b) Enable Containment Spray Pump Start on CHP
c) Initiate Safety Injection Valve operations

Each Manual Actuation channel consists of one pushbutton which directly starts the SIS actuation logic for the associated train. ~~either a high containment pressure or a low pressurizer pressure signal will initiate SIAS. SIAS initiates the Emergency Core Cooling Systems (ECCS), control room isolation, and several other Functions, such as starting the emergency diesel generators.~~

(continued)

~~BASES~~

APPLICABLE SAFETY ANALYSES (continued)

The pressurizer pressure instrument channels which provide input to SIS are the same channels which provide an input to the RPS. The RPS receives an analog signal from each Pressurizer Pressure channel; each SIS initiation logic train receives a binary signal from a group of four relays, each actuated by a bistable in one of the four instrument channels. The contacts of these relays are wired into a 2 out of 4 logic. It is the output of this pressurizer pressure 2 out of four logic circuit that is blocked during plant cooldowns. A similar arrangement of bistables and relays provide the pressurizer low pressure block permissive signal when three of the four pressurizer pressure-low bypass bistables are below the bypass setpoint.. The initiation and block circuits are illustrated in reference 10.

Each SIS logic train is also actuated by a contact pair on one of the CHP initiation relays for the associated CHP train.

Each train of SIS actuation logic consists of a group of "SIS" relays which energize and seal in when the initiation logic is satisfied. These SIS relays actuate alarms and control functions. One of the control functions selects between an immediate actuation circuit, if offsite power is available, and a time sequenced actuation circuit, if only diesel power is available. These actuation circuits initiate motor operated valve opening and pump starting. The SIS actuation logic is illustrated in Reference 10. ~~The SIS actuation logic is illustrated in Reference 5.~~

~~2. Containment Spray Actuation Signal~~

~~The CSAS initiates containment spray, preventing containment overpressurization during a LOCA or MSLB. At some plants, both a high containment pressure signal and an SIAS have to actuate to provide the required protection. This configuration reduces the likelihood of inadvertent containment spray.~~

~~3. Containment Isolation Actuation Signal~~

~~The CIAS actuates the Containment Isolation System, ensuring acceptable consequences during LOCAs and MSLBs or FWLBs (inside containment). To provide protection, a high containment pressure signal will initiate CIAS at the same setpoint at which an SIAS is generated.~~

3. Containment High Pressure Signal

The CHP signal closes all containment isolation valves not required for ESF operation, ensuring acceptable consequences during LOCAs and MSLBs or FWLBs (inside containment).

~~BASES~~

CHP is actuated by 2 out of 4 pressure switches for the associated train reaching their setpoints. CHP initiates the following actions:

a) Containment Spray
b) Safety Injection Signal
c) Main Feedwater Isolation
d) Main Steam Line Isolation
e) Control Room HVAC Emergency Mode
f) Close Containment Isolation Valves

Eight containment pressure channels are provided. Each channel consists of one pressure sensing bellows which actuates two micro-switches. Four of these sixteen micro-switches provide input to the RPS; the remainder are divided into two circuits of 2 out of 4 logic for the CHP logic trains.

(continued)

~~BASES~~

APPLICABLE SAFETY ANALYSES (continued)

Each CHP logic train consists of an arrangement of six micro-switch contacts and a test relay which energize a group of "5P" relays when the 2 out of 4 logic is satisfied. The CHP logic is illustrated in reference 11.

In performing the Containment Isolation Function, either a CHP or a CHR will isolate the same containment isolation valves, except that CHR does not close Component Cooling line valves.

4. Containment High Radiation Signal

CHR is actuated by manual action or, during normal operation, by 2 out of 4 radiation monitors setpoints. During refueling operations the CHR actuation is manually switched to actuate on 1 of 2 low range radiation monitors at a much lower setpoint. CHR initiates the following actions:

a) Control Room HVAC Emergency Mode
b) Close Containment Isolation Valves
c) Block automatic starting of ECCS pump room sump pumps

The containment area radiation monitors which actuate CHR each de-energize an output relay upon reaching their setpoint. The output contacts of these relays are arranged into two trains of 2 out of 4 logic. Two manual controls each de-energize two of these relays, initiating both trains of CHR.

When either train of 2 out of 4 logic is satisfied, a group of "5R" relays energize to initiate CHR actions.

One containment radiation monitor is located adjacent to each containment air cooler where radioiodines would condense along with water vapor in the event of minor breaches of primary system integrity. Radiation monitor locations in lower level containment will respond to an abnormal accumulation of radioactive coolant, such as from a ruptured letdown line, or Primary Drain Tank leakage. CHR Logic is depicted in Reference 12.

During refueling, separate switch-selectable radiation monitors initiate CHR, as addressed by LCO 3.3.6.

4. Steam Generator Low Pressure Signal
~~Main Steam Isolation Signal~~

The SGLP ~~MSIS~~ ensures acceptable consequences during an MSLB or FWLB by isolating the steam generator if it indicates a low steam generator pressure ~~both steam generators if either generator indicates a low steam generator pressure.~~ The SGLP ~~The MSIS,~~ concurrent with or following a reactor trip, minimizes the rate of heat

~~BASES~~

extraction and subsequent cooldown of the PCS ~~RCS~~ during these events. ~~minimizes the rate of heat extraction and subsequent cooldown of the RCS during these events.~~

(continued)

~~BASES~~

APPLICABLE SAFETY ANALYSES (continued)

One SGLP circuit is provided for each steam generator. Each SGLP circuit is actuated by 2 out of 4 pressure channels on the associated steam generator reaching their setpoint. SGLP initiates the following actions:

a) Close the associated Feedwater Regulating valve and its bypass.

b) Close both Main Steam Isolation Valves.

The steam generator pressure instrument channels which provide input to SGLP are the same channels which provide an input to the RPS. Both the SGLP logic and the RPS receive analog signals from the instrument channel, and both have their own bistables to initiate actuation on low pressure.

Each SGLP logic is made up of output contacts from four pressure bistables from the associated steam generator. When the logic circuit is satisfied, two relays are energized to actuate steam and feedwater line isolation. The SGLP Logic is depicted in Reference 13.

5. Recirculation Actuation Signal

At the end of the injection phase of a LOCA, the SIRWT will be nearly empty. ~~the refueling water tank (RWT) will be nearly empty.~~ Continued cooling must be provided by the ECCS to remove decay heat. The source of water for the ECCS pumps is automatically switched to the containment recirculation sump. Switchover from SIRWT to the containment sump must occur before the SIRWT empties to prevent damage to the ECCS pumps and a loss of core cooling capability. ~~Switchover from RWT to the containment sump must occur before the RWT empties to prevent damage to the ECCS pumps and a loss of core cooling capability.~~ For similar reasons, switchover must not occur before there is sufficient water in the containment sump to support pump suction. Furthermore, early switchover must not occur to ensure sufficient borated water is injected from the SIRWT to ensure the reactor remains shut down in the recirculation mode. An SIRWT Level - Low signal initiates the RAS. ~~An SIRWT Level - Low singla indicates the RAS.~~

RAS is actuated by manually actuating the circuit "Test" switch or by two of the four level sensors in the SIRWT reaching their setpoints. RAS initiates the following actions:

a) Trip LPSI pumps (this trip can be manually bypassed)

b) Switch HPSI & Spray suction from SIRWT to Containment Sump

~~BASES~~

c) Adjust cooling water to Shutdown Cooling Heat Exchangers

d) Closes the SIRWT Recirc CVs.

(continued)

~~BASES~~

APPLICABLE SAFETY ANALYSES (continued)

The four SIRWT level sensors each deenergize two relays, one per logic train, when tank level reaches the setpoint. Each channel of level sensor and associated output relays is powered from a different Preferred AC bus. Two Preferred AC buses are powered, through inverters, from each station battery. The manual RAS control for each train de-energizes two of these relays, initiating RAS through the logic train.

Each train of RAS logic consists of the output contacts of the relays actuated by the level switches arranged in a "1 out of 2 taken twice" logic. The contacts are arranged so that at least one low level signal powered from each station battery is required to initiate RAS. Loss of a single battery, therefore, cannot either cause or prevent RAS initiation. When the logic is satisfied, two DC relays are energized to initiate RAS actions and alarms. The RAS logic is illustrated in reference 3.

The RAS signal is actuated by separate sensors from those which provide tank level indication. The allowable range of 21" to 27" above the tank floor corresponds to 1.1% to 3.3% indicated level. Typically the actual setting is near the midpoint of the allowable range.

Each RAS actuates the valves in the injection and spray pump suction lines for the associated train switching the water supply from the SIRW tank to the containment sump for a recirculation mode of operation. The time required to reach the RAS setpoint depends on the initiating event. Following a DBA, RAS would occur after a period of approximately 20 minutes. The setpoint was chosen to provide adequate water in the containment sump for HPSI pump net positive suction head following an accident, but prevent the pumps from running dry during the 60 second switchover. ~~Each RAS actuates the valves in the injection and spray pump suction early switchover must not occur to ensure sufficient borated water is injected from the RWT to ensure the reactor remains shut down in the recirculation mode. An RWT Level — Low signal initiates the RAS.~~

6. Auxiliary Feedwater Actuation Signal

An AFAS initiates feedwater flow to both steam generators if a low level is indicated in either steam generator, ~~unless the generator is ruptured.~~

The AFAS maintains a steam generator heat sink during the following events:

- MSLB;

~~BASES~~

- FWLB;

APPLICABLE SAFETY ANALYSES (continued)

- Inadvertent opening of a steam generator atmospheric dump valve; and
- Loss of feedwater.

AFAS is actuated by manual action or by 2 out of 4 level sensors on either steam generator reaching their setpoints. Manual actuation of Auxiliary Feedwater may be accomplished through pushbutton actuation of each AFAS channel or by use of individual pump and valve controls. Each AFAS channel starts the associated AFW pump(s) and opens the associated flow control valves.

The steam generator level instrument channels which provide input to AFAS are the same channels which provide an input to the RPS. Both the AFAS cabinets and the RPS receive analog signals from the instrument channel, and both have their own bistables to initiate actuation on low level.

Each AFAS train contains a 2 out of 4 logic for each steam generator. One AFAS logic train actuates motor driven AFW pump P-8A and turbine driven pump P-8B and the associated flow control valves; the other actuates motor driven pump P-8C and the associated valves. Each train provides flow to both steam generators. The AFAS logic uses solid state logic circuits.

~~A low steam generator water level signal will initiate auxiliary feed to the affected steam generator.~~

~~Secondary steam generator (SG) differential pressure (SG-A > SG-B) or (SG-B > SG-A) inhibits auxiliary feed to a generator identified as being ruptured. This input to the AFAS logic prevents loss of the intact generator while preventing feeding a ruptured generator during MSLBs and FWLBs. This prevents containment overpressurization during these events.~~

~~The ESFAS satisfies Criterion 3 of the NRC Policy Statement.~~

LCO

The LCO requires all channel components necessary to provide an ESF~~ESFAS~~ actuation to be OPERABLE.

The Bases for the LCO on ESF Functions are:

~~BASES~~

1. Safety Injection Signal

~~1. Safety Injection Actuation Signal~~

~~a. Containment Pressure — High~~

~~This LCO requires four channels of SIAS Containment Pressure — High to be OPERABLE in MODES 1, 2, and 3.~~

~~The Allowable Value for this trip is set high enough to allow for small pressure increases in containment expected during normal operation (i.e., plant heatup) and is not indicative of an offnormal condition. The setting is low enough to initiate the ESF Functions when an offnormal condition is indicated. This allows the ESF systems to perform as expected in the accident~~

~~a. Containment Pressure — High (continued)~~

~~analyses to mitigate the consequences of the analyzed accidents.~~

a~~b.~~ Pressurizer Pressure — Low

This LCO requires four channels of SIS ~~SIAS~~ Pressurizer Pressure — Low to be OPERABLE in MODES 1, 2, and 3.

(continued)

~~BASES~~

LCO (continued)

The setpoint was chosen so as to be low enough to avoid actuation during plant operating transients, but to be high enough to be quickly actuated by a Loss of Coolant Accident (LOCA) or Main Steam Line Break (MSLB). The settings include an uncertainty allowance of -22 psia and are the settings assumed in the Loss of Coolant Accident analysis.

The Pressurizer- Low signal for each SIS train can be blocked when 3 out of 4 channels indicate below 1700 psia. This block prevents undesired actuation of SIS during a normal plant cooldown. The block signal is automatically removed when 2 out of 4 channels exceed the setpoint, in accordance with the bypass philosophy of removing bypasses when the enabling conditions are no longer satisfied.

This LCO requires four channels of the bypass permissive removal for SIS Pressurizer Pressure — Low to be OPERABLE in MODES 1, ~~The Allowable Value for this trip is set low enough to prevent actuating the SIAS during normal plant operation and pressurizer pressure transients. The setting is high enough that with a LOCA or MSLB it will actuate to perform as expected, mitigating the consequences of the accidents.~~

~~The Pressurizer Pressure — Low trip may be blocked when pressurizer pressure is reduced during controlled plant shutdowns. This block is permitted below 1800 psia, and block permissive responses are annunciated in the control room. This allows for a controlled depressurization of the RCS, while maintaining administrative control of ESF protection. From a blocked condition, the block will be automatically removed as pressurizer pressure increases above 1800 psia, as sensed by two of the four sensor subsystems, in accordance with the bypass philosophy of removing bypasses when the enabling conditions are no longer satisfied.~~

~~This LCO requires four channels of the bypass permissive removal for SIAS Pressurizer Pressure — Low to be OPERABLE in MODES 1,~~ 2, and 3.

The bypass permissive channels consist of four sensor subsystems and two actuation subsystems. This LCO applies to failures in the four sensor subsystems, including sensors, bistables, and associated equipment. Failures in the actuation subsystems, including the manual bypass ~~key~~ switches, are considered Actuation Logic failures and are addressed in LCO 3.3.4. ~~LCO 3.3.5.~~

~~BASES~~

This LCO applies to the bypass removal feature only. If the bypass enable Function is failed so as to prevent entering a bypass condition, operation may continue.

The block permissive is set low enough so as not to be enabled during normal plant operation, but high enough to allow blocking prior to reaching the trip setpoint.

2. Containment High Pressure

This LCO requires four channels of CHP Containment Pressure — High to be OPERABLE for each of the two trains in MODES 1, 2, and 3.

The setpoint was chosen so as to be high enough to avoid actuation by containment temperature or atmospheric pressure changes, but low enough to be quickly actuated by a LOCA or a MSLB in the containment.

(continued)

~~BASES~~

LCO (continued)

3. Containment High Radiation Signal

This LCO requires four channels of CHR to be OPERABLE in MODES 1, 2, and 3.

The setpoint is based on the maximum primary coolant leakage to the containment atmosphere allowed by **Specification 3.1.5** and the maximum activity allowed by **Specification 3.1.4.** N^{16} concentration reaches equilibrium in containment atmosphere due to its short half-life, but other activity was assumed to build up. At the end of a 24-hour leakage period the dose rate is approximately 20 R/h as seen by the area monitors. A large leak could cause the area dose rate to quickly exceed the 20 R/h setting and initiate CHR.

~~2. Containment Spray Actuation Signal~~

~~CSAS is initiated either manually or automatically. At many plants, it is also necessary to have an automatic or manual SIAS for complete actuation. The SIAS opens the containment spray valves, whereas the CSAS actuates other required components. The SIAS requirement should always be satisfied on a legitimate CSAS, since the Containment Pressure — High signal setpoint used in the SIAS is the same setpoint used in the CSAS. At many plants, the transmitters used to initiate CSAS are independent of those used in the SIAS to prevent inadvertent containment spray due to failures in two sensor channels.~~

~~a. Containment Pressure — High~~

~~This LCO requires four channels of CSAS Containment Pressure — High to be OPERABLE in MODES 1, 2, and 3.~~

~~The Allowable Value is set high enough to allow for small pressure increases in containment expected during normal operation (i. (i.e., plant heatup) and is not indicative of an offnormal condition. The setting is low enough to initiate the ESF Functions when an offnormal condition is indicated. This allows the ESF systems to perform as expected in the accident analyses to mitigate the consequences of the analyzed accidents.~~

~~a. Containment Pressure — High (continued)~~

~~The Containment Pressure — High setpoint is the same in the SIAS (Function 1), CSAS (Function 2), and CIAS (Function 3). However, different sensors and logic are used in each of these Functions.~~

~~BASES~~

~~3. Containment Isolation Actuation Signal~~

~~a. Containment Pressure — High~~

~~This LCO requires four channels of CIAS Containment Pressure — High to be OPERABLE in MODES 1, 2, and 3.~~

~~The Allowable Value is set high enough to allow for small pressure increases in containment expected during normal operation (i.e., plant heatup) and is not indicative of an offnormal condition. The setting is low enough to initiate the ESF Functions when an offnormal condition is indicated. This allows the ESF systems to perform as expected in the accident analyses to mitigate the consequences of the analyzed accidents.~~

~~The Containment Pressure — High setpoint is the same in the SIAS (Function 1), CSAS (Function 2), and CIAS (Function 3). However, different sensors and logic are used in each of these Functions.~~

~~b. Containment Radiation — High~~

~~This LCO requires four channels of CIAS Containment Radiation — High to be OPERABLE in MODES 1, 2, and 3.~~

~~The Allowable Value is high enough to avoid unnecessary actuation,The Allowable Value is high enough to avoid unnecessary actuation, but adequate to provide diverse actuation of the CIAS in the event of a LOCA.~~

4. Steam Generator Pressure — Low

This LCO requires four channels of Steam Generator Pressure — Low Instrumentation for each steam generator to be OPERABLE in MODES 1, 2, and 3.

The setpoint was chosen to be low enough to avoid actuation during plant operation, but be close enough to full power operating pressure to be actuated quickly in the event of a MSLB. The setting of includes a -22 psi uncertainty allowance and was the setting used in the FSAR Section 14 analysis.

The SGLP signal from each steam generator may be blocked when 3 of the 4 steam pressure channels indicate below 550 psia. This block prevents undesired actuation during a normal plant cooldown. The block signal is automatically removed when steam pressure exceeds the setpoint.

~~BASES~~

Each SGLP logic is made up of output contacts from four pressure bistables from the associated steam generator. When the logic circuit is satisfied, two relays are energized to actuate steam and feedwater line isolation. A similar logic circuit is provided for each block circuit. The block is automatically removed when the steam pressure exceeds 550 psig, in accordance with the bypass philosophy of removing bypasses when the enabling conditions are no longer satisfied.

(continued)

~~BASES~~

LCO (Continued)

This LCO applies to failures in the four sensor subsystems, including sensors, bistables, and associated equipment. Failures in the actuation subsystems, including the manual bypass switches, are considered Actuation Logic failures and are addressed in LCO 3.3.4.

This LCO applies to the bypass removal feature only. If the bypass enable Function is failed so as to prevent entering a bypass condition, operation may continue.

The block permissive is set low enough so as not to be enabled during normal plant operation, but high enough to allow blocking prior to reaching the trip setpoint.

4. ~~Main Steam Isolation Signal~~

~~The MSIS is required to be OPERABLE in MODES 1, 2, and 3 except when all associated valves are closed and de-activated.~~

~~a. Steam Generator Pressure — Low~~

~~This LCO requires four channels of MSIS Steam Generator Pressure — Low for each steam generator to be OPERABLE in MODES 1, 2, and 3.~~

~~The Allowable Value is set below the full load operating value for steam pressure so as not to interfere with normal plant operation. However, the setting is high enough to provide the required protection for excessive steam demand. An excessive steam demand causes the RCS to cool down, resulting in a positive reactivity addition to the core. An MSIS is required to prevent the excessive cooldown.~~

~~This Function may be manually blocked when steam generator pressure is reduced during controlled plant cooldowns. The block is permitted below 785 psia, and block permissive responses are annunciated in the control room. This allows a controlled depressurization of the secondary system, while maintaining administrative control of ESF protection. From a blocked condition, the block will be removed automatically as steam generator pressure increases above 785 psia, as sensed by two of the four sensor subsystems, in accordance with the bypass philosophy of removing bypasses when the enabling conditions are no longer satisfied.~~

~~This LCO requires four channels per steam generator of the bypass removal for MSIS Steam Generator Pressure — Low to be OPERABLE in MODES 1, 2, and 3.~~

~~The bypass removal channels consist of four sensor subsystems and two actuation subsystems. This LCO applies~~

~~BASES~~

~~to failures in the four sensor subsystems, including sensors, bistables, and~~

~~associated equipment. Failures in the actuation subsystems, including the manual bypass key switches, are considered Actuation Logic failures and are addressed in LCO 3.3.5.~~

~~This LCO applies to the bypass removal feature only. If the bypass enable Function is failed so as to prevent entering a bypass condition, operation may continue.~~

~~The block permissive is set low enough so as not to be enabled during normal plant operation, but high enough to allow blocking prior to reaching the trip setpoint.~~

5. Auxiliary Feedwater Actuation Signal

The AFAS logic actuates auxiliary feedwater (AFW) to a steam generator on low level in that generator.

The Auxiliary Feedwater Actuation Signal (AFAS) is initiated by 2 out of 4 low level signals occurring for either steam generator, as sensed by narrow range level transmitters . The setpoint is the same as that for Reactor Trip. The allowable value was chosen to assure that Auxiliary Feedwater Flow would be initiated while the steam generator could still act as a heat sink and steam source, and to assure that a reactor trip would not occur on low level without the actuation of Auxiliary Feedwater.

~~6. Auxiliary Feedwater Actuation Signal~~

~~The AFAS logic actuates auxiliary feedwater (AFW) to a steam generator on low level in that generator unless it has been identified as being ruptured.~~

~~A low level in either generator, as sensed by a two-out-of-four coincidence of four wide range sensors for any generator, will generate an AFAS start signal, which starts both trains of AFW pumps and feeds both steam generators. The AFAS also monitors the secondary differential pressure in both steam generators and initiates an AFAS block signal to a ruptured generator, if the pressure in that generator is lower than that in the other generator by the differential pressure setpoint.~~

~~BASES~~

~~a. Steam Generator A/B Level — Low~~

This LCO requires four channels for each steam generator of Steam Generator Level — Low to be OPERABLE in MODES 1, 2, and 3.

~~The Allowable Value ensures adequate time exists to initiate AFW while the steam generators can function as a heat sink.~~

~~b. Steam Generator Pressure Difference — High (SG-A > SG-B) or (SG-B > SG-A)~~

~~This LCO requires four channels per steam generator of Steam Generator Pressure Difference — High to be OPERABLE in MODES 1, 2, and 3.~~

~~The Allowable Value for this trip is high enough to allow for small pressure differences and normal instrumentation errors between the steam generator channels during normal operation without an actuation. The setting is low enough to detect and inhibit feeding of a ruptured steam generator in the event of an MSLB or FWLB, while permitting the feeding of the intact steam generator.~~

6. Recirculation Actuation Signal

a. Safety Injection Refueling Water Tank Level — Low

This LCO requires four channels of SIRWT Level — Low to be OPERABLE in MODES 1, 2, and 3.

The RAS signal is actuated by separate sensors from those which provide tank level indication. The allowable range of 21" to 27" above the tank floor corresponds to 1.1% to 3.3% indicated level. Typically the actual setting is near the midpoint of the allowable range.

~~5. Recirculation Actuation Signal~~

~~a. Refueling Water Tank Level — Low~~

~~This LCO requires four channels of RWT Level — Low to be OPERABLE in MODES 1, 2, and 3.~~

The upper limit on the Allowable Value for this trip is set low enough to ensure RAS does not initiate before sufficient water is transferred to the containment sump. Premature recirculation could impair the reactivity control Function of safety injection by limiting the amount of boron injection. Premature recirculation could also damage or disable the

~~BASES~~

recirculation system if recirculation begins before the sump has enough water to prevent air containment in the suction. The lower limit on the RWT Level — Low trip Allowable Value is high enough to transfer suction to the containment sump prior to emptying the SIRWT ~~RWT.~~

Four SIRWT level sensors are arranged to provide two independent Recirculation Actuation Signals. Each low level sensor is powered from a separate Preferred AC bus; thus two are ultimately powered from each station battery. Each Recirculation Actuation Signal (RAS) circuit is wired with the contacts from the pair of level sensors powered from the same battery in parallel. These two parallel circuits are wired in series, producing a "1 out of 2 taken twice" logic. RAS for each train is actuated by either switch from the left battery sensing low level concurrently with either switch from the right battery.

APPLICABILITY

All ESF Instrumentation ~~ESFAS~~ Functions are required to be OPERABLE in MODES 1, 2, and 3. In MODES 1, 2, and 3 there is sufficient energy -in the primary and secondary systems to warrant automatic ESF System responses to:

- Close the main steam isolation valves to preclude a positive reactivity addition;
- Actuate AFW to preclude the loss of the steam generators as a heat sink (in the event the normal feedwater system is not available);
- Actuate ESF systems to prevent or limit the release of fission product radioactivity to the environment by isolating containment and limiting the containment pressure from exceeding the containment design pressure during a design basis LOCA or MSLB; and
- Actuate ESF systems to ensure sufficient borated inventory to permit adequate core cooling and reactivity control during a design basis LOCA or MSLB accident.

(continued)

~~BASES~~

In MODES 4, 5, and 6, automatic actuation of ESF Instrumentation ~~ESFAS~~ Functions is not required because adequate time is available for plant operators to evaluate plant conditions and respond by manually operating the ESF components, if required. In LCO 3.6.3, Containment Isolation Valves must remain OPERABLE in MODE 4. ~~IN mode 4 as addressed by LCO 3.3.5. In LCO 3.3.5, manual capability is required for Functions other than AFAS in MODE 4, even though automatic actuation is not required. Because of the large number of components actuated on each ESFAS, actuation is simplified by the use of the Manual Trip push buttons. Manual Trip of AFAS is not required in MODE 4 because AFW or shutdown cooling will already be in operation in this MODE.~~ It is thus possible to initiate CHP and CHR manually, on a component basis, in MODE 4. LCO 3.3.6 addresses automatic Refueling CHR isolation during core alterations or during movement of irradiated fuel.

~~The ESFAS Actuation Logic must be OPERABLE in the same MODES as the automatic and Manual Trip. In MODE 4, only the portion of the ESFAS logic responsible for the required Manual Trip must be OPERABLE.~~

In MODES 5 and 6, ESF Instrumentation ~~ESFAS~~ initiated systems are either reconfigured or disabled for shutdown cooling operation. Accidents in these MODES are slow to develop and would be mitigated by manual operation of individual components.

(continued)

~~BASES~~

ACTIONS

The most common cause of channel inoperability is outright failure or drift of the bistable or process module sufficient to exceed the tolerance allowed by the plant specific setpoint analysis.

Typically, the drift is small and results in a delay of actuation rather than a total loss of function. Determination of setpoint drift is generally made during the performance of a CHANNEL FUNCTIONAL TEST when the process instrument is set up for adjustment to bring it to within specification. If the actual trip setpoint is not within the Allowable Value in Table 3.3.3-1, ~~4-1,~~ the channel is inoperable and the appropriate Condition(s) are entered.

In the event a channel's trip setpoint is found nonconservative with respect to the Allowable Value in Table 3.3.3-1, ~~4-1,~~ or the sensor, instrument loop, signal processing electronics, or ESF Instrumentation ~~ESFAS~~ bistable is found inoperable, then all affected Functions provided by that channel must be declared inoperable and the plant must enter the Condition statement for the particular protection Function affected.

When the number of inoperable channels in a trip Function exceeds those specified in any related Condition associated with the same trip Function, then the plant is outside the safety analysis. Therefore, LCO 3.0.3 should be immediately entered if applicable in the current MODE of operation.

A Note has been added to clarify the application of the Completion Time rules. The Conditions of this Specification may be entered independently for each Function in Table 3.3.3-1. ~~4-1.~~ Completion Times for the inoperable channel of a Function will be tracked separately.

A.1

Condition A applies to the failure of a single channel of one or more input parameters in the following ESFI Functions:

1. Safety Injection Signal
   Pressurizer Pressure — Low

2. Containmenr High Pressure

3. Containment High Radiation

(continued)

~~BASES~~

ACTIONS (continued)

~~A.1 (continued)~~ Steam Generator Low Pressure

~~For those plants with CSAS, Required~~ Auxiliary Feedwater Actuation Signal ~~for a complete CSAS actuation, Condition B for one ESFAS channel inoperable and Condition C for two ESFAS channels inoperable may be preferable to Condition A.~~ Steam Generator Level

~~If a CSAS channel is inoperable, operation is allowed to continue, providing the inoperable channel is placed in bypass within 1 hour. The Completion Time of 1 hour allotted to bypass the channel is sufficient to allow the operator to take all appropriate actions for the failed channel and still ensures that the risk involved in operating with the failed channel is acceptable. Condition A applies to one CSAS Containment Pressure — High channel inoperable. CSAS logic is identical to that of the other ESFAS Functions; the inadvertent actuation of a CSAS is undesirable, since it may damage equipment. For this reason, placing the inoperable channel in trip is not an option as it is in Condition B and C~~ ESF Instrumentation ESFAS channel is inoperable, startup or power operation is allowed to continue restore the design level of redundancy.

If one ESF Instrument ~~ESFAS~~ Channel is inoperable, startup or power operation is allowed to continue providing the inoperable channel is placed in trip within 7 days (Required Action A.1). The provision of four trip channels allows one channel to be failed in a non-trip condition or optionally bypassed up to the 7 day Completion Time allotted to place the channel in Trip, although except for AFAS, there are no installed design provisions for this bypass function. Operating with one failed channel in a non-trip condition or bypassed (removed from service) during operations, placing the ESFI in two-out-of-three coincidence logic.

If the failed channel cannot be restored to OPERABLE status in 7 days, the associated bistable is placed in a tripped condition. This places the function in a one-out-of-three configuration. ~~providing the inoperable channel is placed in bypass or trip within 1 hour (Required Action B.1). By specifying either option, the possibility of inadvertently bypassing a redundant channel is eliminated for those plants with an interlock. The provision of four trip channels allows one channel to be bypassed (removed from service) during operations, placing the ESFAS in two-out-of-three coincidence logic.~~

~~The Completion Time of 1 hour allotted to bypass or trip the channel is sufficient to allow the operator to take all appropriate actions for the failed channel and still ensures that the risk involved in operating with the failed channel is acceptable.~~

~~One failed channel is restored to OPERABLE status or is placed in trip within [48] hours (Required Action B.2.1 or B.2.2). Required Action B.2.1 restores the full capability of the function. Required Action B.2.2 places the function in a one-out-of-three configuration.~~ In this configuration, common cause failure of the dependent channel cannot prevent ESFAS actuation. The 7 day Completion Time is based upon operating experience, which has

~~BASES~~

demonstrated that a random failure of a second channel occurring during the 7 day period is a low probability event. ~~The [48] hour Completion Time is based upon operating experience, which has demonstrated that a random failure of a second channel occurring during the [48] hour period is a low probability event.~~

B.1 and B.2

Condition B applies to the failure of two channels in any of the ESFI functions addressed by Condidion A:

~~1, B.2.1, and B.2.2~~

~~Condition B applies to the failure of a single channel of one or more input parameters in the following ESFAS Functions:~~

~~1. Safety Injection Actuation Signal~~
~~Containment Pressure — High~~
~~Pressurizer Pressure — Low~~

~~3. Containment Isolation Actuation Signal~~
~~Containment Pressure — High~~
~~Containment Radiation — High~~

~~4. Main Steam Isolation Signal~~
~~Steam Generator Pressure — Low~~

~~5. Recirculation Actuation Signal~~
~~Refueling Water Tank Level — Low~~

~~6. Auxiliary Feedwater Actuation Signal~~
~~Steam Generator Level — Low~~
~~Steam Generator Pressure Difference — High~~

~~ESFAS coincidence logic is normally two-out-of-four.~~

With two inoperable channels, one channel should be placed in trip within the 8 hour Completion Time. Eight hours is allowed for this action since it must be accomplished by a circuit modification, or by removing power from a circuit component.

(continued)

~~BASES~~

ACTIONS (continued)

With one channel of protective instrumentation bypassed or failed in a non-trip condition, ~~one channel should be placed in bypass, and the other channel should be placed in trip within the 1 hour Completion Time. With one channel of protective instrumentation bypassed,~~ the ESFAS Function is in two-out-of-three logic, but with another channel failed the ESFI may be operating with a two-out-of-two logic. ~~but with another channel failed the ESFAS may be operating with a two-out-of-two logic.~~ This is outside the assumptions made in the analyses and should be corrected. To correct the problem, the second channel is placed in trip. This places the ESFI in a one-out-of-two logic. ~~This places the ESFAS in a one-out-of-two logic.~~ If any of the other OPERABLE channels receives a trip signal, ESFI actuation will occur.

One of the failed channels should be restored to OPERABLE status within 7 days, for reasons similar to those stated under Condition A. ~~ESFAS actuation will occur.~~

~~One of the failed channels should be restored to OPERABLE status within [48] hours, for reasons similar to those stated under Condition B.~~ After one channel is restored to OPERABLE status, the provisions of Condition A still apply to the remaining inoperable channel. Therefore, the channel that is still inoperable after completion of Required Action B.2 must be placed in trip if more than 7 days has elapsed since the initial channel failure.

The Required Action is modified by a Note stating that LCO 3.0.4 is not applicable. The Note was added to allow the changing of MODES even though two channels are inoperable, with one channel tripped. MODE changes in this configuration are allowed, to permit maintenance and testing on one of the inoperable channels. In this configuration, the protection system is in a one-out-of-two logic, and the probability of a common cause failure affecting both of the OPERABLE channels during the 7 days permitted is remote. ~~the provisions of Condition B still apply to the remaining inoperable channel. Therefore, the channel that is still inoperable after completion of Required Action C.2 must be placed in trip if more than [48] hours has elapsed since the initial channel failure.~~

~~The Required Action is modified by a Note stating that LCO 3.0.4 is not applicable. The Note was added to allow the changing of MODES even though two channels are inoperable, with one channel bypassed and one tripped. MODE changes in this configuration are allowed, to permit maintenance and testing on one of the inoperable channels. In this configuration, the protection system is in a one-out-of-two logic, and the probability of a common cause failure affecting both of the OPERABLE channels during the [48] hours permitted is remote.~~

~~D.1, D.2.1, D.2.2.1, and D.2.2.2~~

~~Condition D applies to the failure of one bypass removal channel.~~

~~BASES~~

~~ACTIONS~~ ~~D.1, D.2.1, D.2.2.1, and D.2.2.2 (continued)~~

~~The bypass removal channels consist of four sensor subsystems and two actuation subsystems. Condition D applies to failures in one of the four sensor subsystems, including sensors, bistables, and associated equipment. Failures in the actuation subsystems, including the manual bypass key switches, are considered Actuation Logic failures and are addressed in LCO 3.3.5.~~

C.1 and C.2

Condition C applies to one SIRWT Lo Level channel inoperable. The SIRWT low level circuitry is arranged in a "1 out of 2 taken twice" logic rather than the more frequently used 2 out of 4 logic. Therefore, Required Action C.1 differs from other ESF functions. With a bypassed SIRWT low level channel, an additional failure might disable automatic RAS, but would not initiate a premature RAS. With a tripped channel, an additional failure could cause a premature RAS, but would not disable the automatic RAS.

Since considerable time is available after initiation of SIS until RAS is required and there is quite a tolerance on the time when RAS must be initiated, and since a premature RAS could damage all the ESF pumps, it is preferable to bypass an inoperable channel and risk loss of automatic RAS than to trip a channel and risk a premature RAS. Eight hours is allowed for this action since it must be accomplished by circuit modification.

(continued)

~~BASES~~

ACTIONS (continued)

Action C.2 requires that the inoperable channel must be repaired within 7 days to limit the time the unit is operated with an inoperable channel.

~~Condition C applies to the failure of two channels in any of the following ESFAS functions:~~

~~1. Safety Injection Actuation Signal~~
~~Containment Pressure — High~~
~~Pressurizer Pressure — Low~~

~~3. Containment Isolation Actuation Signal~~
~~Containment Pressure — High~~
~~Containment Radiation — High~~

~~4. Main Steam Isolation Signal~~
~~Steam Generator Pressure — Low~~

~~5. Recirculation Actuation Signal~~
~~Refueling Water Tank Level — Low~~

~~6. Auxiliary Feedwater Actuation Signal~~
~~Steam Generator Level — Low~~
~~Steam Generator Pressure Difference — High~~

D.1 and D.2

Condition D applies to the failure of one or two bypass removal channels.

~~D.1, D.2.1, D.2.2.1, and D.2.2.2 (continued)~~

The bypass removal channels consist of four sensor subsystems and two actuation subsystems. Condition D applies to failures in one or two of the four sensor subsystems, including sensors, bistables, and associated equipment. Failures in the actuation subsystems, including the manual bypass pushbuttons are considered Actuation Logic failures and are addressed in LCO 3.3.4.

In Condition D, it is permissible to continue operation with one bypass permissive removal channel failed, providing the bypass is disabled (Required Action D.1). This can be accomplished by removing the bypass with the manual bypass switch, which disables the bypass. ~~This can be accomplished by removing the bypass with the manual bypass key switch, which disables the bypass in both trains.~~ Since the bypass Function must

~~BASES~~

be manually enabled, the bypass permissive Function will not by itself cause an undesired bypass insertion.

Alternatively, the bypass may be disabled by defeating the bypass permissive input in one or two of the four channels to the two-out-of-four bypass removal logic. With one bypass channel indicating above the bypass removal setpoint, and one failed below the setpoint, the bypass removal function is in one out of two logic. If two or more channels indicate above the setpoint, the bypass will be removed outright.

~~the bypass may be disabled by defeating the bypass permissive input in one of the four channels to the two-out-of-four bypass removal logic, placing the bypass removal feature in one-out-of-three logic. Thus, any of the remaining three channels is capable of removing the bypass feature when the bypass enable conditions are no longer valid.~~

If the bypass removal feature in the inoperable channel cannot be defeated, actions to address the inoperability of the affected automatic trip channel must be taken. Required Action D.2 requires declaring the affected Actuation Logic Trains inoperable, and entering the appropriate Condition. If the bypass removal feature cannot be removed, then the affected ESF function (Low Pressure SIS input or SGLP) is inoperable. LCO 3.3.4 addresses Logic Channel inoperability. The 8 hour Completion Time is permitted due to the absence of installed bypass defeat capability.

~~BASES~~

~~2.1, Required Action D.2.2.1, and Required Action D.2.2.2 are equivalent to the Required Actions for a single automatic trip channel failure (Condition B). The 1 hour and [48] hour Completion Times have the same bases as discussed for Condition B.~~

~~E.1, E.2.1, and E.2.2~~

~~Condition E applies to two inoperable bypass removal channels. The bypass removal channels consist of four sensor subsystems and two actuation subsystems. This Condition applies to failures in two of the four sensor subsystems. With two of the four sensor subsystems failed in a nonconservative direction (enabling the bypass Function), the bypass removal feature is in two-out-of-two~~

ACTIONS (continued)

E.1 and E.2

~~1, E.2.1, and E.2.2 (continued)~~

~~logic. Failures in the actuation subsystems, including the manual bypass key switches, are considered Actuation Logic failures and are addressed in LCO 3.3.5.~~

~~In Condition E, it is permissible to continue operation with two bypass permissive channels failed, providing the bypasses are disabled in a similar manner as discussed for Condition D.~~

~~If the failed bypasses cannot be disabled,~~

~~f the failed bypasses cannot be disabled, actions to address the inoperability of the affected automatic trip channels must be taken. Required Action E.2.1 and Required Action E.2.2 are equivalent to the Required Actions for a two automatic trip channel failure (Condition C). Also similar to Condition C, after one set of inoperable channels is restored, the provisions of Condition D still apply to the remaining inoperable channel, with the Completion Time measured from the point of the initial bypass channel failure. The 1 hour and [48] hour Completion Times have the same bases as discussed for Condition C.~~

~~The Required Action is modified by a Note stating that LCO 3.0.4 is not applicable. The Note was added to allow the changing of MODES even though two channels are inoperable, with one channel bypassed and one tripped. MODE changes in this configuration are allowed, to permit maintenance and testing on one of the inoperable channels. In this configuration, the protection system is in a one-out-of-two logic, and the probability of a common cause failure affecting both of the OPERABLE channels during the 48 hours permitted is remote.~~

~~BASES~~

~~F.1 and F.2~~

If the Required Actions and associated Completion Times of Condition A, B, C, or D, are not met, ~~D, or E are not met,~~ 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 4 within 30 hours. ~~the plant must be brought to at least MODE 3 within 6 hours and to MODE 4 within [12] 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.

~~BASES~~

SURVEILLANCE REQUIREMENTS

The SRs for any particular ESF ~~ESFAS~~ Function are found in the SRs column of Table 3.3.3-1 for that Function ~~4-1 for that Function.~~ Most functions are subject to CHANNEL CHECK, CHANNEL FUNCTIONAL TEST, and CHANNEL CALIBRATION. ~~CHANNEL CALIBRATION, and response time testing.~~

SR 3.3.3.1

A CHANNEL CHECK is performed each 12 hours on each ESF input channel which is provided with an indicator to provide a qualitative assurance that the channel is working properly and that its readings are within limits. The CHP Signal and SIRWT level channels have no associated control room indicator, and are not channel checked.

~~In order for a unit to take credit for topical reports as the basis for justifying Frequencies, topical reports should be supported by an NRC staff Safety Evaluation Report that establishes the acceptability of each topical report for that unit.~~

~~SR 3.3.4.1~~

Performance of the CHANNEL CHECK once every 12 hours ensures that a gross failure of instrumentation has not occurred. A CHANNEL CHECK is normally a comparison of the parameter indicated on one channel to a similar parameter on other channels. It is based on the assumption that instrument channels monitoring the same parameter should read approximately the same value. Significant deviations between instrument channels could be an indication of excessive instrument drift in one of the channels or of something even more serious. CHANNEL CHECK will detect gross channel failure; thus, it is key to verifying the instrumentation continues to operate properly between each CHANNEL CALIBRATION.

(continued)

~~BASES~~

SURVEILLANCE REQUIREMENTS

Agreement criteria are determined by the plant staff based on a combination of the channel instrument uncertainties,

~~Agreement criteria are determined by the plant staff based on a combination of the channel instrument uncertainties,~~ including indication and readability.

(continued)

If a channel is outside the criteria, ~~If a channel is outside the criteria,~~ it may be an indication that the sensor or the signal processing equipment has drifted outside its limit. If the channels are within the criteria, it is an indication that the channels are OPERABLE. If the channels are normally off scale during times when Surveillance is required, the CHANNEL CHECK will only verify that they are off scale in the same direction. Offscale low current loop channels are verified to be reading at the bottom of the range and not failed downscale.

The Frequency of about once every shift is based on operating experience that demonstrates channel failure is rare. Since the probability of two random failures in redundant channels in any 12 hour period is extremely low,-

~~SURVEILLANCE REQUIREMENTS~~ ~~SR 3.3.4.1 (continued)~~

the CHANNEL CHECK minimizes the chance of loss of protective function due to failure of redundant channels. The CHANNEL CHECK supplements less formal, but more frequent, checks of CHANNEL OPERABILITY during normal operational use of displays associated with the LCO required channels.

SR 3.3.4.2

A CHANNEL FUNCTIONAL TEST is performed every 92 days to ensure the entire channel will perform its intended function when needed.

This test is required to be performed each 92 ~~[92]~~ days on ESF input channels provided with on-line testing capability. It is not required for the SIRWT Level channels since they have no built in test capability. The CHANNEL FUNCTIONAL TEST for SIRWT Level channels is performed each 18 months as part of the required CHANNEL CALIBRATION.

The CHANNEL FUNCTIONAL TEST tests the individual sensor subsystems using an analog test input to each bistable.

(continued)

~~BASES~~

SURVEILLANCE REQUIREMENTS (continued)

A test signal is superimposed on the input in one channel at a time to verify that the bistable trips within the specified tolerance around the setpoint. Any setpoint adjustment shall be consistent with the assumptions of the current ~~plant specific~~ setpoint analysis.

The as found and as left values must also be recorded and reviewed for consistency with the assumptions of the surveillance interval extension analysis. The requirements for this review are outlined in Reference 8. ~~9~~

~~SR 3.3.4.3~~

~~SR 3.3.4.3 is a CHANNEL FUNCTIONAL TEST similar to SR 3.3.4.2, except 3.3.4.3 is performed within 92 days prior to startup and is only applicable to bypass Functions. These include the Pressurizer Pressure — Low bypass and the MSIS Steam Generator Pressure — Low bypass.~~

~~The CHANNEL FUNCTIONAL TEST for proper operation of the bypass removal Functions is critical during plant heatups because the bypasses may be in place prior to entering MODE 3 but must be removed at the appropriate points during plant startup to enable the ESFAS Function. Consequently, just prior to startup is the appropriate time to verify~~

~~bypass removal Function OPERABILITY. Once the bypasses are removed, the bypasses must not fail in such a way that the associated ESFAS Function is inappropriately bypassed. This feature is verified by the appropriate ESFAS Function CHANNEL FUNCTIONAL TEST.~~

~~The allowance to conduct this Surveillance within 92 days of startup is based upon the reliability analysis presented in topical report CEN-327, "RPS/ESFAS Extended Test Interval Evaluation" (Ref. 9).~~

SR 3.3.3.3 ~~3.3.4.4~~

CHANNEL CALIBRATION is a complete check of the instrument channel, including the sensor. The Surveillance verifies that the channel responds to a measured parameter within the necessary range and accuracy. CHANNEL CALIBRATION leaves the channel adjusted to account for instrument drift between successive calibrations to ensure that the channel remains

~~BASES~~

operational between successive surveillances. CHANNEL CALIBRATIONS must be performed consistent with the plant specific setpoint analysis.

The as found and as left values must also be recorded and reviewed for consistency with the assumptions of the extension analysis. The requirements for this review are outlined in Reference9.

The Frequency is based upon the assumption of an 18 ~~[18]~~ month calibration interval for the determination of the magnitude of equipment drift in the setpoint analysis.

(continued)

~~BASES~~

~~SR 3.3.4.5~~

~~This Surveillance ensures that the train actuation response times are the maximum values assumed in the safety analyses. Individual component response times are not modeled in the analyses. The analysis models the overall or total elapsed time, from the point at which the parameter exceeds the trip setpoint value at the sensor to the point at which the equipment in both trains reaches the required functional~~

~~SURVEILLANCE REQUIREMENTS~~

~~SR 3.3.4.5 (continued)~~

~~state (e.g., pumps at rated discharge pressure, valves in full open or closed position). Response time testing acceptance criteria are included in Reference 3. The test may be performed in one measurement or in overlapping segments, with verification that all components are measured.~~

~~ESF RESPONSE TIME tests are conducted on a STAGGERED TEST BASIS of once every [18] months. This results in the interval between successive tests of a given channel of n x 18 months, where n is the number of channels in the Function. Surveillance of the final actuation devices, which make up the bulk of the response time, is included in the testing of each channel. Therefore, staggered testing results in response time verification of these devices every [18] months. The [18] month STAGGERED TEST BASIS Frequency is based upon plant operating experience, which shows that random failures of instrumentation components causing serious response time degradation, but not channel failure, are infrequent occurrences.~~

REFERENCES

1. FSAR, Section 7.3. ~~Section [7.3].~~

2. 10 CFR 50, Appendix A.

3. Logic Diagram, SIS Test and RAS, E 17, sh 5. NRC Safety Evaluation Report, (Date)

4. IEEE Standard 279-1971.

5. FSAR, Chapter 14. ~~Chapter [14].~~

6. 10 CFR 50.49.

7. CPCO EGAD "Setpoint Methodology"

~~7. "Plant Protection System Selection of Trip Setpoint Values."~~

~~BASES~~

8. FSAR, Section 7.2. ~~Section [7.2].~~

9. CEN-327, June 2, 1986, including Supplement 1, March 3, 1989.

10. Logic Diagram, Safety Injection initiation, E 17 sh 3.

11. Logic Diagram, Containment High Pressure, E 17 sh 6.

12. Logic Diagram, Containment High Radiation, E 17 sh 7.

13. Logic Diagram, SG Low Pressure and MSIS, E 17 sh 20.

B 3.3 INSTRUMENTATION

B 3.3.4 ~~5~~ Engineered Safety Features (ESF) ~~(ESFAS~~ Logic and Manual Initiation ~~Trip~~

BASES

BACKGROUND

The ESFI ~~ESFAS~~ initiates necessary safety systems~~,~~ based upon the values of selected unit parameters, to protect against violating core design limits and the Primary Coolant System (PCS) ~~Reactor Coolant System (RCS)~~ pressure boundary and to mitigate accidents.

The ESF ~~ESFAS~~ Instrumentation contains devices and circuitry that generate the following signals when the monitored variables reach levels that are indicative of conditions requiring protective action. Also listed are the inputs to each ESF Actuation Signal:

1. Safety Injection Actuation Signal (SIS);
   a. Containment High pressure (CHP)
   b. Pressurizer Pressure-Low

2. Containment High pressure;
   a. Containment Pressure - High-Left Train
   b. Containment Pressure High-Right Train

3. Containment High Radiation (CHR)
   a. Containment Area Radiation-Hi

4. Steam Generator Low Pressure (SGLP)
   a. "A" SG Pressure-Low
   b. "B" SG Pressure-Low

5. Auxiliary Feedwater Actuation (AFAS)
   a. "A" SG Level-Low
   b. "B" SG Level-Low

6. Recirculation Actuation Signal (RAS);
   a. Safety Injection Refueling Water Tank (SIRWT) Level -Low

~~1. Safety Injection Actuation Signal (SIAS);~~

~~2. Containment Spray Actuation Signal (CSAS);~~

~~3. Containment Isolation Actuation Signal (CIAS);~~

~~4. Main Steam Isolation Signal (MSIS);~~

~~5. Recirculation Actuation Signal (RAS);~~

~~6. Auxiliary Feedwater Actuation Signal (AFAS).~~

In the above list of actuation signals, the CHP and SIRWT Level signals are derived from pressure and level switches, respectively.

Equipment actuated by each of the above signals is identified in the FSAR Section 7.3 (Ref. 1)

(continued)

~~BASES~~

BACKGROUND (continued)

The ESF circuitry, with the exception of RAS, employs 2 out of 4 logic. Four independent measurement channels are provided for each function used to generate ESF actuation signals. When any two channels of the same function reach their setpoint, actuating relays are energized which, in turn, initiate the protective actions. Two separate and redundant trains of actuating relays, each powered from separate power supplies, are utilized. These separate relay trains operate redundant trains of ESF equipment. The actuation relays are considered part of the actuation logic addressed by this LCO.

RAS logic consists of output contacts of the relays actuated by the SIRWT level switches arranged in a "1 out of 2 taken twice" logic. The contacts are arranged so that at least one low level signal powered from each station battery is required to initiate RAS. Loss of a single battery, therefore, cannot either cause or prevent RAS initiation.

The sensor subsystem, including individual channel bistables, is addressed in LCO 3.3.3. This LCO addresses the actuation subsystem, consisting of the 2 out of four bistable relay logic, manual actuation, and downstream components used to actuate the individual ESF functions, as defined in the following section.

<u>ESF Logic</u>

Each of the six ESF actuating signals in Table 3.2.4-1 operates two trains of actuating relays. Each train is capable of initiating the safeguards equipment load groups to meet the minimum requirements to provide all functions necessary to operate the system associated with the plant's capability to cope with abnormal events.

The logic circuitry includes bypass provisions such that the SGLP function may be bypassed (blocked)if three out of four SG pressure channels are below a bypass permissive setpoint. Similarly, the SIS on Pressurizer Pressure -Low may be bypassed when three out of four channels are below a permissive setpoint. This bypassing is performed when these inputs are no longer required for protection.
~~Each of the above ESFAS actuation systems is segmented into four sensor subsystems addressed by LCO 3.3.4, "Engineered Safety Features Actuation System (ESFAS) Instrumentation," and two actuation subsystems addressed by this LCO. Each sensor subsystem includes measurement channels and bistables. The SIAS actuation subsystems include two logic subsystems for sequentially loading the diesel generators.~~

~~Each of the four sensor subsystem channels monitors redundant and independent process measurement channels. Each sensor is monitored by at least one bistable. The bistable associated with each ESFAS Function will trip when the monitored variable exceeds the trip setpoint. When tripped, the sensor subsystems provide outputs to the two actuation subsystems.~~

~~BASES~~

~~BACKGROUND (continued)~~

~~The two independent actuation subsystems each compare the four associated sensor subsystem outputs. If a trip occurs in two or more sensor subsystem channels, the two-out-of-four logic in each actuation subsystem will initiate one train of ESFAS. Each has sufficient equipment to provide protection to the public in the case of a Design Basis Event. The sensor subsystem is addressed in LCO 3.3.4. This LCO addresses the actuation subsystem.~~

~~Each of the four sensor subsystems is mounted in a separate cabinet, excluding the sensors and field wiring.~~

~~The role of the sensor subsystem (measurement channels and bistables) is discussed in LCO 3.3.4. That of the actuation subsystem is discussed below.~~

~~ESFAS Logic~~

~~The two independent actuation subsystems compare the four sensor subsystem outputs. If a trip occurs in the same parameter in two or more sensor subsystem channels, the two-out-of-four logic in each actuation subsystem initiates one train of ESFAS. Either train controls sufficient redundant and independent equipment.~~

~~Each actuation subsystem channel is housed in two cabinets. One cabinet contains the logic circuitry for the actuation channel, while the other cabinet contains the power relay equipment. This power relay equipment includes the power relays (initiation relays) that actuate the ESFAS equipment in response to a signal from the Actuation Logic.~~

~~It is possible to change the two-out-of-four ESFAS Logic to a two-out-of-three logic for a given input parameter in one channel at a time by disabling one channel input to the logic. Thus, the bistables will function normally, producing normal trip indication and annunciation, but ESFAS actuation will not occur since the bypassed channel is effectively removed from the coincidence logic. Maintenance bypassing can be simultaneously performed on any number of parameters in any number of channels, providing each parameter is bypassed in only one channel at a time. At some plants an interlock prevents simultaneous maintenance bypassing of the same parameter in more than one channel.~~

~~BACKGROUND~~ ~~ESFAS Logic (continued)~~

~~Maintenance bypassing is normally employed during maintenance or testing.~~

~~For plants that have demonstrated sufficient channel to channel independence, two-out-of-three logic is the minimum that is required to provide adequate plant protection, since a failure of one channel still ensures that ESFAS actuation would be generated by the two remaining OPERABLE channels. Two-out-of-three logic also prevents inadvertent actuation caused by any single channel failure in a trip condition.~~

~~BASES~~

~~In addition to the maintenance bypasses, there are operating bypasses (blocks) on the Pressurizer Pressure — Low input to the SIAS and on the Steam Generator Pressure — Low input to the MSIS when these inputs are no longer required for protection.~~ These bypasses are enabled manually when the enabling conditions are satisfied in three of the four sensor subsystem channels. The operating bypass circuitry employs four bistable channels in the sensor subsystems, sensing pressurizer pressure (for the SIS) and steam generator pressure (for the SGLP). These bistables provide contact output to the three-out-of-four logic in the two actuation logic channels. ~~sensing pressurizer pressure (for the SIAS) and steam generator pressure (for the MSIS). These bistables provide contact output to the three-out-of-four logic in the two actuation subsystem channels.~~ When the logic is satisfied, manual bypassing is permitted. There are two manual bypass actuation controls for each Function, one per train.

All operating bypasses are automatically removed when enabling bypass conditions are no longer satisfied.

(continued)

BACKGROUND (continued)

Failure of the bistable circuitry used to initiate the block permissive is considered a measurement channel or bistable channel failure and is addressed by LCO 3.3.3. Failure in the logic used to effect two out of four bypass removal or failure of the manual bypass enable circuitry to remove the bypass is addressed by this LCO.

Testing of a major portion of the ESF circuits is accomplished while the plant is at power. More extensive sequence and load testing may be done with the reactor shut down. The test circuits are designed to test the redundant circuits separately such that the correct operation of each circuit may be verified by either equipment operation or by sequence lights. The test circuit is designed such that, should an accident occur during while testing is in progress, the test will not interfere with initiation of the safeguards equipment required.

FSAR Appendix 7A, Reference 3, explains ESF testing in detail.

Manual Initiation

Manual ESF initiation capability is provided to permit the operator to manually actuate an ESF System when necessary. Two control room mounted manual actuation switches are provided for the SIS and CHR Containment Isolation Signal. CHP and RAS may be initiated using individual component controls. In the case of SIS and CHR, each switch affects one actuation channel.

Main Steam Isolation Valves are provided with two closure swtches in the control room. Either switch closes both MSIVs. Other SGLP actuated components must be manually operated using individual component controls.

~~BASES~~

To actuate a RAS manually, it is necessary to actuate the individual components from the control room or use the "test" switches, each of which actuates one train. Two channels of RAS manual actuation are shown in Table 3.3.4-1. Each channel consists of the manual switches for one train.

(continued)

~~Manual ESFAS initiation capability is provided to permit the operator to manually actuate an Engineered Safety Features (ESF) System when necessary. Two push buttons are provided in the control room for each ESFAS Function. Each push button actuates one train via the ESFAS Logic.~~

~~The Actuation Logic is tested by inserting a local test signal. A coincidence logic trip will occur if there is the simultaneous presence of a sensor channel trip, either legitimate or due to testing. Most ESFAS Functions employ several separate parallel two-out-of-four Actuation Logic modules, with each module actuating a subset of the ESFAS equipment associated with that Function. Each of these subchannels can be tested individually so that simultaneous actuation of an entire train can be avoided during testing.~~

~~BACKGROUND~~ ~~ESFAS Logic (continued)~~

~~Except in the case of actuation subchannels SIAS Nos. 5 and 10, CIAS No. 5, and MSIS No. 1, all Actuation Logic channels can be tested at power. The above designated subchannels must be tested when shut down because they actuate the following equipment, which cannot be actuated at power:~~

- ~~Reactor coolant pump (RCP) seal bleedoff isolation valves;~~
- ~~Service water isolation valves;~~
- ~~Volume control tank (VCT) discharge valves;~~
- ~~Letdown stop valves;~~
- ~~Component cooling water (CCW) to RCPs;~~
- ~~CCW from RCPs;~~
- ~~Main steam isolation valves (MSIVs);~~
- ~~Feedwater isolation valves; and~~
- ~~Instrument air containment isolation valves.~~

~~BASES~~

APPLICABLE SAFETY ANALYSES

Each of the analyzed accidents can be detected by one or more ESF Functions. One of the ESF Functions is the primary actuation signal for that accident. An ESF Function may be the primary actuation signal for more than one type of accident. An ESF Functio may also be a secondary, ~~more ESFAS Functions. One of the ESFAS Functions is the primary actuation signal for that accident. An ESFAS Function may be the primary actuation signal for more than one type of accident. An ESFAS Function may also be a secondary,~~ or backup, actuation signal for one or more other accidents. Functions such as Manual Initiation, not specifically credited in the accident analysis, serve as backups to Functions and are part of the NRC staff approved licensing basis for the plant.
~~ESFAS protective Functions are as follows:~~

~~1. Safety Injection Actuation Signal~~

~~The SIAS ensures acceptable consequences during loss of coolant accident (LOCA) events, including steam generator tube rupture, and main steam line breaks (MSLBs) or feedwater line breaks (FWLBs) (inside containment). To provide the required protection, either a high containment pressure or a low pressurizer pressure signal will initiate SIAS. SIAS initiates the Emergency Core Cooling Systems (ECCS) and performs several other Functions, such as initiating control room isolation and starting the diesel generators.~~

~~2. Containment Spray Actuation Signal~~

~~The CSAS initiates containment spray, preventing containment overpressurization during a LOCA or MSLB. At some plants, both a high containment pressure signal and an SIAS have to actuate to provide the required protection. This configuration reduces the likelihood of inadvertent containment spray.~~

~~3 .Containment Isolation Actuation Signal~~

~~The CIAS actuates the Containment Isolation System, ensuring acceptable consequences during LOCAs and MSLBs or FWLBs (inside containment). To provide protection, a high containment pressure signal will initiate CIAS at the same setpoint at which an SIAS is initiated.~~

~~4. Main Steam Isolation Signal~~

~~The MSIS ensures acceptable consequences during an MSLB or FWLB by isolating both steam generators if either generator indicates a low steam generator pressure. The MSIS, concurrent with or following a~~

~~BASES~~

~~reactor trip, minimizes the rate of heat extraction and subsequent cooldown of the RCS during these events.~~

~~5. Recirculation Actuation Signal~~

~~At the end of the injection phase of a LOCA, the refueling water tank (RWT) will be nearly empty. Continued cooling must be provided by the ECCS to remove decay heat. The source of water for the ECCS pumps is automatically switched to the containment recirculation sump. Switchover from RWT to containment sump must occur before the RWT empties to prevent damage to the ECCS pumps and a loss of core cooling capability. For similar reasons, switchover must not occur before there is sufficient water in the containment sump to support pump suction. Furthermore, early switchover must not occur to ensure sufficient borated water is injected from the RWT to ensure the reactor remains shut down in the recirculation mode. An RWT Level — Low signal initiates the RAS.~~

~~6. Auxiliary Feedwater Actuation Signal~~

~~An AFAS initiates feedwater flow to both steam generators if a low level is indicated in either steam generator, unless the generator is ruptured.~~

~~The AFAS maintains a steam generator heat sink during the following events:~~

- ~~MSLB;~~
- ~~FWLB;~~
- ~~Inadvertent opening of a steam generator atmospheric dump valve; and~~
- ~~Loss of feedwater.~~

~~A low steam generator water level signal will initiate auxiliary feed to the affected steam generator.~~

~~Secondary steam generator (SG) differential pressure (SG-A > SG-B) or (SG-B > SG-A) inhibits auxiliary feed to a generator identified as being ruptured. This input to the AFAS logic prevents loss of the intact generator while preventing feeding a ruptured generator during MSLBs and FWLBs. This prevents containment overpressurization during these events.~~

~~APPLICABLE SAFETY ANALYSES~~

~~6. Auxiliary Feedwater Actuation Signal (continued)~~

~~The ESFAS satisfies Criterion 3 of the NRC Policy Statement.~~

~~BASES~~

ESF Logic and Manual Initiation Functions are required to be OPERABLE in MODES 1, 2, and 3, when the associated automatic initiation channels addressed by LCO 3.3.3 are required.

The manual initiation is not required by the accident analysis. The ESF logic must function in all situations where the ESF function is required.

LCO

The LCO requires that all components necessary to provide an ESF actuation be OPERABLE.

The Bases for the LCO on ESF automatic actuation Functions are addressed in LCO 3.3.3. Those associated with the Manual initiation or Actuation Logic are addressed by this LCO.

ESF Logic and Manual Initiation Functions are required to be OPERABLE in MODES 1, 2, and 3, when the associated automatic initiation channels addressed by LCO 3.3.3 are required.

~~LCO~~

~~The LCO requires that all components necessary to provide an ESFAS actuation be OPERABLE.~~

~~Actions allow maintenance bypass of individual channels. Plants are restricted to 48 hours in a maintenance bypass condition before either restoring the Function to four channel operation (two-out-of-four logic) or placing the channel in trip (one-out-of-three logic).~~

~~The Bases for the LCO on ESFAS automatic actuation Functions are addressed in LCO 3.3.4. Those associated with the Manual Trip or Actuation Logic are addressed below.~~

1. <u>Safety Injection Signal</u>

SIS is actuated by manual initiation, by a CHP signal, or by 2 out of 4 Pressurizer Pressure channels decreasing below the setpoint. SIS initiates the following actions:

a) Start HPSI & LPSI pumps
b) Enable Containment Spray Pump Start on CHP
c) Initiate Safety Injection Valve operations

Each Manual Initiation channel consists of one pushbutton which directly starts the SIS actuation logic for the associated train.

The Low Pressurizer Pressure signal for each SIS train can be blocked when 3 out of 4 channels indicate below 1700 psia. This block prevents undesired actuation of SIS during a normal plant cooldown.

~~BASES~~

The block signal is automatically removed when 2 out of 4 channels exceed the setpoint.

The pressurizer pressure instrument channels which provide input to SIS are the same channels which provide an input to the RPS. The RPS receives an analog signal from each Pressurizer Pressure channel; each SIS initiation logic train receives a binary signal from a group of four relays, each actuated by a bistable in one of the four instrument channels. These instrument channels are addressed by LCO 3.3.3. The contacts of these relays are wired into a 2 out of 4 logic. It is the output of this pressurizer pressure 2 out of four logic circuit that is blocked during plant cooldowns, and subject to this LCO. A similar arrangement of bistables and relays provide the pressurizer low pressure block permissive signal. The initiation and block circuits are illustrated in reference 4.

Each SIS logic train is also actuated by a contact pair on one of the CHP initiation relays for the associated CHP train.

Each train of SIS actuation logic consists of a group of "SIS" relays which energize and seal in when the initiation logic is satisfied. These SIS relays actuate alarms and control functions. One of the control functions selects between an immediate actuation circuit, if offsite power is available, and a time sequenced actuation circuit, if only diesel power is available. These actuation circuits initiate motor operated valve opening and pump starting. The SIS actuation logic is illustrated in reference 4.

a. Manual Initiation

This LCO requires two channels of SIS Manual Initiation to be OPERABLE..

b .Actuation Logic

This LCO requires two channels of SIS Actuation Logic to be OPERABLE.

Failures in the actuation subsystems, including the manual bypass switches,

~~1. Safety Injection Actuation Signal~~

~~a. Manual Trip~~

~~This LCO requires two channels of SIAS Manual Trip to be OPERABLE in MODES 1, 2, 3, and 4.~~

~~BASES~~

~~b. Actuation Logic~~

~~This LCO requires two channels of SIAS Actuation Logic to be OPERABLE in MODES 1, 2, 3, and 4.~~

~~Failures in the actuation subsystems, including the manual bypass key switches,~~ are Actuation Logic failures and are addressed in this LCO.

(continued)

LCO (continued)

c. CHP Logic Trains

The CHP initiation relay input to the SIS logic is considered part of the SIS logic. Two channels, one per SIS train, must therefore be OPERABLE.

2. Containment High Pressure

CHP is actuated by 2 out of 4 pressure switches for the associated train reaching their setpoints. CHP initiates the following actions:

a) Containment Spray
b) Safety Injection Signal
c) Main Feedwater Isolation
d) Main Steam Line Isolation
e) Control Room HVAC Emergency Mode
f) Close Containment Isolation Valves

Eight containment pressure channels are provided. Each channel consists of one pressure sensing bellows which actuates two micro-switches. Four of these sixteen micro-switches provide input to the RPS; the remainder are divided into two circuits of 2 out of 4 logic for the CHP logic trains.

Each CHP logic train consists of an arrangement of six micro-switch contacts and a test relay which energize a group of "5P" relays when the 2 out of 4 logic is satisfied. The CHP logic is illustrated in reference 7. CHP may also be initiated manually, by individual component actuation.

a. Manual Initiation

This LCO requires two channels of CHP manual initiation to be OPERABLE.

a. Actuation Logic

~~BASES~~

This LCO requires two channels of CHP Actuation Logic to be OPERABLE.

~~LCO (continued)~~

~~2. Containment Spray Actuation Signal~~

~~CSAS is initiated either manually or automatically. At many plants it is also necessary to have an automatic or manual SIAS for a complete actuation. The SIAS opens the containment spray valves, whereas the CSAS actuates other required components. The SIAS requirement should always be satisfied on a legitimate CSAS, since the Containment Pressure — High signal used in the SIAS is the same setpoint used in the CSAS. The transmitters used to initiate CSAS are independent of those used in the SIAS to prevent inadvertent containment spray due to failures in two sensor channels.~~

~~a. a. Manual Trip~~

~~This LCO requires two channels of CSAS Manual Trip to be OPERABLE in MODES 1, 2, 3, and 4.~~

~~b. Actuation Logic~~

~~This LCO requires two channels of CSAS Actuation Logic to be OPERABLE in MODES 1, 2, 3, and 4.~~

~~Actuation Logic consists of all circuitry housed within the actuation subsystems, including the initiating relay contacts responsible for actuating the ESF equipment.~~

~~3. Containment Isolation Actuation Signal~~

~~a. Manual Trip~~

~~This LCO requires two channels of CIAS Manual Trip to be OPERABLE in MODES 1, 2, 3, and 4.~~

~~b. Actuation Logic~~

~~This LCO requires two channels of Actuation Logic for CIAS to be OPERABLE in MODES 1, 2, 3, and 4.~~

~~Actuation Logic consists of all circuitry housed within the actuation subsystems, including the initiating relay contacts responsible for actuating the ESF equipment.~~

~~BASES~~

3. Containment High Radiation

CHR is actuated by manual action or, during normal operation, by 2 out of 4 radiation monitors above their respective setpoints. During refueling operations the CHR actuation is manually switched to include an additional actuation on 1 of 2 low range radiation monitors at a much lower setpoint. CHR initiates the following actions:

(continued)

~~BASES~~

LCO (continued)

a) Control Room HVAC Emergency Mode
b) Close Containment Isolation Valves
c) Block automatic starting of ECCS pump room sump pumps

The containment area radiation monitors which actuate CHR each de-energize an output relay upon reaching their setpoint. The output contacts of these relays are arranged into two trains of 2 out of 4 logic. Two manual controls each de-energize two of these relays, initiating both trains of CHR.

When either train of 2 out of 4 logic is satisfied, a group of "5R" relays energize to initiate CHR actions. The CHR logic is illustrated in reference 8.

a. Manual Initiation

This LCO requires two channels of CHR Manual Initiation to be OPERABLE.

b. Actuation Logic

This LCO requires two channels of CHR Actuation Logic to be OPERABLE.

4. Steam Generator Low Pressure

One SGLP circuit is provided for each steam generator. Each SGLP circuit is actuated by 2 out of 4 pressure channels on the associated steam generator reaching their setpoint. SGLP initiates the following actions:

a) Close the associated Feedwater Regulating valve and its bypass.

b) Close both Main Steam Isolation Valves (MSIVs).

The steam generator pressure instrument channels which provide input to SGLP are the same channels which provide an input to the RPS. Both the SGLP logic and the RPS receive analog signals from the instrument channel, and both have their own bistables to initiate actuation on low pressure.

(continued)

LCO The SGLP signal from each steam generator may be blocked when 3

~~BASES~~

(continued)

of the 4 steam pressure channels indicate below 550 psia. This block prevents undesired actuation during a normal plant cooldown. The block signal is automatically removed when steam pressure exceeds the setpoint.

Each SGLP logic is made up of output contacts from four pressure bistables from the associated steam generator. When the logic circuit is satisfied, two relays are energized to actuate steam and feedwater line isolation. A similar logic circuit is provided for each block circuit. The block is automatically removed when the steam pressure exceeds 550 psig. SGLP logic is illustrated in reference 9.

Two MSIV manual close handswitchess are provided in the control room. Depressing either pushbutton will close both MSIVs. The feedwater regulating and bypass valves must be manually closed by individual component controls.

a. Manual Initiation

This LCO requires two channels of SGLP Manual Initiation to be OPERABLE.

b. Actuation Logic

This LCO requires two channels of SGLP Actuation Logic to be OPERABLE.

~~4. Main Steam Isolation Signal~~

~~a. Manual Trip~~

~~This LCO requires two channels per steam generator of the MSIS Manual Trip to be OPERABLE in MODES 1, 2, 3, and 4.~~

~~b. Actuation Logic~~

~~This LCO requires two channels of MSIS Actuation Logic to be OPERABLE in MODES 1, 2, 3, and 4.~~

~~Failures in the actuation subsystems, including the manual bypass key switches, are considered Actuation Logic failures and are addressed in the logic LCO.~~

~~BASES~~

5. Auxiliary Feedwater Actuation Signal

AFAS is actuated by manual action or by 2 out of 4 level sensors on either steam generator reaching their setpoints. Manual actuation of Auxiliary Feedwater may be accomplished through pushbutton actuation of each AFAS channel or by use of individual pump and valve controls. Each AFAS channel starts the associated AFW pump(s) and opens the associated flow control valves.

The steam generator level instrument channels which provide input to AFAS are the same channels which provide an input to the RPS. Both the AFAS cabinets and the RPS receive analog signals from the instrument channel, and both have their own bistables to initiate actuation on low level.

Each AFAS train contains a 2 out of 4 logic for each steam generator. One AFAS logic train actuates motor driven AFW pump P-8A and turbine driven pump P-8B and the associated flow control valves; the other actuates motor driven pump P-8C and the associated valves. Each train provides flow to both steam generators. The AFAS logic uses solid state logic circuits. It is illustrated in reference 6.

a. Manual Initiation

This LCO requires two channels of AFAS Manual Trip to be OPERABLE.

b. Actuation Logic

This LCO requires two channels of AFAS Actuation Logic to be OPERABLE.

(continued)

~~BASES~~

~~Actuation Logic consists of all circuitry housed within the actuation subsystems, including the initiating relay contacts responsible for actuating the ESF equipment.~~

~~6. Auxiliary Feedwater Actuation Signal~~

~~A low level in either generator, as sensed by a two-out-of-four coincidence of four wide range sensors for each generator, will generate an auxiliary feedwater actuation signal (AFAS), which starts both trains of auxiliary feedwater (AFW) pumps and feeds both steam generators. The AFAS also monitors the secondary differential pressure in both steam generators and initiates an AFAS block signal to a ruptured generator if the pressure in that generator is lower than the other generator by the differential pressure setpoint.~~

~~a. Manual Trip~~

~~This LCO requires two channels of AFAS Manual Trip to be OPERABLE in MODES 1, 2, and 3.~~

~~b. Actuation Logic~~

~~This LCO requires two channels of AFAS Actuation Logic to be OPERABLE in MODES 1, 2, and 3.~~

~~Actuation Logic consists of all circuitry housed within the actuation subsystems, including the initiating relay contacts responsible for actuating the ESF equipment.~~

LCO
(continued)

6. Recirculation Actuation Signal

RAS is actuated by manually actuating the circuit "Test" switch or by two of the four level sensors in the SIRWT reaching their setpoints. RAS initiates the following actions:

a) Trip LPSI pumps (this trip can be manually bypassed)

b) Switch HPSI & Spray suction from SIRWT to Containment Sump

c) Adjust cooling water to Shutdown Cooling Heat Exchangers

The four SIRWT level sensors each de-energize two relays, one per logic train, when tank level reaches the setpoint. Each channel of level sensor and associated output relays is powered from a different Preferred AC bus. Two Preferred AC buses are powered, through

~~BASES~~

inverters, from each station battery. The manual RAS control for each train de-energizes two of these relays, initiating RAS through the logic train.

Each train of RAS logic consists of the output contacts of the relays actuated by the level switches arranged in a "1 out of 2 taken twice" logic. The contacts are arranged so that at least one low level signal powered from each station battery is required to initiate RAS. Loss of a single battery, therefore, cannot either cause or prevent RAS initiation. When the logic is satisfied, two DC relays are energized to initiate RAS actions and alarms. The RAS logic is illustrated in reference 5.

a. Manual Initiation

This LCO requires two channels of RAS Manual Initiation to be OPERABLE.

b. Actuation Logic

This LCO requires two channels of RAS Actuation Logic to be OPERABLE.

~~5. Recirculation Actuation Signal~~

~~a. Manual Trip~~

~~This LCO requires two channels of RAS Manual Trip to be OPERABLE in MODES 1, 2, 3, and 4.~~

~~b. Actuation Logic~~

~~This LCO requires two channels of RAS Actuation Logic to be OPERABLE in MODES 1, 2, 3, and 4.~~

Actuation Logic consists of all circuitry housed within the actuation subsystems, including the initiating relay contacts responsible for actuating the ESF equipment.

(continued)

~~BASES~~

APPLICABILITY

All ESF ~~ESFAS~~ Functions are required to be OPERABLE in MODES 1, 2, and 3. In MODES 1, 2, and 3, there is sufficient energy in the primary and secondary systems to warrant automatic ESF System responses to:

- Close the MSIVs to preclude a positive reactivity addition;
- Actuate AFW to preclude the loss of the steam generators as a heat sink (in the event the normal feedwater system is not available);
- Actuate ESF systems to prevent or limit the release of fission product radioactivity to the environment by isolating containment and limiting the containment pressure from exceeding the containment design pressure during a design basis LOCA or MSLB; and
- Actuate ESF systems to ensure sufficient borated inventory to permit adequate core cooling and reactivity control during a LOCA or MSLB accident

In MODES 4, 5, and 6, automatic actuation of ESFAS Functions is not required, because adequate time is available for plant operators to evaluate plant conditions and respond by manually operating the ESF components if required.

ESF Manual Isolation capability is retained on a component actuation level in MODE 4 by LCO 3.6.3, "Containment Isolation Valves"

The ESF Actuation Logic must be OPERABLE in the same MODES as the Automatic and Manual Initiation Functions.

~~[ESFAS Manual Trip capability is required for Functions other than AFAS in MODE 4 even though automatic actuation is not required. ESFAS Manual Trip capability is required for Functions other than AFAS in MODE 4 even though automatic actuation is not required. Because of the large number of components actuated on each ESFAS, actuation is simplified by the use of the Manual Trip push buttons. Manual Trip of AFAS is not required in MODE 4 because AFW or shutdown cooling will already be in operation in this MODE.~~

The ESF ~~ESFAS~~ Actuation Logic must be OPERABLE in the same MODES as the Automatic and Manual Trips. In MODE 4, only the portion of the ESFAS logic responsible for the required Manual Trip must be OPERABLE.

In MODES 5 and 6, ESF ~~ESFAS~~ initiated systems are either reconfigured or disabled for shutdown cooling operation. Accidents in these MODES are slow to develop and would be mitigated by manual operation of individual components.

~~BASES~~

(continued)

ACTIONS

When the number of inoperable channels in a trip Function exceeds those specified in any related Condition associated with the same trip Function, then the plant is outside the safety analysis. Therefore, LCO 3.0.3 should be immediately entered, if applicable in the current MODE of operation.

A Note has been added to the ACTIONS to clarify the application of the Completion Time rules. The Conditions of this Specification may be entered independently for each Function in Table 3.3.5-1 in the LCO. Completion Times for the inoperable channel of a Function will be tracked separately.

A.1

Condition A applies to one Manual Initiation or Actuation Logic channel inoperable. The channel must be restored to OPERABLE status to restore redundancy of the affected Functions. The 48 hour Completion Time is commensurate with the importance of avoiding the vulnerability of a single failure in the only remaining OPERABLE channel.

ACTIONS ~~(continued)~~

~~A.1~~

~~Condition A applies to one AFAS Manual Trip or AFAS Actuation Logic channel inoperable. It is identical to Condition C for the other ESFAS Functions, except for the shutdown track imposed by Condition D.~~

~~The channel must be restored to OPERABLE status to restore redundancy of the AFAS Function.The channel must be restored to O PERABLE status to restore redundancy of the AFAS Function. The channel must be restored to OPERABLE status to restore redundancy of the AFAS Function. The 48 hour Completion Time is commensurate with the importance of avoiding the vulnerability of a single failure in the only remaining OPERABLE channel.~~

B.1 and B.2

Condition B is entered when the Required Action and associated Completion Time of Condition A are not met. If Required Action A.1 ~~the Required Action and associated Completion Time of Condition A~~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 4 within 30 hours 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.

~~BASES~~

~~C.1~~

~~Condition C applies to one Manual Trip or Actuation Logic channel inoperable for those ESFAS Functions that must be OPERABLE in MODES 1, 2, 3, and 4 (all Functions except AFAS). The shutdown track imposed by Condition D requires entry into MODE 5, where the LCO does not apply to the affected Functions.~~

~~Condition D is entered when the Required Action and associated Completion Time of Condition C are not met. If Required Action C.~~

SURVEILLANCE REQUIREMENTS

SR 3.3.4.1

A CHANNEL FUNCTIONAL TEST is performed performed each 92 days on the AFAS logic circuits using the installed test circuits to ensure the entire channel will perform its intended function when needed.

~~SURVEILLANCE REQUIREMENTS~~

~~SR 3.3.5.1~~

~~A CHANNEL FUNCTIONAL TEST is performed every 92 days to ensure the entire channel will perform its intended function when needed.~~ Sensor subsystem tests are addressed in LCO 3.3.3~~.4.~~ This SR addresses Actuation Logic tests.

~~Actuation Logic Tests~~

~~Actuation subsystem testing includes injecting one trip signal into each two-out-of-four logic subsystem in each ESFAS Function and using a bistable trip input to satisfy the trip logic. Initiation relays associated with the affected channel will then actuate the individual ESFAS components. Since each ESFAS Function employs subchannels of Actuation Logic, it is possible to actuate individual components without actuating an entire ESFAS Function.~~

~~Note 1 requires that Actuation Logic tests include operation of initiation relays. Note 2 allows deferred at power testing of certain relays to allow for the fact that operating certain relays during power operation could cause plant transients or equipment damage. Those initiation relays that cannot be tested at power must be tested in accordance with Note 2. These include SIAS No. 5, SIAS No. 10, CIAS No. 5, and MSIS No. 1.~~

~~BASES~~

~~These relays actuate the following components, which cannot be tested at power:~~

- ~~RCP seal bleedoff isolation valves;~~

~~SURVEILLANCE REQUIREMENTS~~

~~Actuation Logic Tests (continued)~~

- ~~Service water isolation valves;~~
- ~~VCT discharge valves;~~
- ~~Letdown stop valves;~~
- ~~CCW to and from the RCPs;~~
- ~~MSIVs and feedwater isolation valves; and~~
- ~~Instrument air containment isolation valves.~~

~~The reasons that each of the above cannot be fully tested at power are stated in Reference 1.~~

~~These tests verify that the ESFAS is capable of performing its intended function, from bistable input through the actuated components.~~

The Frequency of [92] days is based on the reliability analysis presented in topical report CEN-327, "RPS/ESFAS Extended Test Interval Evaluation" (Ref. 2).

(continued)

SURVEILLANCE REQUIREMENTS (continued)

SR 3.3.4.2

A CHANNEL FUNCTIONAL TEST is performed each 92 days on the SIS logic circuits using the installed test circuits. Logic for SIS both with and without offsite power must be tested. When testing the "without power" circuits, proper operation of the DBA sequence and the associated logic circuit must be verified. The test circuits are designed to block those SIS functions, such as injection of concentrated boric acid, which would interfere with plant operation. This frequency is acceptable since the test may be performed at power, and the logic circuitry is not subject to drift.

SR 3.3.4.3

A CHANNEL FUNCTIONAL TEST is performed on the manual ESF Initiation Channel every 18 months, providing manual initiation of the Function. This may be performed as part of the Logic CHANNEL FUNCTIONAL TEST, SR 3.3.4.4.

~~BASES~~

This Surveillance verifies that the trip push buttons or switches are capable of opening contacts in the Actuation Logic as designed, providing Manual Trip of the Function. The 18 month Frequency is based on the need to perform this Surveillance under the conditions that apply during a plant outage and the potential for an unplanned transient if the Surveillance were performed with the reactor at power. Operating experience has shown these components usually pass the Surveillance when performed at a Frequency of once every 18 months.

SR 3.3.4.4

A CHANNEL FUNCTIONAL TEST is performed on each ESF Logic Channel every 18 months. This shall verify all automatic actuations and the automatic resetting capability of the Low Pressure bypass on the SIS Low Pressure block and SGLP Block circuitry. This may be as part of the Manual Initiation CHANNEL FUNCTIONAL TEST, SR 3.3.4.3.

In the SIS circuit, the complete SIS actuation logic is tested by inserting an actual or simulated low pressure input into the Pressurizer Pressure channels feeding the SIS actuation logic and verify that all normal automatic operations occur as designed.

The 18 month Frequency is based on the need to perform this Surveillance under the conditions that apply during a plant outage and the potential for an unplanned transient if the Surveillance were performed with the reactor at power. Operating experience has shown these components usually pass the Surveillance when performed at a Frequency of once every 18 months.

(continued)

~~SR 3.3.5.2~~

~~A CHANNEL FUNCTIONAL TEST is performed on the manual ESFAS actuation circuitry, de-energizing relays and providing Manual Trip of the Function.~~

~~This Surveillance verifies that the trip push buttons are capable of opening contacts in the Actuation Logic as designed, de-energizing the initiation relays and providing Manual Trip of the Function. The [18] month Frequency is based on the need to perform this Surveillance under the conditions that apply during a plant outage and the potential for an unplanned transient if the Surveillance were performed with the reactor at power. Operating experience has shown these components usually pass the Surveillance when performed at a Frequency of once every [18] months.~~

~~BASES~~

REFERENCES

1. FSAR, Section 7.3. ~~Section [7.3].~~
2. CEN-327, June 2, 1986, including Supplement 1, March 3, 1989.
3. FSAR Appendix 7A, Engineered Safeguards Testing.
4. Logic Diagram Safety Injection Initiation, E-17, Sh 3
5. Logic Diagram SIS Test and RAS E-17, Sh 5
6. Updated FSAR, Figure 7-37
7. Logic Diagram, Containment High Pressure E-17, Sh 6
8. Logic Diagram, Containment High Radiation E-17, Sh 7
9. Logic Diagram, SG Low Pressure and MSIS E-17, Sh 20

]

B 3.3 INSTRUMENTATION

B 3.3.5 Diesel Generator (DG) - UV Start (UV Start) ~~— Loss of Voltage Start (LOVS) (Analog)~~

BASES

BACKGROUND

The DGs provide a source of emergency power when offsite power is either unavailable or insufficiently stable to allow safe plant operation. Undervoltage protection will generate a UV Start in the event a Loss of Voltage or Degraded Voltage condition occurs. There are two UV Start Functions for each 2.4 kV vital bus 1C and 1D.

Voltage protection and load shedding features for safety-related buses at the 2,400 volt and lower voltage levels are designed in accordance with 10 CFR 50, Appendix A, General Design Criterion 17 (Reference 5) and the following features:

Undervoltage protection will generate a LOVS in the event a Loss of Voltage or Degraded Voltage condition occurs. There are two LOVS Functions for each 4.16 kV vital bus.

Four undervoltage relays with inverse time characteristics are provided on each 4.16 kV Class 1E instrument bus for the purpose of detecting a sustained undervoltage condition or a loss of bus voltage. The relays are combined in a two-out-of-four logic to generate a LOVS if the voltage is below 75% for a short time or below 90% for a long time. The LOVS initiated actions are described in Reference 1.

1. Two levels of automatic voltage protection from loss or degradation of offsite power sources are provided. The first level (loss of voltage) provides normal loss of voltage protection. The second level of protection (degraded voltage) has voltage and time delay set points selected for automatic trip of the offsite sources to protect safety-related equipment from sustained degraded voltage conditions at all bus voltage levels. Coincidence logic is provided to preclude spurious trips.

2. The voltage protection system automatically prevents load shedding of the safety-related buses when the emergency generators are supplying power to the safeguards loads.

3. Control circuits for shedding of Class 1E and Nonclass 1E loads during a Loss of Coolant Accident themselves are Class 1E or are separated electrically from the Class 1E portions.

(continued)

BACKGROUND (continued)

Description

Each 2,400 volt Bus 1C and 1D is equipped with two levels of voltage protection relays. The first level (loss of voltage) Relays 127-1 and 127-2 are set at approximately 77% of rated voltage with an inverse time relay. Each of these relays measures voltage on all three phases, and protects against sudden loss of voltage as sensed on the corresponding bus using a three out of three coincidence logic. The actuation of these relays will trip their respective incoming bus circuit breakers, start both emergency generators, initiate bus load shed, and activate annunciators in the control room. The emergency generator circuit breaker is closed automatically upon establishment of satisfactory voltage and frequency by the use of voltage protection Relays 127D-1 and/or 127D-2.

The second level of voltage protection (degraded voltage) undervoltage Relays 127-7 and 127-8 are set at approximately 92% of rated voltage, with each relay monitoring all three phases on its respective bus. . These relays protect against sustained degraded voltage conditions on the corresponding bus using a three-out-of-three coincidence logic. These relays have a built-in 0.5 second time delay, after which both emergency generators will receive a start signal and activate annunciators in the control room. If a bus undervoltage exists after an additional six seconds, then the respective incoming bus circuit breaker will be tripped and a bus load shed will be initiated.

~~"AC Sources — Shutdown." The LOVS supports safety systems associated with the ESFAS. In MODES 5 and 6, the four channels must be OPERABLE whenever the associated DG is required to be OPERABLE to ensure that the automatic start of the DG is available when needed.~~

~~Actions allow maintenance (trip channel) bypass of individual channels. Plants are restricted to 48 hours in a trip channel bypass condition before either restoring the Function to four channel operation (two-out-of-four logic) or placing the channel in trip (one-out-of-three logic). At plants where adequate channel to channel independence has been demonstrated, specific exceptions have been approved by the NRC staff to permit one of the two-out-of-four channels to be bypassed for an extended period of time.~~

~~Loss of LOVS Function could result in the delay of safety system initiation when required.~~

(continued)

BACKGROUND

Trip Setpoints and Allowable Values

~~(continued)~~

~~BASES~~

(continued)

~~Trip Setpoints and Allowable Values~~

The trip setpoints and Allowable Values are based on the analytical limits presented in Reference 3 and justified in Reference 9 ~~2~~. The selection of these trip setpoints is such that adequate protection is provided when all sensor and processing time delays are taken into account. To allow for calibration tolerances, instrumentation uncertainties, and instrument drift, Allowable Values specified in SR 3.3.5.1 ~~6.3~~ are conservatively adjusted with respect to the analytical limits. A detailed analysis of the degraded voltage setpoints is provided in References 6 and 7. ~~description of the methodology used to calculate the trip setpoints, including their explicit uncertainties, is provided in **Reference 3**. The actual nominal trip setpoint is normally still more conservative than that required by the plant specific setpoint calculations~~. If the measured setpoint does not exceed the documented surveillance trip acceptance criteria, the undervoltage relay is considered OPERABLE.

~~Setpoints in accordance with the Allowable Values will ensure that the consequences of accidents will be acceptable, providing the plant is operated from within the LCOs at the onset of the accident and the equipment functions as designed.~~

~~The undervoltage protection scheme has been designed to protect the plant from spurious trips caused by the offsite power source. This is made possible by the inverse voltage time characteristics of the relays used. A complete loss of offsite power will result in approximately a 1 second delay in LOVS actuation. The DG starts and is available to accept loads within a 10 second time interval on the Engineered Safety Features Actuation System (ESFAS) or LOVS. Emergency power is established within the maximum time delay assumed for each event analyzed in the accident analysis (Ref. 2).~~

~~Since there are four protective channels in a two-out-of-four trip logic for each division of the 4.16 kV power supply, no single failure will cause or prevent protective system actuation. This arrangement meets IEEE Standard 279-1971 criteria (Ref. 4).~~

APPLICABLE The DG - UV Trip is required for Engineered Safety Features

~~(continued)~~

~~BASES~~

~~APPLICABLE~~ SAFETY ANALYSES

~~The DG — LOVS is required for Engineered Safety Features~~ (ESF) systems to function in any accident with a loss of offsite power. Its design basis is that of the ESF. ~~Its design basis is that of the ESFAS.~~

Accident analyses credit the loading of the DG based on a loss of offsite power during a loss of coolant accident. The diesel loading has been included in the delay time associated with each safety system component requiring DG supplied power following a loss of offsite power. ~~. [The analysis assumes a nonmechanistic DG loading. The actual DG start has historically been associated with the ESFAS actuation. which does not explicitly account for each individual component of the loss of power detection and subsequent actions.~~ This delay time includes contributions from the DG start, DG loading, and Safety Injection System component actuation.

(continued)

APPLICABLE SAFETY ANALYSES (continued)

The required channels of DG UV Start, ~~LOVS,~~ in conjunction with the ESF systems powered from the DGs, provide plant protection in the event of any of the analyzed accidents discussed in Reference 2, in which a loss of offsite power is assumed. DG UV Start ~~LOVS~~ channels are required to meet the redundancy and testability requirements of GDC 21 in 10 CFR 50, Appendix A(Ref. 4) ~~(Ref. 5)~~

~~The delay times assumed in the safety analysis for the ESF equipment include the [10] second DG start delay and the appropriate sequencing delay, if applicable. The response times for ESFAS actuated equipment include the appropriate DG loading and sequencing delay.~~

~~The DG - UV Start LOVS channels satisfy Criterion 3 of the NRC Policy Statement.~~

LCO

The LCO for the DG UV Start requires that all three ~~four~~ channels (phases) per bus of each UV Start ~~LOVS~~ instrumentation Function be OPERABLE ~~in MODES 1, 2, 3, and 4 and~~ when the associated DG is required to be OPERABLE ~~by LCO 3.8.2, "AC Sources-Shutdown".~~ The UV Start ~~LOVS~~ supports safety systems associated with the ESF ~~ESFAS~~ actuation.

~~(continued)~~

~~BASES~~

~~Actuation In MODE 5 or 6 is required whenever the required DG must be OPERABLE to assure the automatic start of the DG is available when needed.~~

Actions require that in the event one or more sensor channels becomes inoperable, the associated DG must be declared inoperable. The three out of three logic is intolerant of component failures, and there is no readily available means of bypassing a failed channel.

Loss of DG UV Start Function could result in the delay of safety system initiation when required.

This could lead to unacceptable consequences during accidents. During the loss of offsite power, which is an anticipated operational occurrence, the DG powers the motor driven auxiliary feedwater pumps. Failure of these pumps to start would leave only the one turbine driven pump as well as an increased potential for a loss of decay heat removal through the secondary system.

Only Allowable Values are specified for each Function in the LCO. Nominal trip setpoints are specified in the plant specific setpoint calculations. The nominal setpoints are selected to ensure that the setpoint measured by CHANNEL FUNCTIONAL TESTS does not exceed the Allowable Value if the bistable is performing as required. . Operation with a trip setpoint less conservative than the nominal trip setpoint, but within the Allowable Value, is acceptable, provided that operation and testing are consistent with the assumptions of the plant specific setpoint calculation. A channel is inoperable if its actual trip setpoint is not within its required Allowable Value.

The Bases for the Allowable Values and trip setpoints are as follows:

The voltage trip set point has been set low enough such that spurious trips of the offsite source due to operation of the undervoltage relays are not expected for any combination of unit loads and normal grid voltages.

(continued)

~~(continued)~~

~~BASES~~

LCO (continued)

This set point at the 2,400 volt bus and reflected down to the 480 volt buses has been verified through an analysis to be greater than the minimum allowable motor voltage (90% of nominal voltage). Motors are the most limiting equipment in the system. MCC contactor pickup and drop-out voltage is also adequate at the set-point values. The analysis ensured that the distribution system is capable of starting and operating all safety-related equipment within the equipment voltage rating at the allowed source voltages. The power distribution system model used in the analysis has been verified by actual testing. (References 8,9).

The time delays involved will not cause any thermal damage as the set points are within voltage ranges for sustained operation. They are long enough to preclude trip of the offsite source caused by the starting of large motors and yet do not exceed the time limits of safeguards actuation assumed in Chapter 14 (Reference 2) and validated by Reference 10..

Calibration of the undervoltage relays verify that the time delay is sufficient to avoid spurious trips.

APPLICABILITY

The DG - UV Start actuation Function is required in MODES 1, 2, and 3,~~MODES 1, 2, 3, and 4~~ because ESF Functions are designed to provide protection in these MODES. Actuation in MODE 4, 5 or 6 ~~5 or 6~~ is required whenever the required DG must be OPERABLE~~,~~ so that it can perform its function on a loss of power or degraded power to the vital bus.

ACTIONS

A DG UV Start~~A LOVS~~ channel is inoperable when it does not satisfy the OPERABILITY criteria for the channel's Function~~.~~ T~~he most common cause of channel inoperability is outright failure or drift of the bistable or process module sufficient to exceed the tolerance allowed by the plant specific setpoint analysis. Typically, the drift is found to be small and results in a delay of actuation rather than a total loss of function. Determination of setpoint drift is generally made during the performance of a CHANNEL FUNCTIONAL TEST when the instrument is set up for adjustment to bring it within specification. If the actual trip setpoint is not within the Allowable Value, the channel is inoperable and the appropriate Conditions must be entered.~~

In the event a channel's trip setpoint is found nonconservative with respect to the Allowable Value, or the channel is found inoperable, then all affected Functions provided by that channel must be declared inoperable and the

~~(continued)~~

~~BASES~~

LCO Condition entered. The required channels are specified on a per DG basis.

~~(continued)~~

~~(continued)~~

~~BASES~~

ACTIONS (continued)

~~When the number of inoperable channels in a trip Function exceeds those specified in any related Condition associated with the same trip Function, then the plant is outside the safety analysis. Therefore, LCO 3.0.3 should be entered immediately if applicable in the current MODE of operation.~~

A Note has been added to the ACTIONS to clarify the application of Completion Time rules. The Conditions of this LCO may be entered independently for each Function. The Completion Times of the inoperable channels/trains of a Function will be tracked separately for each Function, starting from the time the Condition was entered for that Function.

A.1

Condition A applies if one or more of the three phase UV sensors od relay logic is inoperable for one or more Functions (Degraded Voltage or Loss of Voltage) per DG bus.~~1, A.2.1, and A.2.2~~

~~Condition A applies if one channel is inoperable for one or more Functions per DG bus.~~

If the channel cannot be restored to OPERABLE status, the affected DG should be declared inoperable and the appropriate Conditions entered. Because of the three out of three logic in both the loss of voltage and degraded voltage Functions, combined with the absence of readily available channel bypass capability, the most expeditious means of addressing channel failure is declarimg the channel inoperable, and effecting repair in a manner consistent with other DG failures.

Required Action A.~~, the affected channel should either be bypassed or tripped within 1 hour (Required Action A.1).~~

~~Placing this channel in either Condition ensures that logic is in a known configuration. In trip, the LOVS Logic is one-out-of-three. In bypass, the LOVS Logic is two-out-of-three. The 1 hour Completion Time is sufficient to perform these Required Actions.~~

~~Once Required Action A.1 has been complied with, Required Action A.2.1 allows [48] hours to repair the inoperable channel for those plants that have not demonstrated sufficient channel to channel independence on this Function. If the channel cannot be restored to OPERABLE status, it must be tripped in accordance with Required Action A.2.2. The time allowed to repair or trip the channel is reasonable to repair the affected channel while~~

~~(continued)~~

~~BASES~~

~~ensuring that the risk involved in operating with the inoperable channel is acceptable. The [48] hour Completion Time is based upon operating experience, which has demonstrated that a random failure of a second channel is a rare event during any given [48] hour period.~~

~~ACTIONS (continued)~~

~~B.1, B.2.1, and B.2.2~~

~~Condition B applies if two channels are inoperable for one or more Functions per DG.~~

~~The Required Action is modified by a Note stating that LCO 3.0.4 is not applicable. The Note was added to allow the changing of MODES, even though two channels are inoperable, with one channel bypassed and one tripped. In this configuration, the protection system is in a one-out-of-two logic, which is adequate to ensure that no random failure will prevent protection system operation.~~

~~Restoring at least one channel to OPERABLE status is the preferred action. If the channel cannot be restored to OPERABLE status within 1 hour, the Conditions and Required Actions for the associated DG made inoperable by DG — LOVS instrumentation are required to be entered. Alternatively, one affected channel is required to be bypassed and the other is tripped, in accordance with Required Action B.2.~~1 ensures that Required Actions for the affected DG inoperabilities are initiated. Depending upon plant MODE, the actions specified in LCO 3.8.1, "AC Sources - Operating, ~~"AC Sources — Operating,~~" or LCO 3.8.2 "AC Sources-Shutdown" are required immediately.

~~This places the Function in one-out-of-two logic. The 1 hour Completion Time is sufficient to perform the Required Actions.~~

~~Once Required Action B.2.1 has been complied with, Required Action B.2.2 allows [48] hours to repair the bypassed or inoperable channel.~~

~~After one channel is restored to OPERABLE status, the provisions of Condition A still apply to the remaining inoperable channel. Therefore, the channel that is still inoperable after completion of Required Action B.2.2 shall be placed in trip if more than [48] hours have elapsed since the initial channel failure.~~

~~(continued)~~

~~BASES~~

~~C.1~~

~~Condition C applies when more than two undervoltage or Degraded Voltage channels on a single bus are inoperable.~~

~~Required Action C.1 requires all but two channels to be restored to OPERABLE status within 1 hour. With more than two channels inoperable, the logic is not capable of providing a DG — LOVS signal for valid Loss of Voltage or Degraded Voltage conditions. The 1 hour Completion Time is~~

~~ACTIONS~~ ~~C.1 (continued)~~

~~reasonable to evaluate and take action to correct the degraded condition in an orderly manner and takes into account the low probability of an event requiring LOVS occurring during this interval.~~

~~D.1~~

~~Condition D applies if the Required Actions and associated Completion Times are not met.~~

~~Required Action D.~~

SURVEILLANCE REQUIREMENTS — The following SR applies to each DG - UV Start Function.

SR 3.3.5.1

~~SURVEILLANCE REQUIREMENTS~~ ~~The following SRs apply to each DG — LOVS Function.~~

~~SR 3.3.6.1~~

~~Performance of the CHANNEL CHECK once every 12 hours ensures that a gross failure of instrumentation has not occurred. A CHANNEL CHECK is normally a comparison of the indicated output of the potential transformers that feed the LOVS undervoltage relays. It is based on the assumption that instrument channels monitoring the same parameter should read~~

~~(continued)~~

~~BASES~~

~~SURVEILLANCE REQUIREMENTS~~

~~SR 3.3.6.1 (continued)~~

~~approximately the same value. Significant deviations between the two channels could be an indication of excessive drift in one of the channels or~~ [illegible] ~~is extremely low, the CHANNEL CHECK minimizes the chance of loss of protective~~ [illegible] ~~channels.~~

~~SR 3.3.6.2~~

~~A CHANNEL FUNCTIONAL TEST is performed every [92] days to ensure that the entire channel will perform its intended function when needed.~~

~~The Frequency of [92] days is based on plant operating experience with regard to channel OPERABILITY and drift, which demonstrates that failure of more than one channel of a given function in any [92] day Frequency is a rare event.~~
~~Any setpoint adjustment shall be consistent with the assumptions of the current plant specific setpoint analysis.~~

~~The as found and as left values must also be recorded and reviewed for consistency with the assumptions of the surveillance interval extension analysis. The requirements for this review are outlined in Reference [6].~~

~~SR 3.3.6.3~~

SR 3.3.5.1 is the performance of a CHANNEL CALIBRATION every 18 months.~~6.3 is the performance of a CHANNEL CALIBRATION every 18 months.~~ The CHANNEL CALIBRATION verifies the accuracy of each component within the instrument channel. This includes calibration of the undervoltage relays and demonstrates that the equipment falls within the specified operating characteristics defined by the manufacturer.

The Surveillance verifies that the channel responds to a measured parameter within the necessary range and accuracy.

CHANNEL CALIBRATION leaves the channel adjusted to account for instrument drift between successive calibrations to ensure that the channel

~~(continued)~~

~~BASES~~

remains operational between successive tests.. CHANNEL CALIBRATIONS must be performed consistent with the plant specific setpoint analysis.

~~[The as found and as left values must also be recorded and reviewed for consistency with the assumptions of the surveillance interval extension analysis. The requirements for this review are outlined in Reference [10].The as found and as left values must also be recorded and reviewed for consistency with the assumptions of the surveillance interval extension analysis. The requirements for this review are outlined in Reference [6].~~

~~The setpoints, as well as the response to a Loss of Voltage and Degraded Voltage test, shall include a single point verification that the trip occurs within the required delay time as shown in Reference 1. The Frequency is based upon the assumption of an 18 month calibration interval for the determination of the magnitude of equipment drift in the setpoint analysis.]~~

~~The Frequency is based upon the assumption of an [18] month calibration interval for the determination of the magnitude of equipment drift in the setpoint analysis.~~

REFERENCES

1. FSAR, Section 8.6.

2. FSAR, Chapter 14.

3. CPCo Analysis EGAD-ELEC-22

4. 10 CFR 50, Appendix A, GDC 21.

5. 10 CFR 50 Appendix A, GDC 17.

6.. CPCo Analysis EA-ELEC-VOLT-033

7. CPCo Analysis EA-ELEC-VOLT-034

8. CPCo Analysis EA-ELEC-VOLT-13

9. CPCo Analysis EA-ELEC-VOLT-17

10. CPCo Analysis A-NL-92-111.

~~(continued)~~

~~BASES~~

5. 10 CFR 50, Appendix A, GDC 21.

6. 10 CFR 50 Appendix A, GDC 17.

7. ANSI C8.4.1-1977

8. IEEE 308-1978

9. IEEE 501-1978

~~1. FSAR, Section [8.3].~~

~~2. FSAR, Chapter [15].~~

~~3. "Plant Protection System Selection of Trip Setpoint Values."~~

~~4. IEEE Standard 279-1971.~~

~~5. 10 CFR 50, Appendix A, GDC 21.~~

~~[ ]~~

B 3.3 INSTRUMENTATION

B 3.3.6. Refueling Containment High Radiation (CHR) Initiation

BASES

BACKGROUND

This LCO addresses Refueling CHR initiation. This signal provides automatic containment isolation valve closure during refueling operations, using two radiation monitors located in the refueling area of Containment. Each monitor actuates one train of CHR logic when containment radiation exceeds the setpoint. Two separate enabling keylock handswitches, one per train, enable the Refueling CHR input to the CHR logic when switched to the "Refueling" Mode. Each Refueling CHR channel, associated keylock handswitch, and initiation circuit input to the CHR logic thus forms a one-out-of-one logic input to its associated CHR actuation logic train. The Refueling CHR isolation instrumentation is separate from the CHR instrumentation addressed in LCO 3.3.3, "ESF Instrumentation". However, the Refueling CHR Instrumentation does operate the same CHR actuation relays as the two out of four CHR logic addressed in LCO 3.3.4. These include relays 5R1, 5R3, 5R5, and 5R7 for Train A, and 5R2, 5R4, 5R6, and 5R8 for Train B. This LCO is not included in LCOs 3.3.3 and 3.3.4 due to the differences in APPLICABILITY and due to the single channel nature of the Refueling CHR input. The Refueling CHR signal performs the automatic containment isolation valve closure function during refueling operations required by LCO 3.9.3, (Containment Penetrations)

The Refueling CHR Isolation provides protection from radioactive contamination in the containment in the event a fuel assembly should be severely damaged during handling.

The Refueling CHR Instrumentation will detect any abnormal amounts of radioactive material in the containment and will initiate CHR Containment Isolation to limit the release of radioactivity to the environment. The same valves are closed as on a CHR signal.

The Refueling CHR includes two independent, redundant actuation subsystems, as described above. Reference 1 describes the Refueling CHR circuitry. Reference 3 shows Refueling CHR Logic.

<u>Trip Setpoints and Allowable Values</u>

Trip setpoints used in the Refueling CHR bistables are based on the nominal values required by Reference 2, and are described in Reference 4.

BASES

(continued)

BASES

BACKGROUND (CONTINUED)

Setpoints in accordance with the Allowable Value will ensure that Safety Limits are not violated during anticipated operational occurrences (AOOs) and the consequences of Design Basis Accidents will be acceptable, providing the plant is operated from within the LCOs at the onset of the AOO or accident and the equipment functions as designed.

APPLICABLE SAFETY ANALYSIS

The Refueling CHR isolates containment in the event of a fuel handling accident. The alarm function is required by 10 CFR 70.24 (a)(2) (Reference2)

LCO

Only the Allowable Values are specified for the trip Function in the LCO. Operation with a trip setpoint less conservative than the nominal trip setpoint, but within its Allowable Value, is acceptable, provided that the difference between the nominal trip setpoint and the Allowable Value is equal to or greater than the drift allowance assumed for each trip in the transient and accident analyses.

The LCO on the radiation monitoring channels requires that both channels be OPERABLE. In addition to the Containment Refueling Radiation Monitor, this LCO also addresses the enabling keyswitch and all logic components necessary to initiate this mode of CHR Isolation. The four CHR radiation channels addressed by LCO 3.3.3, and the portion of the CHR logic addressed by LCO 3.3.4 which provides the two out of four CHR channel comparison are excluded from LCO, since these channels and logic are not necessary to accomplish the Refueling CHR Isolation function.

The Containment Radiation -Hi setpoint is specified in 10 CFR 70.24(a)(2) , as greater than 5 millirem above background, but less than 20 millirem above background. This setpoint is high enough to avoid inadvertent actuation in the event of normal background radiation fluctuations during fuel handling, but low enough to alarm and isolate the containment in the event of a fuel handling accident.

(continued)

BASES

APPLICABILITY

In MODE 5 or 6, the isolation of containment is not required to be OPERABLE. However, during CORE ALTERATIONS or during movement of irradiated fuel, there is the possibility of a fuel handling accident requiring the Containment Isolation on high radiation in containment. Accordingly, the Refueling CHR Isolation must be OPERABLE during CORE ALTERATIONS and when moving any irradiated fuel in containment.

In MODES 1, 2, and 3, both the Containment High Pressure (CHP) and CHR signals provide containment isolation as explained in LCOs 3.3.3 and 3.3.4.

ACTIONS

A Refueling CHR channel is inoperable when it does not satisfy the OPERABILITY criteria for the channel's Function.

In the event a channel's trip setpoint is found nonconservative with respect to the Allowable Value, or the associated instrument channel is found inoperable, then the Refueling CHR Function provided by that channel should be declared inoperable and LCO Condition A entered.

A.1, A.2

Condition A applies to the failure of one or both Refueling CHR channels. This failure may be in the radiation monitor, enabling keyswitch, or downstream logic. If the keyswitch is failed such that the Refueling CHR is enabled, then the Refueling CHR shall be considered OPERABLE unless otherwise incapacitated. The Required Action is to suspend CORE ALTERATIONS and suspend movement of irradiated fuel assemblies within containment. This places the plant in a condition where the LCO does not apply. The immediate completion time is justified on the basis of loss of containment isolation capability.

(continued)

BASES

SURVEILLANCE REQUIREMENTS

SR 3.3.6.1

Performance of the CHANNEL CHECK once every 24 hours ensures that a gross failure of instrumentation has not occurred. A CHANNEL CHECK is normally a comparison of the parameter indicated on one channel to a similar parameter on other channels. It is based on the assumption that instrument channels monitoring the same parameter should read approximately the same value.

Significant deviations between the two instrument channels could be an indication of excessive instrument drift in one of the channels or of something even more serious. CHANNEL CHECK will detect gross channel failure; thus, it is key to verifying the instrumentation continues to operate properly between each CHANNEL CALIBRATION.

Agreement criteria are determined by the plant staff, based on a combination of the channel instrument uncertainties, including indication and readability. If a channel is outside the criteria, it may be an indication that the transmitter or the signal processing equipment has drifted outside its limits.

The Frequency, is based on operating experience that demonstrates the rarity of channel failure. Since the probability of two random failures in redundant channels in any 24 hour period is low, the CHANNEL CHECK minimizes the chance of loss of protective function due to failure of redundant channels. The CHANNEL CHECK supplements less formal, but more frequent, checks of channel OPERABILITY during normal operational use of the displays associated with the LCO required channels.

SR 3.3.6.2

A CHANNEL FUNCTIONAL TEST is performed on each refueling CHR channel to ensure the entire channel will perform its intended function. Any setpoint adjustment shall be consistent with the assumptions of the current plant specific setpoint analysis.

The Frequency of 31 days is based on plant operating experience with regard to channel OPERABILITY and drift, which demonstrates that failure of more than one channel of a given Function in any 31 day interval is a rare event.

BASES

(continued)

BASES

SR 3.363

CHANNEL CALIBRATION is a complete check of the instrument channel including the sensor. The Surveillance verifies that the channel responds to a measured parameter within the necessary range and accuracy. CHANNEL CALIBRATION leaves the channel adjusted to account for instrument drift between successive calibrations to ensure that the channel remains operational between successive tests.

The Frequency is based upon the assumption of an 18 month calibration interval for the determination of the magnitude of equipment drift in the setpoint analysis.

REFERENCES

1. FSAR, Section 7.3.
2. 10 CFR 70.24(a)(2)
3. FSAR Figure 7-37.
4. RI-86E Basis Document

B 3.3 INSTRUMENTATION

B 3.3.7 Accident Monitoring (AM) Instrumentation
~~11 Post Accident Monitoring (PAM) Instrumentation (Analog)~~

BASES

BACKGROUND

The primary purpose of the accident monitoring (AM)~~(PAM)~~ instrumentation is to display plant variables that provide information required by the control room operators during accident situations.

This information provides the necessary support for the operator to take the manual actions, for which no automatic control is provided, that are required for safety systems to accomplish their safety Functions for Design Basis Events.

The OPERABILITY of the AM ~~PAM~~ instrumentation ensures that there is sufficient information available on selected plant parameters to monitor and assess plant status and behavior following an accident.

The availability of AM ~~PAM~~ instrumentation is important so that responses to corrective actions can be observed and the need for, and magnitude of, further actions can be determined. These essential instruments are identified by the FSAR Appendix 7C (Ref. 1) ~~plant specific documents (Ref.~~ 1) addressing the recommendations of Regulatory Guide 1.97 (Ref. 2), as required by Supplement 1 to NUREG-0737, "TMI Action Items" (Ref. 3).

Type A variables are included in this LCO because they provide the primary information required to permit the control room operator to take specific manually controlled actions, for which no automatic control is provided, that are required for safety systems to accomplish their safety functions for Design Basis Accidents (DBAs). ~~Because the list of Type A variables differs widely between plants, Table 3.3.11-1, in the accompanying LCO, contains no examples of Type A variables, except for those that may also be Category I.~~

Category I variables are the key variables deemed risk significant because they are needed to:

- Determine whether other systems important to safety are performing their intended functions;
- Provide information to the operators that will enable them to determine the potential for causing a gross breach of the barriers to radioactive release, and

* Provide information regarding the release of radioactive materials to allow for early indication of the need to initiate action necessary to protect the public and for an estimate of the magnitude of any impending threat.

(continued)

~~(continued)~~

~~BASES~~

BACKGROUND (continued)

These key variables are identified by Regulatory Guide 1.97 Parameter Summary table in FSAR Appendix 7C (Ref. ~~analyses (Ref.~~ 1). This analysis ~~These analyses~~ identified the plant specific Type A and Category I variables and provided justification for ~~deviating from the NRC proposed list of Category I variables.~~

~~Reviewer's Note: Table 3.3.11-1, in the accompanying LCO, provides a list of variables typical of those identified by plant specific Regulatory Guide 1.97 analyses. Table 3.3.11-1 in the plant specific Technical Specifications shall list all Type A and Category I variables identified by plant specific Regulatory Guide 1.97 analyses, as amended by NRC's Safety Evaluation Report (SER) (Ref. 4).~~

The specific instrument Functions listed in Table 3.3.7-1 ~~11-1~~ are discussed in the LCO Bases.

APPLICABLE SAFETY ANALYSES

The ~~AM~~ ~~PAM~~ instrumentation ensures the OPERABILITY of Regulatory Guide 1.97 Type A variables, so that the control room operating staff can:

- Perform the diagnosis specified in the emergency operating procedures. These variables are restricted to preplanned actions for the primary success path of DBAs; and
- Take the specified, preplanned, manually controlled actions, for which no automatic control is provided, that are required for safety systems to accomplish their safety functions.

APPLICABLE SAFETY ANALYSIS

The AM ~~PAM~~ instrumentation also ensures OPERABILITY of Category I,non-Type A variables. This ensures the control room operating staff can:

- Determine whether systems important to safety are performing their intended functions;
- Determine the potential for causing a gross breach of the barriers to radioactivity release;
- Determine if a gross breach of a barrier has occurred; and

~~(continued)~~

~~BASES~~

- Initiate action necessary to protect the public as well as to obtain an estimate of the magnitude of any impending threat.

~~PAM instrumentation that satisfies the definition of Type A in Regultory Guide 1.97 meets Criterion 3 of the NRC Policy Statement.~~

Category I, non-Type A ~~AM~~ ~~PAM~~ instruments are retained in the Specification because they are intended to assist operators in minimizing the consequences of accidents. Therefore, these Category I variables are important in reducing public risk.

~~(continued)~~

~~(continued)~~

~~BASES~~

LCO

LCO 3.3.7 ~~11~~ requires two OPERABLE channels for all but one Function to ensure no single failure prevents the operators from being presented with the information necessary to determine the status of the plant and to bring the plant to, and maintain it in, a safe condition following that accident.

Furthermore, provision of two channels allows a CHANNEL CHECK during the post accident phase to confirm the validity of displayed information.

The exception to the two channel requirement is Containment Isolation Valve Position. ~~More than two channels may be required at some units if the Regulatory Guide 1.97 analysis determined that failure of one PAM channel results in information ambiguity (that is, the redundant displays disagree) that could lead operators to defeat or to fail to accomplish a required safety function.~~

In this case, the important information is the status of the containment penetrations. The LCO requires one position indicator for each active containment isolation valve. This is sufficient to redundantly verify the isolation status of each isolable penetration either via indicated status of the active valve and prior knowledge of the passive valve or via system boundary status. If a normally active containment isolation valve is known to be closed and deactivated, position indication is not needed to determine status. Therefore, the position indication for valves in this state is not required to be OPERABLE.

Listed below are discussions of the specified instrument Functions in Table 3.3.7-1. Component ID's of the sensors, indicators, power supplies, displays and recorders in each instrument loop are found in Reference 1.

~~11-1. These discussions are intended as examples of what should be provided for each Function when the plant specific list is prepared.~~

1, 2 Primary Coolant System (PCS) Hot and Cold Leg

~~1.~~

~~(continued)~~

~~BASES~~

~~1.~~ ~~1.~~ ~~[Logarithmic] Neutron Flux~~

~~[Logarithmic] Neutron Flux indication is provided to verify reactor shutdown.~~

~~At this unit, the [Logarithmic] Neutron Flux PAM channels consist of the following:~~

~~2, 3.~~ ~~Reactor Coolant System (RCS) Hot and Cold Leg~~ Temperature

PCS Hot and Cold Leg Temperatures are Type B Category I variables provided for verification of core cooling and long term surveillance.

PCS outlet temperature inputs to the AM are provided by two wide range resistance elements and associated transmitters in each loop. The channels provide indication over a range of 50°F to 700°F.

~~RCS Hot and Cold Leg Temperatures are Category I variables provided for verification of core cooling and long term surveillance.~~

~~Reactor outlet temperature inputs to the PAM are provided by two fast response resistance elements and associated transmitters in each loop. The channels provide indication over a range of 32°F to 700°F.~~

(continued)

3. Wide Range Neutron Flux

Wide Range Neutron Flux indication a Type B, Category 1, and is provided to verify reactor shutdown.
The Wide Range Neutron Flux AM channels consist of the following:

LCO (continued)

4. Containment Floor Water Level

Containment wide range Floor Water Level is a Category 1 type B variable. It is provided for verification and long term surveillance of PCS integrity.

~~(continued)~~

~~BASES~~

There are separate narrow range sump level channels. However, they are Type B Category 2 instruments, and are not required as AM instrumentation.

~~Reactor Coolant System Pressure (wide range)~~

~~RCS wide range pressure is a Category I variable provided for verification of core cooling and RCS integrity long term surveillance.~~

~~Wide range RCS loop pressure is measured by pressure transmitters with a span of 0 psig to 3000 psig. The pressure transmitters are located outside the containment. Redundant monitoring capability is provided by two trains of instrumentation. Control room indications are provided through the inadequate core cooling (ICC) plasma display. The ICC plasma display is the primary indication used by the operator during an accident. Therefore, the PAM instrumentation LCO deals specifically with this portion of the instrument channel.~~

~~In some plants, RCS pressure is a Type A variable because the operator uses this indication to monitor the cooldown of the RCS following a steam generator tube rupture or small break loss of coolant accident (LOCA). Operator actions to maintain a controlled cooldown, such as adjusting steam generator pressure or level, would use this indication. Furthermore, RCS pressure is one factor that may be used in decisions to terminate reactor coolant pump operation.~~

5. Subcooled Margin Monitor

The Subcooled Margin Monitor is a Type A, Category 1 variable used to initiate tripping of the primary coolant pumps and to initiate throttling of SIS flows. Each SMM channel uses a number of PCS pressure and temperature inputs to determine the degree of PCS subcooling or superheat.

6. Wide Range Pressurizer Level

Pressurizer Level is a Type A Category 1 variable used to determine whether to terminate safety injection (SI), ~~i~~ f still in progress, or to reinitiate SI if it has been stopped. Knowledge of pressurizer water level is also used to verify the plant conditions necessary to establish

~~(continued)~~

~~BASES~~

natural circulation in the PCS and to verify that the plant is maintained in a safe shutdown condition.

~~Reactor Vessel Water Level~~

~~Reactor Vessel Water Level is provided for verification and long term surveillance of core cooling.~~

(continued)

~~(continued)~~

~~BASES~~

LCO ~~For this unit,~~

~~12. Steam Generator Water Level~~

7. Containment Hydrogen Monitors

Containment Hydrogen Monitors are a Category 1 Type A variable. They are provided to detect high hydrogen concentration conditions that represent a potential for containment breach, and are used to determine when to initiate hydrogen recombiners.
~~Containment Hydrogen Monitors are provided to detect high hydrogen concentration conditions that represent a potential for containment breach.~~ This variable is also important in verifying the adequacy of mitigating actions.

~~For this unit,~~

~~LCO (continued)~~ ~~11. Pressurizer Level~~

~~Pressurizer Level is used to determine whether to terminate safety injection (SI),~~

Condensate Storage Tank (CST) Level

CST Level is a Type D Category 1 variable and is provided to ensure water supply for Auxiliary Feedwater (AFW). The CST provides the ensured safety grade water supply for the AFW System. Inventory is monitored by a 0 to 100% level indication.
~~CST Level is provided to ensure water supply for [AFW]. The CST provides the ensured safety grade water supply for the [AFW] System. The CST consists of two identical tanks connected by a common outlet header. Inventory is monitored by a 0 to 144 inch level indication for each tank.~~ CST Level is displayed on a control room indicator, ~~strip chart recorder,~~ and plant computer. In addition, a control room annunciator alarms on low level.

The CST is the initial source of water for the AFW System. ~~At some plants, CST Level is considered a Type A variable because the control room meter and annunciator are considered the primary indication~~

~~(continued)~~

~~BASES~~

~~used by the operator. The DBAs that require [AFW] are the loss of electric power, steam line break (SLB), and small break LOCA. The CST is the initial source of water for the [AFW] System.~~ However, as the CST is depleted, manual operator action is necessary to replenish the CST ~~or align suction to the AFW pumps from the hotwell~~.

(continued)

LCO (continued)

9. Primary Coolant System Pressure (wide range)

PCS wide range pressure is a Type A Category I variable provided for verification of core cooling and RCS integrity long term surveillance. The indication is used to manually initiate a trip of a Primary Coolant Pump following small break LOCA.

Wide range PCS loop pressure is measured by pressure transmitters with a span of 0 psig to 3000 psig. Redundant monitoring capability is provided by two trains of instrumentation. Control room indications are provided through the Plant Process Computer, and on C12 and C02.

~~PCS wide range pressure is a Type A Catagory 1 variable provides for verification of core cooling and RCS integrity long term surveillance.~~

~~Wide range PCS loop pressure is measured by pressure transmitters with a span of 0 psig to 3000 psig.~~

~~14, 15, 16, 17.~~

10. Containment Pressure (wide range)

Containment Pressure is a Type C Category 1 variable, and is provided for verification of PCS and containment OPERABILITY.

~~Containment Pressure is provided for verification of RCS and containment OPERABILITY.~~

~~For this unit,~~ ~~For this unit, Containment Pressure instrumentation consists of the following:~~

(continued)

LCO (continued)

11, 12. Wide Range Steam Generator Water Level

~~(continued)~~

~~BASES~~

~~8. Containment Isolation Valve Position~~

~~Containment Isolation Valve Position is provided for verification of containment OPERABILITY.~~

~~PCIV position is provided for verification of containment integrity. In the case of PCIV position,~~

Steam Generator Water Level is provided to monitor operation of decay heat removal via the steam generators. It is a Type A, Category 1 Variable.

The indication of steam generator level instrumentation covers a span extending from the tubesheet to the steam, with an indicated range of -140% to + 150%. Redundant monitoring capability is provided by two channels of instrumentation. ~~with an indicated range of 138% to 100%~~

~~The Category I indication of steam generator level is the extended startup range level instrumentation. The extended startup range level covers a span of 6 inches to 394 inches above the lower tubesheet. The measured differential pressure is displayed in inches of water at 68°F. Temperature compensation of this indication is performed manually by the operator. Redundant monitoring capability is provided by two trains of instrumentation.~~

~~Operator action is based on the control room indication of Steam Generator Water Level~~. The indication is used during a Steam Generator Tube Rupture to determine which SG has the ruptured tube. It is also used to initiate once through cooling on low-low water level.

13, 14. Narrow Range SG Pressure

Steam Generator Pressure is a Category 1 Type A variable used in accident identification, including Loss of Coolant, and Steam Line Break.

~~(continued)~~

~~BASES~~

15. Containment Isolation Valve (CIV) Position

Containment Isolation Valve Position is a type B Category 1 variable and is provided for verification of containment OPERABILITY.

CIV position is provided for verification of containment integrity. In the case
of CIV position, ~~At some plants, operator action is based on the control room indication of Steam Generator Water Level. The RCS response during a design basis small break LOCA is dependent on the break size. For a certain range of break sizes, the boiler condenser mode of heat transfer is necessary to remove decay heat. At these plants, extended startup range level is a Type A variable because the operator must manually raise and control the steam generator level to establish boiler condenser heat transfer. Operator action is initiated on a loss of subcooled margin. Feedwater flow is increased until the indicated extended startup range level reaches the boiler condenser setpoint.~~

~~LCO~~ ~~13.~~

the important information is the isolation status of the containment penetration. The LCO requires one channel of valve position indication in the control room to be OPERABLE for each active ~~PCIV~~ CIV in a containment penetration flow path. ~~, i.e., two total channels of PCIV position indication for a penetration flow path with two active valves.~~ For containment penetrations with only one active PCIV having control room indication, Note (b) requires a single channel of valve position indication to be OPERABLE. This is sufficient to redundantly verify the isolation status of each isolable penetration via indicated status of the active valve, as applicable, and prior knowledge of passive valve or system boundary status. If a penetration flow path is isolated, position indication for the CIV(s) in the associated penetration flow path is not needed to determine status. ~~position indication for the PCIV(s) in the associated penetration flow path is not needed to determine status.~~ Therefore, the position indication for valves in an isolated penetration flow path is not required to be OPERABLE.

(continued)

LCO

16, 17, 18, 19

Core Exit Temperature

~~(continued)~~

~~BASES~~

Core Exit Temperature is a Type C Category 1 variable and is provided for verification and long term surveillance of core cooling.

~~Core Exit Temperature is provided for verification and long term surveillance of core cooling.~~

Each core exit thermocouple (CET) channel consists of a single environmentally qualified thermocouple. This definition of a CET channel differs from standard Technical Specifications. The CET requirements actions were added to the Palisades Technical Specifications by amendment 147 on June 22, 1992.

~~An evaluation was made of the minimum number of valid core exit thermocouples necessary for inadequate core cooling detection. The evaluation determined the reduced complement of core exit thermocouples necessary to detect initial core recovery and trend the ensuing core heatup. The evaluations account for core nonuniformities including incore effects of the radial decay power distribution and excore effects of condensate runback in the hot legs and nonuniform inlet temperatures. Based on these evaluations, adequate or inadequate core cooling detection is ensured with two valid core exit thermocouples per quadrant].~~

The design of the Incore Instrumentation System includes a Type K (chromel alumel) thermocouple within each of the 56 incore instrument detector assemblies.

The junction of each thermocouple is located above the core eit, inside the incore detector assembly guide tube, which supports andshields the incore instrument detector assembly string from flow forces in the outlet plenum region.

LCO 14, 15, 16, 17.

~~The junction of each thermocouple is located a few inches above the fuel assembly, inside a structure that supports and shields the incore instrument detector assembly string from flow forces in the outlet plenum region.~~ These core exit thermocouples monitor the temperature of the reactor coolant as it exits the fuel assemblies.

(continued)

~~(continued)~~

~~BASES~~

LCO
(continued)

The core exit thermocouples have a usable temperature range from 32°F to 2300°F.

~~The core exit thermocouples have a usable temperature range from 32°F to 2300°F,~~ although accuracy is reduced at temperatures above 1800°F.

20. PCS Vessel Water Level

PCS Vessel Water Level is monitored by the Reactor Vessel Level Monitoring System (RVLMS). It is not listed in Reference 1 as either a Category 1 or a Type A instrument. It is described in FSAR Section 7.4, (Reference 4). Reactor vessel level monitoring is provided for verification and long term surveillance of core cooling.

The Reactor Vessel Water Level monitoring system provides a direct measurement of the collapsed liquid level above the fuel alignment plate. The collapsed level represents the amount of liquid mass that is in the reactor vessel above the core. Measurement of the collapsed water level is selected because it is a direct indication of the water inventory. The collapsed level is obtained over the same temperature and pressure range as the saturation measurements, thereby encompassing all operating and accident conditions where it must function. Also, it functions

during the recovery interval. Therefore, it is designed to survive the high steam temperature that may occur during the preceding core recovery interval.

(continued)

~~(continued)~~

~~BASES~~

LCO (continued)

The level range extends from the top of the vessel down to the top of the fuel alignment plate. A total of eight HJTC pairs are employed in each of the two RVLMS channels. Four are located above the Fuel Alignment Plate, and four are located below. Each pair consists of a heated junction TC and an unheated junction TC. The differential temperature at each HJTC pair provides discrete indication of uncovery at the HJTC pair location. This indication is displayed using LEDs in the control room.

~~The level range extends from the top of the vessel down to the top of the fuel alignment plate. The response time is short enough to track the level during small break LOCA events. The resolution is sufficient to show the initial level drop, the key locations near the hot leg elevation, and the lowest levels just above the alignment plate.~~ This provides the operator with adequate indication to track the progression of the accident and to detect the consequences of its mitigating actions or the functionality of automatic equipment.

A Reactor Vessel Water Level channel consists of eight sensors in a probe. A channel is OPERABLE if four or more sensors, two or more of the upper four and two or more of the lower four, are OPERABLE.

~~18. [Auxiliary Feedwater (AFW)] Flow~~

~~[AFW] Flow is provided to monitor operation of decay heat removal via the steam generators.~~

~~The [AFW] Flow to each steam generator is determined from a differential pressure measurement calibrated to a span of 0 gpm to 1200 gpm. Redundant monitoring capability is provided by two independent trains of instrumentation for each steam generator. Each differential pressure transmitter provides an input to a control room indicator and the plant computer. Since the primary indication used by the operator during an accident is the control room indicator, the PAM instrumentation Specification deals specifically with this portion of the instrument channel.~~

~~At some plants [AFW] Flow is a Type A variable because operator action is required to throttle flow during an SLB accident in order to prevent the [AFW] pumps from operating in runout conditions. [AFW] Flow is also used by the operator to verify that the [AFW] System is delivering the correct flow to each steam generator. However, the~~

~~(continued)~~

~~BASES~~

~~primary indication used by the operator to ensure an adequate inventory is steam generator level.~~

21.
~~6. Containment Sump Water Level (wide range)~~

~~Containment Sump Water Level is provided for verification and long term surveillance of RCS integrity.~~

~~For this unit, Containment Sump Water Level instrumentation consists of the following:~~

Containment Area Radiation (high range)

Containment Area Radiation is a Category 1 Type E variable. It is provided to monitor for the potential of significant radiation releases and to provide release assessment for use by operators in determining the need to invoke site emergency plans.

Containment Area Radiation is provided to monitor for the potential of significant radiation releases and to provide release assessment for use by operators in determining the need to invoke site emergency plans.

Two channels are required to be OPERABLE for all but one Function. Two OPERABLE channels ensure that no single failure, within either the AM instrumentation or its auxiliary supporting features or power sources (concurrent with the failures that are a condition of or result from a specific accident), ~~within either the PAM instrumentation or its auxiliary supporting features or power sources (concurrent with the failures that are a condition of or result from aspecific accident),~~ prevents the operators from being presented the information necessary for them to determine the safety status of the plant and to bring the plant to and maintain it in a safe condition following that accident.

In Table 3.3.7-1 the exception to the two channel requirement is Containment Isolation Valve Position.

(continued)

~~(continued)~~

~~BASES~~

LCO (continued)

For loop and steam generator related variables, the required information is individual loop temperature and individual steam generator pressure and level. ~~11-1 the exception to the two channel requirement is Containment Isolation Valve Position.~~

~~Two OPERABLE channels of core exit thermocouples are required for each channel in each quadrant to provide indication of radial distribution of the coolant temperature rise across representative regions of the core. Power distribution symmetry was considered in determining the specific number and locations provided for diagnosis of local core problems. Therefore, two randomly selected thermocouples may not be sufficient to meet the two thermocouples per channel requirement in any quadrant. The two thermocouples in each channel must meet the additional requirement that one be located near the center of the core and the other near the core perimeter, such that the pair of core exit thermocouples indicate the radial temperature gradient across their core quadrant. Plant specific evaluations in response to Item II.F.2 of NUREG-0737 should have identified the thermocouple pairings that satisfy these requirements. Two sets of two thermocouples in each quadrant ensure a single failure will not disable the ability to determine the radial temperature gradient.~~

~~For loop and steam generator related variables, the required information is individual loop temperature and individual steam generator level.~~ In these cases two channels are required to be OPERABLE for each loop of steam generator to redundantly provide the necessary information.

In the case of Containment Isolation Valve Position, the important information is the status of the containment penetrations. The LCO requires one position indicator for each active containment isolation valve. This is sufficient to redundantly verify the isolation status of each isolable penetration either via indicated status of the active valve and prior knowledge of the passive valve or via system boundary status. If a normally active containment isolation valve is known to be closed and deactivated, position indication is not needed to determine status. Therefore, the position indication for valves in this state is not required to be OPERABLE.

APPLICABILITY

The AM PAM instrumentation LCO is applicable in MODES 1, 2, and 3. These variables are related to the diagnosis and preplanned actions required to mitigate DBAs. The applicable DBAs are assumed to occur in MODES 1, 2, and 3. In MODES 4, 5, and 6, plant conditions are such that

~~(continued)~~

~~BASES~~

the likelihood of an event occurring that would require AM ~~PAM~~ instrumentation is low; therefore, AM ~~PAM~~ instrumentation is not required to be OPERABLE in these MODES.

ACTIONS

Note 1 has been added in the ACTIONS to exclude the MODE change restriction of LCO 3.0.4. This exception allows entry into the applicable MODE while relying on the ACTIONS, even though the ACTIONS may eventually require plant shutdown. This exception is acceptable due to the passive function of the instruments, the operator's ability to monitor an accident using alternate instruments and methods, and the low probability of an event requiring these instruments.

Note 2 has been added in the ACTIONS to clarify the application of Completion Time rules. The Conditions of this Specification may be entered independently for each Function listed in Table 3.3.7-1 ~~11-1.~~ The Completion Time(s) of the inoperable channel(s) of a Function will be tracked separately for each Function, starting from the time the Condition was entered for that Function.

(continued)

~~(continued)~~

~~BASES~~

~~A.~~

ACTIONS A.~~1 (continued)~~

1
(continued)

When one or more Functions have one required channel that is inoperable, the required inoperable channel must be restored to OPERABLE status within 7~~-30~~. The 7 ~~-30~~-day Completion
Time is based on operating experience and takes into account the remaining OPERABLE channel (or in the case of a Function that has only one required channel, other non-Regulatory Guide 1.97 instrument channels to monitor the Function), the
passive nature of the instrument (no critical automatic action is assumed to occur from these instruments), and the low probability of an event requiring AM ~~PAM~~ instrumentation during this interval.

In the case of Containment Isolation Valve Position (Function 15), the 7 days allows ample time to isolate the affected penetration in accordance with note a, if repairs cannot be effected.

B.1

~~This Required Action specifies initiation of actions in accordance with Specification 5.6.8,~~
When one or more Functions have two required channels inoperable (i.e., two channels inoperable in the same Function), one channel in the Function should be restored to OPERABLE status within 48 hours~~7 days~~. The Completion Time of 48 hours~~7 days~~ is based on the relatively low probability of an event requiring AM instrumentation operation and the availability of alternate means to obtain the required information. Continuous operation with two required channels inoperable in a Function is not acceptable because the alternate indications may not fully meet all performance qualification requirements applied to the AM ~~PAM~~ instrumentation. Therefore, requiring restoration of one inoperable channel of the Function limits the risk that the AM ~~PAM~~ Function will be in a degraded condition should an accident occur.

~~D.1~~

~~(continued)~~

~~BASES~~

~~When two required hydrogen monitor channels are inoperable, Required Action D.1 requires one channel to be restored to~~

~~OPERABLE status. This Required Action restores the monitoring capability of the hydrogen monitor. The 72 hour Completion Time is based on the relatively low probability of an event requiring hydrogen monitoring and the availability of alternative means to obtain the required information. Continuous operation with two required channels inoperable is not acceptable because alternate indications are not available.~~

~~E.1~~

~~This Required Action directs entry into the appropriate Condition referenced in Table 3.3.11-1. The applicable Condition referenced in the Table is Function dependent. Each time Required Action C.1 or D.1 is not met, and the associated Completion Time has expired, Condition E is entered for that channel and provides for transfer to the appropriate subsequent Condition.~~

~~F.1 and F.2~~

~~If the Required Action and associated Completion Time of Condition C are not met, and Table 3.3.11-1 directs entry into Condition F,~~

C.1

If the Required Action and associated Completion Time of Condition A (one channel inoperable) are not met for Functions 1 through 15, or the Required Actions and associated Completion Times of Condition B (2 channels inoperable) are not met for Functions 1 through 19,

the plant must be brought to a MODE in which the requirements of this LCO do not apply. To achieve this status, the plant must be brought to at least MODE 3 within 6 hours and to MODE 4 within 30 hours.

(continued)

~~(continued)~~

~~BASES~~

ACTIONS (continued)

The allowed Completion Times are reasonable, ~~the plant must be brought to at least MODE 3 within 6 hours and to MODE 4 within 12 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.

The shutdown track for Table 3.3.7-1 items not addressed by this Condition are addressed by Condition D.

D.1 and D.2

If the Required Action and associated Completion Time of Condition A (one channel inoperable) are not met for Functions 16 through 21, or the Required Actions and associated Completion Times of Condition B (2 channels inoperable) are not met for Functions 20 and 21, Condition D is entered.

Required Action D.1 specifies initiation of actions in accordance with Specification 5.6.7, ~~to reach the required plant conditions from full power conditions in an orderly manner and without challenging plant systems.~~

~~G.1~~

~~At this plant, alternate means of monitoring Reactor Vessel Water Level and Containment Area Radiation have been developed and tested. These alternate means may be temporarily installed if the normal PAM channel cannot be restored to OPERABLE status within the allotted time. If these alternate means are used, the Required Action is not to~~

~~ACTIONS~~ ~~G.1 (continued)~~

~~shut down the plant, but rather to follow the directions of Specification 5.6.8. The report provided to the NRC should discuss the alternate means used, describe the degree to which the alternate means are equivalent to the installed PAM channels, justify the areas in which they are not equivalent, and provide a schedule for restoring the normal PAM channels.~~

~~(continued)~~

~~BASES~~

which requires a written report to be submitted to the Nuclear Regulatory Commission. This report discusses the results of the root cause evaluation of the inoperability and identifies proposed restorative Required Actions. This Required Action is appropriate in lieu of a shutdown requirement, given the likelihood of plant conditions that would require information provided by this instrumentation. Also, alternative Required Actions are identified before a loss of functional capability condition occurs.

Required Action D.2 requires restoration of these channels to OPERABLE status prior to the next startup after entering MODE 6. Items 16 through 20 employ sensing elements located within the reactor vessel, whose access is precluded except during refueling operations. Since Specification 3.0.4 is not applicable, this action is necessary to assure that repair is accomplished when the equipment is accessible during the next refueling.

If two RVWL channels are inoperable, alternate instrument channels must be used for monitoring reactor vessel water level. The alternate channels normally used are Subcooled Margin Monitors, Wide Range Pressurizer Level, and Core Exit Thermocouples required by Table 3.17.4.

(continued)

~~[Alternate means of monitoring Containment Area Radiation have been developed and tested. These alternate means may be temporarily installed if the normal AM channel cannot be restored to OPERABLE status within the allotted time.]~~

SURVEILLANCE REQUIREMENTS

A Note at the beginning of the Surveillance Requirements specifies that the following SRs apply to each AM instrumentation Function in Table 3.3.7-1. ~~3.3.11.1~~

SR 3.3.7.1

~~(continued)~~

~~BASES~~

~~SR 3.3.11.~~1

Performance of the CHANNEL CHECK once every 31 days ensures that a gross failure of instrumentation has not occurred. A CHANNEL CHECK is normally a comparison of the parameter indicated on one channel to a similar parameter on other channels. Significant deviations between the two instrument channels could be an indication of excessive instrument drift in one of the channels or of something even more serious. A CHANNEL CHECK will detect gross channel failure; thus, it is key to verifying the instrumentation continues to operate properly between each CHANNEL CALIBRATION.

Agreement criteria are determined by the plant staff based on a combination of the channel instrument uncertainties, including indication and readability. If a channel is outside the criteria, it may be an indication that the sensor or the signal processing equipment has drifted outside its limit. If the channels are within the criteria, it is an indication that the channels are OPERABLE. If the channels are normally off scale during times when surveillance is required, the CHANNEL CHECK will only verify that they are off scale in the same direction. Off scale low current loop channels are verified to be reading at the bottom of the range and not failed downscale.

~~(continued)~~

SURVEILLANCE REQUIREMENTS

SR 3.3.7.~~11.~~1 (continued)

The Frequency of 31 days is based upon plant operating experience with regard to channel OPERABILITY and drift, which demonstrates that failure of more than one channel of a given Function in any 31 day interval is a rare event. The CHANNEL CHECK supplements less formal, but more frequent, checks of channel during normal operational use of the displays associated with this LCO's required channels.

SR 3.3.7.2

A CHANNEL CALIBRATION is performed every 18 months or approximately every refueling.

~~SR 3.3.11.2~~

~~A CHANNEL CALIBRATION is performed every [18] months or approximately every refueling.~~ CHANNEL CALIBRATION is a complete check of the instrument channel including the sensor. The Surveillance verifies the channel responds to the measured parameter within the necessary range and accuracy. A Note allows exclusion of neutron detectors from the CHANNEL CALIBRATION.

~~(continued)~~

~~BASES~~

~~At this unit, CHANNEL CALIBRATION shall find measurement errors are within the following acceptance criteria:~~

~~For the Containment Area Radiation instrumentation, a CHANNEL CALIBRATION may consist of an electronic calibration of the channel, not including the detector, for range decades above 10 R/hr, and a one point calibration check of the detector below 10 R/hr with a gamma source.~~

~~A Note is added stating that the neutron detectors are excluded from CHANNEL CALIBRATION, because they are passive devices with minimal drift, and because of the difficulty in simulating a meaningful signal.~~

A note is added that Core Exit Thermocouple calibration is performed by substituting a known voltage for the thermocouple voltage.

The Frequency is based upon operating experience and consistency with the typical industry refueling cycle and is justified by an 18 ~~[18]~~ month calibration interval for the determination of the magnitude of equipment drift.

(continued)

REFERENCES

1. FSAR Appendix 7.C, Regulatory Guide 1.97 Instrumentation. ~~Plant specific document (e.g., FSAR, NRC Regulatory Guide 1.97, SER letter).~~

2. Regulatory Guide 1.97.

3. NUREG-0737, Supplement 1.

4. FSAR Section 7.4, Other Safety Related Protection, Cointrol, and Display Systems..

B 3.3 INSTRUMENTATION

B 3.3.8 Alternate Shutdown System
~~12 Remote Shutdown System (Analog)~~

BASES

BACKGROUND

The Alternate ~~The Remote~~ Shutdown System provides the control room operator with sufficient instrumentation and controls to place and maintain the unit in a safe shutdown condition from a location other than the control room. This capability is necessary to protect against the possibility that the control room becomes inaccessible. A safe shutdown condition is defined as MODE 3. With the unit in MODE 3, the Auxiliary Feedwater (AFW) System and the steam generator safety valves or the steam generator atmospheric dump valves can be used to remove core decay heat and meet all safety requirements. The long term supply of water for the AFW System and the ability to borate the Primary Coolant System-(PCS)~~Reactor Coolant System (RCS)~~ from outside the control room allow extended operation in MODE 3.

In order to ensure use of sufficient components of the Auxiliary Feedwater System and sufficient process information to permit reactor MODE 3 control in the event a fire damages equipment and circuitry of the main feedwater system or the Auxiliary Feedwater System in the control room, cable spreading room, Engineered Safeguards Auxiliary Panel C-33 room, or the corridor between Switchgear Room 1-C and the charging pump rooms, auxiliary Hot Shutdown Control Panels (C-150/C-150A) have been provided and located in the southwest electrical penetration room. These panels are comprised of two enclosures, the main enclosure C-150 and an auxiliary one called C-150A. The description below combines these two enclosures into one entity called "Panel C-150." (Reference 4)

From this panel, control of the auxiliary feedwater valves is enabled by transfer and control of auxiliary feedwater turbine steam supply Valve B. Indication of auxiliary feedwater flow to both steam generators, water level of both steam generators and pressurizer level are enabled by transfer. In addition, primary coolant pressure (pressurizer pressure) is displayed by a primary sensor dedicated to this use. Transfer of the above-mentioned systems is annunciated in the control room. See FSAR Section 7.4 (Reference 3) for operation via Panel C-150.

The equipment controls that are required are listed in the LCO section of this basis.

(continued)

BACKGROUND (CONTINUED)

Switches, which transfer control or instrument functions from the control room to the auxiliary shutdown control panel, alarm in the control room when the devices in the Auxiliary Hot Shutdown Control Panel are enabled.

The transfer switches of the Auxiliary Hot Shutdown Control Panel provide access to the Auxiliary Feedwater System for MODE 3 control only. No other means of achieving MODE 3 control exists if a fire damages the control room or the cable spreading room.

Wiring, including power sources for the control circuit and equipment operation for the alternate shutdown method, is independent of equipment wiring in the postulated fire areas.

Alternate shutdown power sources, including all breakers, have isolation devices on control circuits that are routed through the postulated fire areas, even if the breaker is to be operated manually.

Procedures are provided for taking the Plant to hot shutdown via the Auxiliary Hot Shutdown Control Panel in the event a fire prevents use of the control room.

The unit automatically reaches MODE 3 following a unit shutdown and can be maintained safely in MODE 3 for an extended period of time.

The OPERABILITY of the Alternate Shutdown System control and instrumentation Functions ensures that there is sufficient information available on selected plant parameters to place and maintain the plant in MODE 3.

~~In the event that the control room becomes inaccessible, the operators can establish control at the remote shutdown panel and place and maintain the unit in MODE 3. Not all controls and necessary transfer switches are located at the remote shutdown panel. Some controls and transfer switches will be operated locally at the switchgear, motor control panels, or other local stations. The unit automatically reaches MODE 3 following a unit shutdown and can be maintained safely in MODE 3 for an extended period of time.~~

~~The OPERABILITY of the Remote Shutdown System control and instrumentation Functions ensures that there is sufficient information available on selected plant parameters to place and maintain the plant in MODE 3,~~ should the control room become inaccessible.

APPLICABLE SAFETY ANALYSIS

The Alternate ~~Remote~~ Shutdown System is required to provide equipment at appropriate locations outside the control room with a capability to promptly shut down and maintain the plant in a safe condition in MODE 3.

~~(continued)~~

~~BASES~~

The criteria governing the design and the specific system requirements of the Remote Shutdown System are located in 10 CFR 50, Appendix A, GDC 19, and Appendix R (Ref. 1).

~~The Remote Shutdown System has been identified as an important contributor to the reduction of plant risk to accidents and, therefore, has been retained in the Technical Specifications, as indicated in the NRC Policy Statement.~~

(continued)

LCO

The Alternate ~~Remote~~ Shutdown System LCO provides the requirements for the OPERABILITY of the instrumentation and controls necessary to place and maintain the unit in MODE 3 from a location other than the control room.

~~LCO~~

The instrumentation and controls typically required are listed in Table 3.3.8-1 in the accompanying LCO.

Equipment controls that are required by the alternative dedicated method of achieving and maintaining MODE 3 are as follows:

1. Auxiliary feedwater valves
2. Turbine - driven Auxiliary feedwater pump

Instrumentation systems displayed on the Auxiliary Hot Shutdown Control Panel are:

1. Source range flux monitor
2. Auxiliary feedwater flow
3. Pressurizer pressure
4. Pressurizer level
5. Steam generator level and pressure

~~(continued)~~

~~BASES~~

6. Primary coolant temperatures (hot and cold legs)

7. Turbine-driven auxiliary feedwater pump low-suction pressure warning light

8. SIRW tank level

A Function of a Alternate Shutdown System is OPERABLE if all instrument and control channels needed to support the remote shutdown Functions are OPERABLE.

The Alternate Shutdown System instrumentation and control circuits covered by this LCO do not need to be energized to be considered OPERABLE. This LCO is intended to ensure that the instrument and control circuits will be OPERABLE if plant conditions require that the Alternate Shutdown System be placed in operation.

(continued)

LCO (continued)

Indication channels 3 through 14 use a transmitter which also serves normal control room instrumentation. When the control switches are changed to the "AHSDP" (Alternate Hot Shut Down Panel) position, the transmitter is isolated from its normal power supply and circuitry, and connected into the C-150 or C-150A panel circuit; control for AFW flow control valves CV-0727 and 0749 is also transferred to C-150. The transfer switches are alarmed in the control room.

Pressurizer Pressure indicator channel 2 is provided with its own pressure transmitter. Its circuitry is energized when the transfer switch is in the AHSDP position.

~~A Function of a Alternate Shutdown System is OPERABLE if all instrument and control channels needed to support the remote shutdown Functions are OPERABLE.~~

~~12-1 in the accompanying LCO.~~

~~Reviewer's Note: The number of channels that fulfill GDC 19 requirements for the number of OPERABLE channels required depends upon the plant's licensing basis as described in the NRC plant specific Safety Evaluation~~

~~(continued)~~

~~BASES~~

~~Report (SER) (Ref. 2). Generally, two divisions are required to be OPERABLE. However, only one channel is required if the plant has justified such a design and the NRC's SER accepted the justification.~~

~~The controls, instrumentation, and transfer switches are those required for:~~

- ~~Core Reactivity Control (initial and long term);~~
- ~~RCS Pressure Control;~~
- ~~Decay Heat Removal via the [AFW System] and the safety valves or steam generator ADVs;~~
- ~~RCS Inventory Control via charging flow; and~~
- ~~Safety support systems for the above Functions, as well as service water, component cooling water, and onsite power including the diesel generators.~~

~~A Function of a Remote Shutdown System is OPERABLE if all instrument and control channels needed to support the remote shutdown Functions are OPERABLE. In some cases, Table 3.3.12-1 may indicate that the required information or control capability is available from several alternate sources. In these cases, the Function is OPERABLE as long~~

~~LCO~~ ~~as one channel of any of the alternate information or~~

~~LCO~~ ~~as one channel of any of the alternate information or~~

~~(continued)~~ ~~control sources for each Function is OPERABLE.~~

~~The Remote Shutdown System instrumentation and control circuits covered by this LCO do not need to be energized to be considered OPERABLE. This LCO is intended to ensure that the instrument and control circuits will be OPERABLE if plant conditions require that the Remote Shutdown System be placed in operation.~~

APPLICABILITY

The Remote Shutdown System LCO is applicable in MODES 1, 2, and 3. This is required so that the unit can be placed and maintained in MODE 3 for an extended period of time from a location other than the control room.

This LCO is not applicable in MODE 4, 5, or 6. In these MODES, the unit is already subcritical and in the condition of reduced PCS energy. ~~the unit is already subcritical and in the condition of reduced RCS energy.~~ Under these

~~(continued)~~

~~BASES~~

conditions, considerable time is available to restore necessary instrument control Functions if control room instruments or control become unavailable.

ACTIONS

A Note has been included that excludes the ~~MODE change restrictions of LCO 3.0.4~~ LCO 3.0.3 shutdown requirements and MODEchange restriction of LCO 3.0.4. This exception allows entry into an applicable MODE while relying on the ACTIONS, even though the ACTIONS may eventually require a plant shutdown. This is acceptable due to the low probability of an event requiring this system. The Remote Shutdown System equipment can generally be repaired during operation without significant risk of spurious trip.

A Remote Shutdown System division is inoperable when each Function is not accomplished by at least one designated Remote Shutdown System channel that satisfies the OPERABILITY criteria for the channel's Function. ~~These criteria are outlined in the LCO section of the Bases.~~

Note 2 has been added in the ACTIONS to clarify the application of Completion Time rules. The Conditions of this Specification may be entered independently for each Function listed in Table 3.3.8-1. The Completion Times of the inoperable channels of a Function will be tracked separately for each Function,~~12-1. The Completion Time(s) of the inoperable channel(s)/train(s) of a Function will be tracked separately for each Function,~~

~~ACTIONS~~

~~tracked separately for each Function,~~ starting from the time the Condition was entered for that Function.

(continued)

ACTIONS (continued)

A.1 and A.2

Condition A addresses the situation where one or more channels of the Alternate Shutdown System are inoperable.

~~A.1~~

~~Condition A addresses the situation where one or more channels of the Remote Shutdown System are inoperable.~~ This includes any Function listed in Table 3.3.8-1 as well as the control and transfer switches.

~~(continued)~~

~~BASES~~

Required Action A.1 is to provide equivalent shutdown capability within 7 days. There may be several possible means of satisfying the remote shutdown capability.~~12-1 as well as the control and transfer switches.~~

~~The Required Action is to restore the divisions to OPERABLE status within 30 days.~~ The Completion Time is based on operating experience and the low probability of an event that would require evacuation of the control room.

Required Action A.2 is to restore the channels to OPERABLE status within 60 days. This allows time to complete repairs on the failed channel, while maintaining alternate monitoring capability in accordance with Action A.1.

B.1 and B.2

If the Required Action and associated Completion Time of Condition A are not met, 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 4 within 30 hours.~~the plant must be brought to at least MODE 3 within 6 hours and to MODE 4 within [12] hours.~~ The allowed Completion Times are reasonable, based on operating experience, to reach the required MODE from full power conditions in an orderly manner and without challenging plant systems.

SURVEILLANCE REQUIREMENTS

SR 3.3.8.1

~~SURVEILLANCE REQUIREMENTS~~

~~SR 3.3.12.1~~

Performance of the CHANNEL CHECK on Functions 2 through 12, once every 92 days ~~once every 31 days~~ ensures that a gross failure of instrumentation has not occurred. A CHANNEL CHECK is normally a comparison of the parameter indicated on one channel to a similar parameter on other channels. It is based on the assumption that instrument channels monitoring the same parameter should read approximately the same value. Significant deviations between the instrument channels could be an indication of excessive instrument drift in one of the channels or of something even more serious. A CHANNEL CHECK will detect gross channel failure; thus, it is key to verifying that the instrumentation continues to operate properly between each CHANNEL CALIBRATION. Agreement

~~(continued)~~

~~BASES~~

criteria are determined by the plant staff, based on a combination of the channel instrument uncertainties, including indication and readability. If a channel is outside the criteria, it

(continued)

may be an indication that the sensor or the signal processing equipment has drifted outside its limit. As specified in the Surveillance, a CHANNEL CHECK is only required for those channels that are normally energized. If the channels are within the criteria, it is an indication that the channels are OPERABLE. If the channels are normally off scale during times when surveillance is required, the CHANNEL CHECK will only verify that they are off scale in the same direction. Off scale low current loop channels are verified to be reading at the bottom of the range and not failed downscale.

The 92 day interval was chosen because completion of a CHANNEL CHECK requires actuating the circuits with the associated transfer switches and thereby deactivating several normal control room channels which share the same detectors. The CHANNEL CHECK for the Neutron Flux channel is discussed below. AFW flow indicators are excepted because during normal operation there is zero AFW flow and a CHANNEL CHECK would be inconclusive.

SR 3.3.8.2

A CHANNEL CHECK of the Neutron Flux Monitoring Channel is performed within 7 days prior to reactor startup, as part of the CHANNEL FUNCTIONAL TEST of the neutron flux monitoring channels addressed by SR 3.3.1.6. The CHANNEL CHECK consists of comparing the remote indication with that from the control room. The Startup Range provides no alarm or automatic functions; the CHANNEL FUNCTIONAL TEST consists of verifying proper response of the channel to the internal test signals, and verification that a detectable signal is available from the detector. After lengthy shutdown periods flux may be below the range of the channel indication. Signal verification with test equipment is acceptable.

SR 3.3.8. ~~The Frequency is based on plant operating experience that demonstrates channel failure is rare.~~

~~(continued)~~

~~BASES~~

~~SR 3.3.12.2~~

~~SR 3.3.12.2 verifies that each required Remote Shutdown System transfer switch and control circuit performs its intended function. This verification is performed from the reactor shutdown panel and locally, as appropriate. Operation of the equipment from the remote shutdown panel is not necessary. The Surveillance can be satisfied by performance of a continuity check. This will ensure that if the control room becomes inaccessible,~~3

A CHANNEL CHECK is performed on each AFW flow channel (Functions 13 and 14) at 18 month intervals as part of the CHANNEL CALIBRATION of SR 3.3.8.5. AFW flow indicators are excepted from more frequent CHANNEL CHECKS because during normal operation there is zero AFW flow and a CHANNEL CHECK would be inconclusive.

(continued)

~~(continued)~~

~~BASES~~

SURVEILLANCE REQUIREMENTS (continued)

SR 3.3.8. ~~CHANNEL CALIBRATION is a complete check of the instrument channel including the sensor. The Surveillance verifies~~

~~that the channel responds to the measured parameter within the necessary range and accuracy.~~

~~The 18 month Frequency is based upon the need to perform this Surveillance under the conditions that apply during a plant outage and the potential for an unplanned transient if the Surveillance were performed with the reactor at power.~~

~~The SR is modified by a Note, which excludes neutron detectors from the CHANNEL CALIBRATION.~~

~~SR 3.3.12.~~4

A CHANNEL FUNCTIONAL TEST is performed on each Alternate Shutdown Panel control channel (Functions 13 through 18) each 18 months to assure its operability. A CHANNEL FUNCTIONAL TEST is performed on the AFW pump suction pressure alarm as part of its CHANNEL CALIBRATION. SR 3.3.8.4 also verifies that each required Alternate Shutdown System transfer switch and control circuit for Functions 13 through 18 performs its intended function. Operability of the transfer and control switches for Functions 1 through 15 is addressed in the performance of SR 3.3.8.5, CHANNEL CALIBRATION. This verification is performed from the reactor shutdown panel and locally, as appropriate. This will ensure that if the control room becomes inaccessible,

~~SR 3.3.12.4 is the performance of a CHANNEL FUNCTIONAL TEST every 18 months. This Surveillance should verify the OPERABILITY of the reactor trip circuit breaker (RTCB) open/closed indication on the remote shutdown panels by actuating the RTCBs. The Frequency of 18 months was chosen because the RTCBs cannot be exercised while the unit is at power. Operating experience has shown that these components usually pass the Surveillance when performed at a Frequency of once every 18 months. Therefore, the Frequency was concluded to be acceptable from a reliability standpoint.~~

~~(continued)~~

~~BASES~~

SR 3.3.8.5

Performance of a CHANNEL CALIBRATION every 18 months on Functions 1 through 15 ensures that the channels are operating accurately and within specified tolerances. Operating experience has shown this test interval to be satisfactory.

SR 3.3.8.5 also verifies that each required Remote Shutdown System transfer switch and control circuit for Functions 1 through 15 performs its intended function. Operability of the transfer and control switches for Functions 13 through 18 is addressed in the performance of SR 3.3.8.4, CHANNEL FUNCTIONAL TEST. This verification is performed from the alternate shutdown panel and locally, as appropriate. This will ensure that if the control room becomes inaccessible, the plant can be placed and maintained in MODE 3 from the alternate shutdown panel and the local control stations. The 18 ~~[18]~~ month Frequency is based on the need to perform this Surveillance under the conditions that apply during a plant outage and the potential for an unplanned transient if the Surveillance were performed with the reactor at power. Operating experience demonstrates that Remote Shutdown System control channels seldom fail to pass the Surveillance when performed at a Frequency of once every 18 ~~[18]~~ months.

(continued)

~~BASES~~

REFERENCES

1. 10 CFR 50, Appendix A, GDC 19,and Appendix R.
2. NRC Safety Evaluation Report (SER).
3. FSAR Section 7.4, "Other Safety Related Protection, Control, and Display Systems".

B 3.3 INSTRUMENTATION

B 3.3.9 Neutron Flux Monitoring Channels
~~13 [Logarithmic] Power Monitoring Channels (Analog)~~

BASES

BACKGROUND

The wide range neutron flux monitoring channels consist of two combined source range/wide range channels, designated NI 01/03 and NI 02/04. The wide range portions, (NI 03 and 04) provide neutron flux power indication from < 1 X 10^{-7}% RTP to > 100% RTP. They also provide an equipment protective High Startup Rate reactor trip when the RPS is OPERABLE, in MODES 1, 2, and 3, 4, and 5 when more than one control rod is capable of being withdrawn. The source range portions, designated NI 01 and NI 02 provide source range indication over the range of 1 to 1 X 10^{+6} cps.

~~BACKGROUND~~

~~The [logarithmic] power monitoring channels provide neutron flux power indication from < 1E-7% RTP to > 100% RTP. They also provide reactor protection when the reactor trip circuit breakers (RTCBs) are shut, in the form of a Power Rate of Change — High trip (analog plants) or a [Logarithmic] Power Level — High trip (digital plants).~~

This LCO addresses MODES 3, 4, and 5 with no more than one control rod capable of being withdrawn. When more than one control rod is capable of being withdrawn, the neutron flux monitoring channels are addressed by LCO 3.3.1, "Reactor Protective System (RPS) Instrumentation - Operating."

When the plant is shutdown with no more than one control rod capable of being withdrawn, both neutron flux monitoring channels must be available to monitor neutron flux power. If only one section of a neutron flux monitoring channel, source or wide range, is functioning, the neutron flux monitoring channel may be considered OPERABLE if it is capable of detecting the existing reactor neutron flux. In this application~~, and 5 with the RTCBs open. When the RTCBs are shut, the [logarithmic] power monitoring channels are addressed by LCO 3.3.2, "Reactor Protective System (RPS) Instrumentation — Shutdown."~~

~~When the RTCBs are open, two of the four wide range power channels must be available to monitor neutron flux power. In this application,~~ the RPS channels need not be OPERABLE since the reactor trip Function is not required. By monitoring neutron flux power, ~~By monitoring neutron flux power when the RTCBs are open,~~ loss of SDM caused by boron dilution can be detected as an increase in flux. Alarms are also provided when power increases above the fixed bistable setpoints. Two channels must be

OPERABLE to provide single failure protection and to facilitate detection of channel failure by providing CHANNEL CHECK capability.

APPLICABLE SAFETY ANALYSIS

The wide range neutron flux monitoring channels are necessary to monitor core reactivity changes. ~~Alarms are also provided when power increases above the fixed bistable setpoints. For plants employing separate post accident, [logarithmic] nuclear instrumentation channels with adequate range, these can be substituted for the [logarithmic] power range channels. Two channels must be OPERABLE to provide single failure protection and to facilitate detection of channel failure by providing CHANNEL CHECK capability.~~

~~APPLICABLE SAFETY ANALYSES~~

~~The [logarithmic] power monitoring channels are necessary to monitor core reactivity changes.~~ They are the primary means for detecting and triggering operator actions to respond to reactivity transients initiated from conditions in which the RPS is not required to be OPERABLE. They also trigger operator actions to anticipate RPS actuation in the event of reactivity transients starting from shutdown or low power conditions. The neutron flux monitoring channel's LCO requirements support

compliance with 10 CFR 50. ~~The [logarithmic] power monitoring channel's LCO requirements support compliance with 10 CFR 50,~~ Appendix A, GDC 13 (Ref. 1). The FSAR SAFETY ANALYSISchapters 7 and 14 (Refs. ~~The FSAR, Chapters [7] and [15] (Refs.~~ 2 and 3, respectively), describe the specific (continued)neutron flux power monitoring channel features that are critical to comply with the GDC.

The OPERABILITY of neutron flux monitoring channels ~~[logarithmic] power monitoring channels~~is necessary to meet the assumptions of the safety analyses and provide for the mitigation of accident and transient conditions.

~~The neutron flux monitoring channels satisfy Criterion 3 of the NRC Policy Statement.~~

LCO

The LCO on the neutron flux monitoring~~[logarithmic] power monitoring~~ channels ensures that adequate information is available to verify core reactivity conditions while shut down.

If only one section of a neutron flux monitoring channel, source or wide range, is functioning, the neutron flux monitoring channel may be considered OPERABLE if it is capable of detecting the existing reactor neutron flux. For example, with the source range count rate indicator functioning properly, indicating 150 cps, and in reasonabe agreement with the other source range, a neutron flux monitor channel may be considered OPERABLE even though its wide range indicator is not functioning.

~~BASES~~

~~A minimum of two [logarithmic] power monitoring channels are required to be OPERABLE. Some plants may have either four or six channels capable of performing this function. In these cases, multiple failures may be tolerated while the plants are still complying with LCO requirements.~~

APPLICABILITY

In MODES 3, 4, and 5, with no more than one one control capable of withdrawal, neutron flux monitoring channels must be OPERABLE to monitor core power for reactivity changes. ~~with RTCBs open or the Control Element Assembly (CEA) Drive System not capable of CEA withdrawal, [logarithmic] power monitoring channels must be OPERABLE to monitor core power for reactivity changes.~~ In MODES 1 and 2, and in MODES 3, 4, and 5 with more than one control rod capable of withdrawal, the neutron flux monitoring channels ~~and 5 with the RTCBs shut and the CEAs capable of withdrawal, the [logarithmic] power monitoring channels~~ are addressed as part of the RPS in LCO 3.3.1, "Reactor Protective System (RPS) Instrumentation ~~– Operating.~~

The requirements for source range neutron flux monitoring in MODE 6 are addressed in LCO 3.8.9.2, "Nuclear Instrumentation." The source range nuclear instrumentation channels (NI 01 and 02) provide neutron flux coverage extending an additional one to two decades below the wide range ~~[logarithmic]~~ channels for use during refueling, when neutron flux may be extremely low.

(continued)

(continued)

~~BASES~~

~~They are built into the [logarithmic] neutron flux channels in the analog plants and in many of the post accident channels used in both the digital and analog plants.~~

ACTIONS

A.1 and A.2

With one required channel inoperable, it may not be possible to perform a CHANNEL CHECK to verify that the other required channel is OPERABLE. Therefore, with one or more required channels inoperable, the neutron flux ~~the [logarithmic] power~~ monitoring Function cannot be reliably performed. Consequently, the Required Actions are the same for one required channel inoperable or more than one required channel inoperable. The absence of reliable neutron flux indication makes it difficult to ensure SDM is maintained. Required Action A.1, therefore, requires that all positive reactivity additions that are under operator control, such as boron dilution or Reactor Coolant System temperature changes, be halted immediately, preserving SDM.

SDM must be verified periodically to ensure that it is being maintained. Both required channels must be restored as soon as possible. The initial Completion Time of 4 hours and once every 12 hours thereafter to perform SDM verification takes into consideration that Required Action A.1 eliminates many of the means by which SDM can be reduced. These Completion Times are also based on operating experience in performing the Required Actions and the fact that plant conditions will change slowly.

SURVEILLANCE SR 3.3.9.

~~SURVEILLANCE~~ REQUIREMENTS

~~SR 3.3.13.1~~

SR 3.3.9 ~~13.~~1 is the performance of a CHANNEL CHECK on each required channel every 12 hours. ~~A CHANNEL CHECK is normally a comparison of the parameter indicated on one channel to a similar parameter on other channels.~~ It is based upon the assumption that instrument channels monitoring the same parameter should read approximately the same value. Significant deviations between instrument channels could be an indication of excessive instrument drift in one of the channels or of something even more serious. CHANNEL CHECK will detect gross channel failure; thus, it is key to verifying that the instrumentation continues to operate properly between each CHANNEL CALIBRATION.

(continued)

~~BASES~~

Agreement criteria are determined by the plant staff and should be based on a combination of the channel instrument uncertainties including control isolation, indication, and readability. ~~and readability.~~ If a channel is outside the criteria, it may be an indication that the detector or the signal processing equipment has drifted outside its limits. ~~it may be an indication that the transmitter or the signal processing equipment has drifted outside its limits.~~ If the channels are within the criteria, it is an indication that the channels are OPERABLE.

(continued)

The Frequency, about once every shift, is based on operating experience that demonstrates the rarity of channel failure. Since the probability of two random failures in redundant channels in any 12 hour period is extremely low, CHANNEL CHECK minimizes the chance of loss of protective function due to failure of redundant channels. CHANNEL CHECK supplements less formal, but more frequent, checks of channel OPERABILITY during normal operational use of displays associated with the LCO required channels.

SR 3.3.9.2 ~~13.3~~

SR 3.3.9.2 ~~13.3~~ is the performance of a CHANNEL CALIBRATION. A CHANNEL CALIBRATION is performed every 18 [18] months. The Surveillance is a complete check and readjustment of the wide range ~~[logarithmic]~~power channel from the preamplifier input through to the remote indicators.

~~The Surveillance verifies that the channel responds to a measured parameter within the necessary range and accuracy. CHANNEL CALIBRATION leaves the channel adjusted to account for instrument drift between successive calibrations to ensure that the channel remains operational between successive surveillances.~~

~~CHANNEL CALIBRATIONS must be performed consistent with the plant specific setpoint analysis.~~

~~This SR is modified by a Note to indicate that it is not necessary to test the detector because generating a meaningful test signal is difficult; the detectors are of simple construction, and any failures in the detectors will be apparent as change in channel output.~~ This Frequency is the same as that employed for the same channels in the other applicable MODES.

~~BASES~~

~~A CHANNEL FUNCTIONAL TEST is performed every [92] days to ensure that the entire channel is capable of properly indicating neutron flux. Internal test circuitry is used to feed preadjusted test signals into the preamplifier to verify channel alignment. It is not necessary to test the detector, because generating a meaningful test signal is difficult; the detectors are of simple construction, and any failures in the detectors will be apparent as change in channel output. This Frequency is the same as that employed for the same channels in the other applicable MODES. [At this unit, the channel trip Functions tested by the CHANNEL FUNCTIONAL TEST are as follows:]~~

REFERENCES

1.10 CFR 50, Appendix A, GDC 13.

2.FSAR, Chapter 7.

3.FSAR, Chapter 14.

~~Chapter [7].~~

~~3. FSAR, Chapter [15].~~

B 3.3 INSTRUMENTATION

B 3.3.10. Spent Fuel Pool (SFP) Radiation Monitor

BASES

BACKGROUND

This LCO addresses SFP Criticality Monitoring. It consists of two SFP Radiation Monitors, which provide alarms in the event of an approach to criticality. This satisfies the requirements of 10 CFR 70.24 (a) (2), (Reference 1) which requires an alarm system to warn of criticality events capable of generating radiation levels in excess of of 300 Rem/hr one foot from the source of the radiation.

Each of the two radiation monitors located in the spent fuel pool area is capable of providing the required alarm functions. No automatic actuation functions are provided by this circuitry.

Trip Setpoints and Allowable Values

Trip setpoints used in the SFP Criticality Monitor are based on the Reference 1 requirement of providing an alarm at a setpoint of less than 20 millirem/hr to warn of criticality accidents, while assuring that the setpoint is at least 5 millirem/hr to avoid spurious actuations. If the measured setpoint does not exceed the Allowable Value, the bistable is considered OPERABLE.

APPLICABLE SAFETY ANALYSIS

The SFP Radiation Monitors used to effect the criticality monitoring function are required by reference 1. This reference requires that persons licensed to possess special nuclear materials prior to December 6, 1974 maintain a monitoring system capable of detecting criticality events which genetrate radiation levels in excess of 300 Rem/hr at one foot. This reference stipulates that the devices shall in no case be further than 120 feet from the special nuclear matrerial being handled, with the possibility of lesser distances to account for shielding or other pertinent factors. It also requires the trip setpoints between 5 millirem/hr and 20 millirem/hr, as stated above.

LCO

The LCO on the SFP Radiation Monitoring channels requires that both channels be OPERABLE.

BASES

APPLICABILITY

The APPLICABILITY of the SFP Radiation Monitor is whenever fuel is in the Fuel Pool Area. This is consistent with the requirements of Reference 1. The APPLICABILITY is independent of any operational MODES by the nature of the moniutoring requirements.

ACTIONS

A note has been added which excludes the the shutdown requirements of LCO 3.0.3 and the power change restrictions of LCO 3.0.4. These exclusions are appropriate because the APPLICABILITY and Actions are not MODE dependent, and initiating LCO 3.0.3 or 3.0.4 Required Actions will not result in an improvement in plant safety.

A SFP Radiation Monitoring channel is inoperable when it does not satisfy the criteria for the channel's Function. The most common cause of channel inoperability is outright failure or drift of the bistable or process module. Typically, the drift is not large and would result in an alarm delay rather than a total loss of function. This determination is generally made during the performance of a CHANNEL FUNCTIONAL TEST when the process instrument is set up for adjustment to bring it within specification. If the actual trip setpoint is not within the SR 3.3.10.2 Allowable Value, the channel is inoperable and Condition A must be entered.

A.1, A.2.1, A.2.2

Condition A applies to the failure of one or both SFP Radiation Monitoring channels used to perform the Criticality Monitoring Function. No distinction is made between one channel inoperable or two channels inoperable, since with only one channel inoperable there is no backup if the second monitor should fail. Therefore the Required Actions are the same in both cases.

Required Action A.1 is to immediately suspend fuel movement in the SFP area. The fuel pool is designed to be subcritical even at zero PPM Boron concentration. This makes it extremely unlikely that a criticality accident could occur.

Required Actions A.2.1 and A.2.2 requires restoration of the inoperable channels to OPERABLE statue in 72 hours, or to provide equivalent monitoring capability. The 72 hour Completion Time is sufficient to either effect the required repairs, or provide other monitoring equipment.

BASES

SURVEILLANCE REQUIREMENTS

SR 3.3.10.1

Performance of the CHANNEL CHECK once every 24 hours ensures that a gross failure of instrumentation has not occurred.

Significant deviations between the two instrument channels could be an indication of excessive instrument drift in one of the channels or of something even more serious. CHANNEL CHECK will detect gross channel failure; thus, it is key to verifying the instrumentation continues to operate properly between each CHANNEL CALIBRATION. Agreement criteria are determined by the plant staff, based on a combination of the channel instrument uncertainties, including indication and readability.

The Frequency, is based on operating experience that demonstrates the rarity of channel failure. Since the probability of two random failures in redundant channels in any 24 hour period is low, the CHANNEL CHECK minimizes the chance of loss of function due to failure of redundant channels. The CHANNEL CHECK supplements less formal, but more frequent, checks of channel OPERABILITY during normal operational use of the displays associated with the LCO required channels.

SR 3.3.10.2

A CHANNEL FUNCTIONAL TEST is performed on each SFP Radiation Monitoring channel to ensure the entire channel will perform its intended function.

The Frequency of 31 days is based on plant operating experience with regard to channel OPERABILITY and drift, which demonstrates that failure of more than one channel of a given Function in any 31 day interval is a rare event.

SR 3.3.10.3

CHANNEL CALIBRATION is a complete check of the instrument channel including the sensor. The Surveillance verifies that the channel responds to a measured parameter within the necessary range and accuracy. CHANNEL CALIBRATION leaves the channel adjusted to account for instrument drift between successive calibrations to ensure that the channel remains operational between successive tests.

The Frequency is based upon the assumption of an 18 month calibration interval for the determination of the magnitude of equipment drift in the setpoint analysis.

REFERENCES

1. 10 CFR 70.24 (a)(2)

ATTACHMENT 6

CONSUMERS POWER COMPANY
PALISADES PLANT
DOCKET 50-255

STS CONVERSION TECHNICAL SPECIFICATION CHANGE REQUEST

3.3 INSTRUMENTATION PART

Comparison of Revised and Standard Technical Specifications

Palisades Revised Tech Spec Requirement List. (03/28/96)

A listing of the proposed Palisades Revised Tech Specs (RTS) correlated to the CE Standard Tech Specs (STS).

First Column; Proposed Palisades Revised Tech Spec (RTS) number
Each RTS item is listed in the left-most column.
If a STS item has been omitted from RTS, the word 'Omitted' is used.

Second Column; CE Standard Tech Spec (STS) number
The corresponding STS item is listed in the second column.
If a RTS item does not appear in STS, it is noted as 'Added'.

Third Column; Existing Palisades Tech Spec (TS) number
The closest TS item is listed in the third column.
If a RTS item does not appear in TS, it is noted as 'New'.

Fourth Column; RTS Item Description
An abbreviation of the RTS item appears in the third column.
Each item is identified as: LCO, ACTION, SR, ADMIN, Exception, etc.
In cases where a STS item was omitted from RTS, the description is of the STS item.

Description Key:	RTS requirement type:	Column 4 syntax:
	Safety Limit	SL: Safety limit; Applicable conditions
	Limiting Condition for Operation	LCO: LCO Description; Applicable conditions
	Condition	COND: Description of non-conforming condition
	Action	ACTN: Required action; Completion time
	Surveillance Requirement	SR: Test description; Frequency
	Table	TABL: Title
	Administrative Requirement	ADMN: Administrative requirement
	Defined Term	DEF: Name of defined term

Fifth Column; Comments and Explanations of Differences between RTS and STS.
A brief explanation of differences between RTS and STS is provided in the fifth column.

Other abbreviations used in the listing are:

NA:	Not Applicable
CFT:	Channel Functional Test
CHNL:	Channel

RTS Number	STS Number	TS Number	RTS (STS) requirement Description	Explanation of Differences

Global differences between the proposed Palisades Technical Specifications and the Standard Technical Specifications for CE plants, Nureg 1432:

The following changes are not discussed in the explanation of differences for each TS requirement.

1) Bracketed values have been replaced with appropriate values for Palisades. Typically, the basis for these values is provided in the bases document.

2) Each required action of the form "Perform SR X.X.X.X . . ." has been altered by a parenthetical summary of the SR requirements. This change allows a reader to understand the required actions without constantly turning pages to locate the referenced SR.

3) Terminology has been changed to reflect Palisades usage:

"RWT"	becomes	"SIRWT"	Safety Injection Refueling Water Tank
"CEA"	becomes	"Control Rod" or "Rod"	Palisades uses cruciform control rods rather than the multifingered "Control Element Assemblies" of later CE plants.
"RCS"	becomes	"PCS"	Palisades terminology is "Primary Coolant System" rather than "Reactor Coolant System"
"SIAS"	becomes	"SIS"	Palisades terminology is "Safety Injection Signal" rather than "Safety Injection Actuation Signal"
"AC Vital bus"	becomes	"Preferred AC bus"	Palisades terminology.
"PAMI"	becomes	"AMI"	Accident Monitoring Instrumentation, Palisades terminology
"ESFAS"	becomes	"ESF Instrumentation"	There is no stand-alone ESFAS system or cabinet at Palisades; ESF instruments actuate the ESF functions
"DG LOVS"	becomes	"DG UV Start"	Palisades Terminology
"Remote Shutdown System"	becomes	"Alternate Shutdown System"	Palisades Terminology
"Power Rate of Change-High"	becomes	"High Startup Rate"	Palisades Terminology

RTS Number	STS Number	TS Number	RTS (STS) requirement Description	Explanation of Differences
3.3	3.3	3.16/.17	INSTRUMENTATION	
3.3.1	3.3.1/3.3.2	2.3/3.17.1	LCO: Four RPS channels OPERABLE; Modes 1 & 2 and MODES 3, 4, 5 w > 1 rod capable of withdrawal.	RTS LCO 3.3.1 has similar APPLICABILITY to STS LCO 3.3.1 and 3.3.2, since Palisades requires all trips to be OPERABLE in the lower modes. Therefore STS LCO 3.3.2 has been eliminated. STS LCO 3.3.2 only requires MODE 3, 4, 5, APPLICABILITY for High Startup Rate. This is Less Restrictive than RTS. The APPLICABILITY for the lower MODES is consistent with existing Palisades TS and is similar to STS except that it specifies More than one Control Rod capable of withdrawal, rather than one rod capable of withdrawal. Palisades has a rod drop test panel downstream of the clutch power supplies which allows individually removing power to rods. This capability does not exist elsewhere. One rod withdrawn is assumed for SDM calculation purposes in the lower MODES. The listed RPS trip units are those assumed OPERABLE in the Palisades safety analyses. The allowable values specified are the same as in the existing Palisades Tech Specs. Trips are listed in the order in which they appear on the front of the RPS.
3.3.1 A	3.3.1 A	3.17.1.2	COND: One RPS instrument channel inoperable	Unchanged, except that "excore not calibrated with incores" deleted from STS, since Palisades does not have an APD trip. Instead, "Hi Start Up Rate or Loss of Load" is excepted in RTS to be consistent with current TS. At Palisades, these equipment protective trips have fewer than four sensor channels, and cannot be repaired at power.
Omitted	3.3.1 A.1	NA	ACTN: (Place in bypass or trip, 1 hr.)	This action is not proposed. It would comprise a new requirement for Palisades. Placing an inoperable channel in bypass provides no safety benefit over leaving it unbypassed, and in some instances could preclude trouble shooting or repair. Current TS does not have this requirement.
Omitted	3.3.1.A.2.1	NA	ACTN: (Restore in 48 hours)	Restore is always an option. This action is not in existing TS and is not proposed.
3.3.1 A.1	3.3.1 A.2.2	3.17.1.2 a	ACTN: Trip RPS trip units; 7 days	Completion Time in STS is 48 hours. TS is 7 days
3.3.1 B	3.3.1 B	3.17.1.3	COND: Two RPS inst channels inoperable	Unchanged except for the exception of Loss of Load and Hi Start Up Rate in RTS, vice Ex-core versus Incore Cal in STS. Similar reasoning as for RTS Condition A. This is as in TS.
3.3.1.B.1	3.3.1 B.1	3.17.1.3 a	ACTN: Trip one channel; 1 hour	Deleted requirement to bypass one channel, for reasoning similar to Condition A. Placement of one channel in Trip in 1 hr is consistent with STS and TS.

RTS Number	STS Number	TS Number	RTS (STS) requirement Description	Explanation of Differences
3.3.1 B.2	3.3.1 B.2	3.17.1.3 c	ACTN: Restore one channel in 7 days	Unchanged except completion time is 48 hours in STS. It is 7 days in TS. This is retained in RTS.
Omitted	3.3.1 C	NA	COND: (One or more excore channel not cal w. incores)	There is no equivalent requirement at Palisades. There is no APD Trip.
3.3.1 C	Added	3.3.1 a	COND: One Loss of Load or Hi Start Up Rate inoperable	Same as TS. Palisades has fewer than four sensor channels on these functions. They cannot be repaired at power.
3.3.1 C.1	Added	New	ACTN: Restore before Start Up	New requirement. Current TS does not specify restoration. Since Loss of Load or Hi Start Up Rate may not be repairable at power, this requires repair when shutdown.
3.3.1 D.	Added	3.17.1.3 a	COND: Two Hi Start Up Rate or Loss of Load channel inoperable:	Same as TS
3.3.1 D.1/D.2	Added	3.17.1.3 a/c	ACTN: Place 1 in trip and restore 1 before Start Up	Same as TS, but restoration step is not specified in TS. Since Loss of Load and Hi Start Up Rate may not be repairable at power, this requires repair when shutdown.
3.3.1 E.	3.3.1 D/E	New	COND: One or more function with one or two bypass channel inop.	Same intent as STS. STS Conditions combined, since Actions the same. No bypass removal in TS.
3.3.1 E.1	3.3.1 D.1/E.1	New	ACTN: Disable bypass channels, 1 hr	Same as STS
3.3.1 E.2	3.3.1 D.2/E.2	New	ACTN: Declare Trip Units inoperable, enter appropriate Condition	Same intent as STS. Since some bypass channels (Loss of Load and Hi Start Up Rate) affect functions that do not require the same Actions as others, entering the same Condition as the affected inoperable channel is a clean way reflecting the different required actions.
3.3.1 F	3.3.1 F	3.17.1.6	COND: Required action not met	Unchanged.
3.3.1 F.1	3.3.1 F.1	3.17.1.6 a	ACTN: Be in Mode 3; 6 hours	Unchanged.
3.3.1 F.2.1	3.3.1 F.2	3.17.1.6 b	ACTN: Ensure < 2 rods can be withdrawn	Places the plant in a condition where the LCO does not apply. Times consistent with LCO 3.0.3. Analogous to shutdown Track of LCO STS 3.3.2. This additional step is required since RTS LCO 3.3.1 is applicable in lower modes, whereas in STS, LCO 3.3.2 addresses lower Modes.
3.3.1 F.2.2	Added	3.17.6 b	ACTN: Ensure PCS boron > LCO 3.9.1 limit	Added this action as an altermate to 3.3.1 F.2.1 because either action would take plant out of applicability for LCO 3.3.1.
3.3.1 G	Added	New	COND: Control room > 90°F	Added condition to reflect Control Room temperature exceeding Thermal Margin Monitor (TMM) qualification.

RTS Number	STS Number	TS Number	RTS (STS) requirement Description	Explanation of Differences
3.3.1 G.1	Added	New	ACTN: Enter 3.0.3; Immediately	Added action to reflect all TMM channels being inoperable due to exceeding temperature.
3.3.1.1	3.3.1.1	4.17.1t	SR: Channel Check all but Loss of Load and CHP, 12 hrs.	Same as STS, except CHP not excepted in STS. CHP is pressure switch. Same requirements as TS.
3.3.1.2	3.3.1.2	4.17.1t (b)	SR: Daily Calorimetric NI and Delta T Power, 24 hours	Same as STS, except deleted Note 2 of STS, which permits suspension of calorimetric during physics testing. This provision is not needed at Palisades, since power ascension procedures do not require suspension.
Omitted	3.3.1.3	NA	SR: (Calibrate Power Range NI channels using Incores)	There is no APD Hi trip at Palisades. Therefore this is not RPS-related instrumentation. Other power distribution monitoring addressed in the power distribution monitoring LCO section.
3.3.1.3	3.3.1.4	4.17.1t	SR: Perform CFT except Loss of Load & Hi Start Up Rate, 92 days	Unchanged
3.3.1.4	3.3.1.5	4.17.1t (c)	SR: Calibrate the Power Range NIs with Test Signal, 31 days	RTS test same as TS. Similar to STS, but use of internal test signal specified in lieu of standard CHANNEL CALIBRATION wording. Actual CHANNEL CALIBRATION done every 18 months, per SR 3.3.1.8, as in TS. CHANNEL CALIBRATION Interval in STS is 92 days. This Calibration with a test signal is retained as 31 days in TS to RTS conversion.
3.3.1.5	Added	4.17.1t 15.	SR: Verify TMM constants, 92 days	The TMM is a digital device not part of the STS hardware. It calculates the TM/LP and VHPT. Interval same as in TS
3.3.1.6	3.3.1.6	4.17.1t (a)	SR: Perform CFT of LOL and Hi SUR, 7 days before Start Up	Unchanged
3.3.1.4/6	3.3.1.7	NA	SR: Perform CFT on bypass removal channels	Bypass removal channels are not specified in TS. CFT on bypass rem. channel is done at same interval as the source hardware. For WR NIs, this is 7 days before Start Up per SR 3.3.1.6. For Loss of Load, sensed from power range NIs, it is 31 days per SR 3.3.1.4
3.3.1.7	3.3.1.8	4.17.1t1	SR: perform Channel Cal. every 18 months	Unchanged. Same as Pal TS. In TS and RTS, Pwr Range NI Cal done every 18 months. Therefore note excepting neutron detectors has been added. In STS, NI cal done more frequently (92 days)
3.3.1.8	Added	New	SR: Verify Control Room Temperature ≤ 90°F; 12 hours	Added SR to verify Control Room temperature. In support of TMM operability.
Omitted	3.3.1.9	NA	SR: (Response Time Testing, 18 months)	Not required at Palisades. Not in TS.

RTS Number	STS Number	TS Number	RTS (STS) requirement Description	Explanation of Differences
3.3.1t	3.3.1t	2.3.1t	Tabl: Required RPS inst & setpoints	Used Palisades values from table 2.3.1 of existing Tech Specs. Otherwise, format in accordance with STS.
3.3.1t1	3.3.1t1	2.3.1t1	LCO: VHP trip setpoint	Plant specific setpoint. Otherwise, no change.
3.3.1t2	3.3.1t2	NA	LCO: Hi Startup Rate	Allowable value omitted, since there is no analytical basis; Otherwise, no change.
3.3.1t3	3.3.1t3	2.3.1t2	LCO: Low Flow setpoint	Plant specific setpoint and bypass removal provisions. Palisades does not require raising the Zero Power Mode Bypass (ZPMB) setpoint during physics testing, as in Note b of STS. Therefore, this provision is deleted. In addition, Palisades is administratively prohibited from going into ZPMB unless the RPS is not required (fewer than two control rods capable of withdrawal), hence note b has been amended.
3.3.1t4	3.3.1t7a	2.3.1t5	LCO: Low SG A level setpoint	Plant specific setpoint, otherwise no change.
3.3.1t5	3.3.1t7b	2.3.1t5	LCO: Low SG B level setpoint	Plant specific setpoint, otherwise no change
3.3.1t6	3.3.1t6	2.3.1t6	LCO: Low SG A Pressure setpoint	The "standard" CE plant auctioneers its SGLP signals from each SG, thereby using only one RPS trip unit. Palisades uses two trip units. Setpoint plant specific. Bypass removal at Palisades is part of the Zero Power Mode Bypass circuitry. Other plants use separate bypass bistable sensed from SG pressure. Hence, note c in STS is NA to Palisades.
3.3.1t7	3.3.1t6	2.3.1t6	LCO: Low SG B Pressure setpoint	Same as above (SG A Pressure).
3.3.1t8	3.3.1t4	2.3.1t3	LCO: High Pressurizer pressure setpoint	Plant specific setpoint, otherwise no change
Omitted	3.3.1t8	NA	LCO: (APD Hi Trip Setpoint)	NA to Palisades. This trip does not exist.
3.3.1t9	3.3.1t9a	2.3.1t4	LCO: TM/LPT setpoint	Palisades uses à digital Thermal Margin Monitor to generate Setpoint. Algorithm specified numerically in TS, rather than in Figures. Therefore, STS figures are deleted, and RTS uses an equation to specify setpoint constants, as in current TS.
Omitted	3.3.1t9b	NA	LCO: (SG Pressure Difference)	This function does not exist at Palisades.
3.3.1t10	3.3.1t10	NA	LCO: Loss of Load Trip Setpoint.	Allowable value omitted, since there is no analytical basis; Bypass, referenced by note b, is also plant specific. Otherwise no change
3.3.1t11	3.3.1t5	2.3.1t7	LCO: High Containment Pressure setpoint	Plant specific setpoint, otherwise no change

RTS Number	STS Number	TS Number	RTS (STS) requirement Description	Explanation of Differences
Omitted	3.3.2	NA	LCO: (4 RPS Channel required OPERABLE in MODES 3, 4, 5 etc.)	The APPLICABILITY has been included in 3.3.1. The CE standard plant only required Hi Start Up Rate to be OPERABLE in the lower modes. Palisades requires all trips.
3.3.2	3.3.3	3.17.1.1	LCO: RPS logic and manual trip channels OPERABLE; Modes 1-5	Reworded to reflect Palisades use of contactors rather than RTCBs. The contactors used at Palisades are part of the Initiation Logic, and are not tested separately, as are RTCBs. RTS APPLICABILITY is "more than one control rod capable of being withdrawn" rather than STS "any CEAs (control rods) capable of being withdrawn". This reflect the absence of RTCBs and the capability at Palisades to use a Rod Drop Test Panel to individually incapacitate control rods. It is consistent with TS usage, and reflects the assumption of a single stuck control rod in the SDM calculation.
3.3.2 A	3.3.3 A	3.17.1.4	COND: One matrix channel inoperable	Unchanged.
3.3.2 A.1	3.3.3 A.1	3.17.1.4 a	ACTN: Restore channel to OPERABLE; 48 hours	Unchanged.
3.3.2 B	3.3.3 B	3.17.1.5	COND: One initiation channel inoperable	Omitted reference to RTCBs, which Palisades does not have, and to inoperable manual trip channels. Manual trip channels are addressed in RTS condition C.
3.3.2 B.1	3.3.3 B.1	3.17.1.5 a	ACTN: De-energize affected CRDM power supplies; 1 hour	Reworded to reflect Palisades use of contactors rather than RTCBs. Otherwise the RTS reflects the STS actions. Palisades uses clutch power supplies in a selective two out of four logic similar to that employed by the RTCBs.
3.3.2 C	3.3.3 B	3.17.1.1	COND: One manual trip inoperable	Palisades has only two manual trip buttons, either of which trips the plant. They cannot be tested at power. Therefore they cannot be repaired at power.
3.3.2.C.1	Added	3.17.1.1 a	ACTN: Restore before startup	Manual trip cannot be tested at power. This is a plant specific difference from the CE standard plant which has four manual trip buttons in a selective two out of four logic. RTS Completion Time is the same as TS.
Omitted	3.3.3 C	NA	COND: (One ch. of manual, RTCBs, or init. inop in MODES 3, 4, 5)	Omitted. RTS similar to TS. STS Action C.1 is irrelevant in the case of manual trip, since it must be restored prior to startup, per RTS Action C.1. There are no RTCBs. Initiation logic is addressed by Condition B.1. Palisades TS makes no distinction between upper and lower MODES in LCO 3.3.1 from the standpoint of OPERABILITY.

RTS Number	STS Number	TS Number	RTS (STS) requirement Description	Explanation of Differences
Omitted	3.3.3 D	NA	COND: (Two ch. of RTCBs/init log. affecting same trip leg inop)	Condition NA to Palisades. This condition was written all later CE plants, which split matrix power supplies. It is thus possible to deenergize two supplies on loss of a vital bus or matrix power supply, deenergizing two trip paths. The condition was written to permit continued operation as long as the initiation logic deenergized as designed. In the case of Palisades, this is not a credible single failure, since the matrix supplies are fully auctioneered, and loss of a single supply will not deenergize two trip paths.
3.3.2 D	3.3.3 E	3.17.1.6	COND: Required Actions not met	Unchanged.
3.3.2 D.1	3.3.3 E.1	3.17.1.6 a	ACTION: Be in MODE 3, 6 hrs.	Unchanged.
3.3.2 D.2	3.3.3 E.2	3.17.1.6 b	ACTION: No more than 1 rod withdrawn; 30 hrs	Unchanged, except that Action B.2 reflects the slightly differing APPLICABILITY from the standard. In RTS, placing the plant in a condition in which the LCO does not apply requires assuring that no more than one rod can be withdrawn. 30 hrs for the completion time is explained in LCO 3.0.3
3.3.2.1	3.3.3.1	4.17.1t	SR: Channel Functional Test each Logic channel; 92 days	Unchanged, except reference to RTCBs is deleted. 92 day interval in accordance with CEN 327.
3.3.2.2	3.3.3.2	4.17.1t	SR: Channel Functional Test Manual trips; 7 days B4 startup	Unchanged.
Omitted	3.3.3.3	NA	SR: (Channel Functional Test RTCBs; 18 months)	Palisades does not use RTCBs.
3.3.3	3.3.4	3.16.1/3.17.2	LCO: Four ESF inst channels OPERABLE; Modes 1,2,3	Required Functions and specified allowable values are consistent with existing Palisades Tech Specs. Term ESFAS changed to ESF Instrumentation to be consistent with plant vernacular. There is no ESFAS as such at Palisades.
3.3.3 A	3.3.4 A	3.17.2.4	COND: One SIRWT Channel Inoperable	The Function, at Palisades, which has actions different from other ESF Functions is SIRWT Level, which provides Recirculation Actuation. Palisades has no CSAS signal; Containment Spray is initiated from Containment High Pressure (CHP) along with containment Isolation.
3.3.3 A.1	3.3.4 A.1	3.17.2.4 a	ACTN: Bypass inoperable RAS level switch; 8 hours	Action and Completion Time consistent with existing TS. It is preferable to bypass rather than trip RAS since inadvertent function actuation could result in switching SIS to a dry containment sump. 8 hours required due to absence of installed bypass capability.
3.3.3 A.2	Added	3.17.2.4 b	ACTN: Restore inoperable RAS channel; 7 days	Action and Completion Time consistent with TS.

RTS Number	STS Number	TS Number	RTS (STS) requirement Description	Explanation of Differences
3.3.3 B	3.3.4 B	3.17.2.2	COND: One ESF instrument channel inoperable, except SIRWT	Newer CE plants use an ESFAS cabinet with logic networks similar to the RPS. Palisades has no equivalent. Palisades typically uses a bistable in each instrument loop with its contact pairs wired into a 2 out of 4 logic. CHP uses pressure switches rather than instrument loops; RAS uses capacitance sensing level probes. There are no built in bypass or trip capabilities for each channel. SIRWT is excepted, as in TS, since it uses a selective two out of four logic, and the preferred failure mode for RAS is in an untripped condition.
Omitted	3.3.4.B.1	NA	ACTN: (place affected Trip Unit in bypass or trip)	This action is not proposed. It would comprise a new requirement for Palisades. Placing an inoperable channel in bypass provides no safety benefit over leaving it unbypassed, and in some instances could preclude trouble shooting or repair. Current TS does not have this requirement.
Omitted	3.3.4 B.2.1	NA	ACTN: (Restore in 48 hours)	Restore is always an option. This Action not in TS.
3.3.3 B.1	3.3.4.B.2.2	3.17.2.2 a	ACTN: Place affected trip unit in trip; 7 days	Action and completion time per TS. Requirement to bypass (STS Action B.1) is eliminated, since there are no installed bypass capabilities. Circuit modifications are required to trip the function.
3.3.3 C	3.3.4 C	3.17.2.3	COND: Two ESF Channels Inoperable	Unchanged except that RTS and TS except SIRWT level, and STS excepts CSAS. SIRWT is selective two out of four, and CSAS does not exist at Palisades.
3.3.3 C.1	3.3.4 C.1	3.17.2.3 a	ACTN: Place one trip unit in trip; 8 hours	Consistent with TS. STS allows 1 hour. This cannot be done at Palisades due to lack of built in trip capability. The STS bypass action was omitted since, at Palisades, only the RPS and AFAS trip units have a built in trip and bypass capability. The AFAS circuitry has no interlock preventing bypassing multiple channels. Associated ESF circuitry cannot be bypassed or tripped without lifting leads or opening links; such actions are neither advisable in a short time nor required for these circuits.
3.3.3 C.2	3.3.4 C.2	3.17.2.3 b	ACTN: Restore to OPERABLE, 7 days	7 days consistent with TS. STS allows 48 hours.
3.3.3 D	3.3.4 D/E	New	COND: One or two Bypass removal channels inoperable	Combined STS Conditions D and E. This is more conservative than STS.
3.3.3 D.1	3.3.4 D.1/E.1	New	ACTN: Disable the Bypass channels, 1 hour	Unchanged.

RTS Number	STS Number	TS Number	RTS (STS) requirement Description	Explanation of Differences
Omitted	3.3.4 D.2.1	NA	ACTN: (place affected trip unit in bypass or trip; 48 hrs)	The STS action is inappropriate for Palisades. Theis action is omitted because at Palisades the bypass instrument channels are combined into logic completely independently of the instrument channels of the bypassed function. The bypass is accomplished downstream of the bypass 3/4 enable logic. Therefore bypassing or tripping the affected ESF actuation trip unit would have no effect. Proposed Action 3.3.3 D.2 replaces STS Actions D.2.1, D.2.2.1, and D.2.2.2. Declaring the logic channel inoperable places the plant under Condition 3.3.4 A.
Omitted	3.3.4 D.2.2.1	NA	ACTN: (Restore bypass channel & affected trip units; 48 hours)	See discussion following omitted STS action d.2.1, above.
Omitted	3.3.4 D.2.2.2	NA	ACTN: (place in trip; 48 hrs)	See discussion following omitted STS action d.2.1, above.
3.3.3 D.2	Added	New	ACTN: Declare affected logic channel inoperable;1 hour	The wording reflects the fact that at Palisades the bypass instrument channels are combined into logic completely independently of the instrument channels of the bypassed function. The bypass is accomplished downstream of the bypass 3/4 enable logic. Declaring the logic channel inoperable places the plant under Condition 3.3.3 A.
Omitted	3.3.4 E	NA	COND: (2 bypass channels inoperable)	STS Conditions 3.3.4 D and 3.3.4 E were replaced by proposed Condition 3.3.3 D. The STS actions associated with those conditions are inappropriate for Palisades. The proposed action is more restrictive.
3.3.3 E	3.3.4 F	3.17.2.6	COND: Required Actions not met,	Unchanged
3.3.3 E.1	3.3.4 F.1	3.17.2.6 a	ACTN: Be in MODE 3, 6 hrs	Unchanged
3.3.3 E.2	3.3.4 F.2	3.17.2.6 b	ACTN: Be in MODE 4, 30 hrs	Unchanged except for completion time. Palisades used a 30 hour time to Mode 4.
3.3.3.1	3.3.4.1	4.17.2t	SR: Channel check ESF instruments; 12 hours	Excepted CHP and RAS from channel check since no indicators are provided in the trip initiating instrument channels. CHP uses pressure switches; RAS uses capacitance probe level detectors. This exception is not in STS, since normal analog transmitters are assumed.
3.3.3.2	3.3.4.2	4.17.2t	SR: CFT of each channel except SIRWT Level sw., 92 days	Unchanged except for SIRWT level switch exception. Capacitance probes are tested by physically lifting them above the existing fluid in the tank. This is not done at power.

RTS Number	STS Number	TS Number	RTS (STS) requirement Description	Explanation of Differences
Omitted	3.3.4.3	NA	SR: (CFT on Bypass removal Channels; 92 days before startup)	This would constitute a new requirement for Palisades. The actuation of the bypass removal bistable contacts is required, by definition, in the channel functional testing required by RTS SR 3.3.3.2. The functioning of the bypass removal logic is verified by RTS SR 3.3.3.3.
3.3.3.3	3.3.4.4	4.17.2t	SR: Perform CHANNEL CALIBRATION, 18 months	Unchanged. This CHANNEL CALIBRATION also includes a CHANNEL FUNCTIONAL TEST of the SIRWT Level Probes (by definition, a Channel Calibration includes a CFT). This satisfies TS Table 3.17.2 requirement for a CHANNEL FUNCTIONAL TEST on these probes. Capacitance probes cannot be tested at power. SR 3.3.3.2 exempts level switches. The bypass removal functions are also specified in this SR, as in STS 3.3.4.4. CHANNEL CALIBRATION. This is consistent with existing TS.
Omitted	3.3.4.5	NA	SR: (Response time test, 18 months)	Not required at Palisades. Not in TS. NRC evaluated this item during the Palisades Systematic Evaluation Program and concluded, Nureg 0820, Page 4-35, Item 4.22, that such testing would have little effect on risk and would not be required.
3.3.3-1t	3.3.4-1t	3.17.2t/3.17.3t	Tabl: Required ESF Inst. and setpoints	Tables similar in format. The MODES column has been deleted since all are applicable in MODES 1, 2, and 3. It was retained in STS in case there are plant-specific requirements for other MODES. Setpoints derived from Table 3.16 in TS. Signal naming consistent with Palisades vernacular. Palisades does not have many of the traditional actuation signals, and groups them differently. Naming and grouping consistent with TS.
3.3.3-1t1	3.3.4-1t1	3.16t/3.17.2t	LCO: SIS Inst	Unchanged except name change from SIAS to SIS
3.3.3-1t1a	3.3.4-1t1b	3.16.t/3.17.2t	LCO: Pressurizer Pressure SIS input	Unchanged, uses Palisades setpoint and bypass setpoint per note a.
Omitted	3.3.3-1t1a	NA	LCO: (Cont. Press. input to SIS)	Palisades does not have separate CHP instrumentation input channels to SIS. The CHP actuation logic is an input to SIS, as in LCO 3.3.4
3.3.3-1t2	3.3.4-1t3	3.16t/3.17.2t	LCO: CHP Signal	The CHP signal at Palisades is similar to the CIAS in STS. The CHP logic output isolates containment, and provides a logic input to SIS, which is addressed in LCO 3.3.4. Palisades setpoints used
3.3.3-1t2a/b	3.3.4-1t3a	3.16t/3.17.3t	LCO: Cont. Press. left and right train	Palisades has train-specific sensor channels. This differs from the CE standard design. The resulting logic output is the CHP. The CHR is a separate signal which isolates a similar though different subset of components. This also differs from the CE standard.

RTS Number	STS Number	TS Number	RTS (STS) requirement Description	Explanation of Differences
3.3.3-1t3/3a	3.3.4-1t3b	3.16t/3.17.3t	LCO: Cont High Radiation	CHR employs four sensor channels, but is a different actuation signal from CHP.
3.3.3-1t4	3.3.4-1t4	3.16t/3.17.3t	LCO: SGLP	The SGLP signals are analogous to the MSIS in STS.
3.3.3-1t4a/b	3.3.4-1t4a	3.16t/3.17.3t	LCO: SG Press low SG A, B	The SGLP uses two out of four logic from both SGs. Either SGLP input closes both MSIVs, but generator-specific feedwater isolation. This differs from the standard. The SG pressure low bypass is similar to STS, but uses plant specific setpoints. Note d in STS allows MSIS to be inoperable when the associated valves are closed and deactivated. This provision is not in current Palisades TS, and the note has been eliminated.
3.3.3-1t5	3.3.4-1t6	3.16t/3.17.2t	LCO: AFAS	Palisades AFAS does not have SG Delta P logic. It feeds on low water level only. Therefore the STS Table 3.3.4-1t5c is Not Applicable to RTS.
3.3.3-1t5a/b	3.3.4-1t5a/b	3.16t/3.17.2t	LCO: SG water level input to AFAS	Similar in concept to STS.
3.3.3-1t6	3.3.4-1t5	3.16/3,17,2t	LCO: RAS signal	Similar to standard
3.3.3-1t6a	3.3.4-1t5a	3.16/3.17.2t	LCO: Low SIRWT Level RAS input	Similar to STS, but Level switches used at Palisades.
Omitted	3.3.4-1t2	NA	LCO: (CSAS)	There is no CSAS unction at Palisades. Containment spray is one of several SIS functions.
3.3.4	3.3.5	3.17.2/.3	LCO: Two ESF Manual & two actuation channels; Modes 1,2,3	Reworded to reflect Palisades hardware & applicability removed from table. Palisades does not have actuation Logic separate from the instrument channels, but uses actuating relays arranged into two trains. The APPLICABILITY for all Palisades ESF functions is the same so the column was removed from the table to the applicability line.
3.3.4 A	3.3.5 A/C	3.17.2.1/3.1	COND: One ESF manual channel or actuation train inoperable	RSTS conditions combined since, with all functions having the same APPLICABILITY, hence the required actions are identical.
3.3.4 A.1	3.3.5 A/C	3.17.2.1a/3.1a	ACTN: Restore inoperable ESF actuation channel; 48 hours	Unchanged.
3.3.4 B	3.3.5 B	3.17.2.6/3.5	COND: Required Action not met	Unchanged.
3.3.4 B.1	3.3.5 B.1	3.17.2.6a/3.5a	ACTN: Be in Mode 3; 6 hours	Unchanged.
3.3.4 B.2	3.3.5 B.2	3.17.2.6b/3.5b	ACTN: Be in Mode 4; 30 hours	Used Palisades time to Mode 4.
Omitted	3.3.5 D	NA	COND: (Required Action not met)	No equipment required in Mode 4 addressed by LCO.

RTS Number	STS Number	TS Number	RTS (STS) requirement Description	Explanation of Differences
3.3.4.1	3.3.5.1	4.17.2t.3.a	SR: Channel Functional Test AFAS trains; 92 days	Specified only SIS and AFAS since other ESF actuation trains cannot be tested on line. A Channel Functional Test is specified for the remaining ESF trains each 18 months. Notes in STS omitted since they are not applicable to Palisades equipment.
3.3.4.2	3.3.5.1	4.17.2t.1b	SR: Channel Functional Test SIS logic, normal and lop, 92 days	See 3.3.4.1 discussion, above.
3.3.4.3	3.3.5.1	4.17.2t/3t	SR: Channel Functional Test ESF trains; 18 months	See explanation for 3.3.4.1, above.
3.3.4.4	3.3.5.2	4.17.2t/3t	SR: Channel Functional Test ESF manual channels; 18 months	Unchanged.
3.3.4t1	3.3.5t1	3.17.2t1	LCO: Two SIS Manual, CHP input, & actuation channels	Similar, except RTS lists components of the SIS. STS does not. This is needed since SIS has a CHP logic input which must be addressed. Mode applicability deleted, since they are all the same and addressed by the LCO APPLICABILITY statement.
3.3.4t2	3.3.5t3	3.17.3t1	LCO: Two CHP Manual & actuation channels.	CHP manual is by individual component actuation, per note a. CHP is analogous to CIAS. MODEs addressed by APPLICABILITY
3.3.4t3	3.3.5t3	3.17.3t2	LCO: Two CHR Manual & actuation channels	MODEs addressed by APPLICABILITY. CHR operates an overlapping subset of components with CHP.
3.3.4t4	3.3.5t4	3.17.3t3	LCO: Two SGLP Manual & actuation channels	MODEs addressed by APPLICABILITY. Manual actuation by individual components per note a.
3.3.4t5	3.3.5T6	3.17.2t3	LCO: Two AFAS Manual & actuation channels	MODEs addressed by APPLICABILITY. manual actuation by individual components, per note a
3.3.4t6	3.3.5t5	3.17.2.2	LCO: Two RAS Manual & actuation channels	MODEs addressed by APPLICABILITY. Manual actuation by individual components (note a)
3.3.5	3.3.6	New	LCO: Two UV channels per DG OPERABLE; when DG required	Reworded LCO to use Palisades usage (we do not use LOVS acronym) and to reflect the use of three sensors in both the undervoltage and loss of voltage functions. Palisades has two UV channels per DG, one time-undervoltage (degraded voltage), and one loss of voltage. APPLICABILITY reflects when the capability is needed.
3.3.5 A	3.3.6A/B/C	New	COND: One or more UV channel inoperable	Palisades has three sensors per function in a 1 out of 3 logic. There is neither trip nor bypass capability. If inoperable, the associated logic is inoperable. This differs from the standard. Therefore it does not matter how many sensor channels are inoperable, and conditions are combined.

RTS Number	STS Number	TS Number	RTS (STS) requirement Description	Explanation of Differences
Omitted	3.3.6 A.1	NA	ACTN: (Place channel in bypass or trip.)	This step is inappropriate. There is no installed bypass capability. If inoperable, the inoperable channel must be restored to OPERABLE.
Omitted	3.3.6 A.2.1	NA	ACTN: (Restore UV channel; 48 hours)	Deleted. Preference is to declare DG inoperable. There is no built in trip capability as per STS A.2.2.
Omitted	3.3.6 A.2.2	NA	ACTN: Place the UV channel in trip; 48 hours	There is no built in trip capability as per STS A.2.2.
3.3.5 A.1	3.3.6 B.1/C./D	New	ACTN: Declare DG inoperable; immediately	Action consistent with similar STS Condition B and Action B.1. STS Completion time shortened to Immediately. This is consistent with the RTS condition statement of "one or more sensor or logic channels inoperable per DG inoperable". Logic channels mentioned in condition statement to address auxiliary relays which actuate the UV start from the primary sensing relays. This RTS action also addresses the STS shutdown track of STS Condition D.
Omitted	3.3.6.1	NA	SR: Channel check UV channels; 12 hours	There is no instrumentation associated with the UV sensors to channel check.
Omitted	3.3.6.2	NA	SR: Channel Functional Test UV channels; 92 days	This SR is inappropriate for the Palisades system. There is no provision for such testing without actually de-energizing and stripping the associated class 1E bus. The RSTS carries a note excluding testing of the end devices, in a relay system there is nothing else. Note that a Channel Functional test is includes, by definition, into the channel calibration.
3.3.5.1	3.3.6.3	New	SR: Channel Calibration, UV channels; 18 months	Unchanged. Plant specific numbers used.
3.3.6	3.3.7	3.17.6t 20	LCO: Two refueling CHR channels OPERABLE; Mode 6	Palisades has no comparable system to the CPIS of STS LCO 3.3.7. Purge isolation is accomplished by CHP or CHR which are addressed by LCO 3.3.4. However, during refueling, additional refueling radiation monitors are manually switched into the CHR logic to provide complete CHR isolation in the event of fuel handling accidents. There is one monitor per train. Hence, STS LCO 3.3.7 is the pattern, though actions differ. Since one out of one logic is employed, and all containment isolation valves are actuated, actions related to one inoperable channel in a two out of four logic system are inappropriate, as are actions requiring only closure of CPIS valves. Applicability is same as STS CPIS. It is similar to TS, where operability is required during refueling. RTS requires 2 channels OPERABLE. STS only requires one OPERABLE.

RTS Number	STS Number	TS Number	RTS (STS) requirement Description	Explanation of Differences
3.3.6.A	3.3.7 A/B	3.17.6 20	COND: One or two Refueling CHR inoperable	RTS A Condition encompasses Conditions A and B of STS, since in a 1 out of 1 logic channel, each monitor disables one entire train.
Omitted	3.3.7 A.1	NA	ACTN: Place channel in trip; 4 hours	This action was omitted because it is inappropriate for a system with 1 out of 2 logic.
3.3.6 A.1	3.3.7 A.2.1	3.17.6.20 a	ACTN: Suspend core alterations	Unchanged.
3.3.6 A.2	3.3.7 A.2.2	New	ACTN: Suspend fuel movement	Unchanged.
Omitted	3.3.7 B	NA	COND: > 1 chnl, 1 manual chnl, or logic inoperable	Condition B and associated actions omitted. Actions required under condition A take plant out of applicable conditions. There is no logic network at Palisades other than for the Manual actuation, which uses the operating CHR logic. Manual actuation is part of the "channel" and need not be addressed seperately.
3.3.6.1	3.3.7.1	4.17.6t 20	SR: Refueling monitor CHANNEL CHECK 24 hrs	Unchanged from STS and TS. Frequency of 24 hours vice 12 hrs in STS to be consistent with TS.
3.3.6.2	3.3.7.2	4.17.6t 20	SR: Refueling Monitor CHANNEL FUNCTIONAL TEST, 31 days	Unchanged from STS, except STS interval is 92 days. 31 days is TS value
Omitted	3.3.7.3	NA	SR: Logic channel CHANNEL FUNCTIONAL TEST, 31 days	The Refueling Monitors actuate the CHR relays directly. Each channel is effectively 1 out of 1 logic. There is no multi channel logic to be tested, other than that tested by the manual actuation SR.
3.3.6.3	3.3.7.4	4.17.6t 20	SR: Refueling Monitor CHANNEL CALIBRATION, 18 months.	Same as TS and STS
3.3.6.4	3.3.7.5	New	SR: CHANNEL FUNCTIONAL TEST on manual channel	Unchanged.
Omitted	3.3.7.6	NA	SR: Verify Response Times	Palisades not required to do response time tests
Omitted	3.3.8	NA	LCO: CRIS system OPERABLE; Modes 1,2,3,4, Etc	Palisades has no comparable system. Control room isolation is accomplished by CHP or CHR which are addressed by LCO 3.3.4.
Omitted	3.3.9	NA	LCO: CVCS isolation channels OPERABLE; Modes 1, 2, 3, 4	Palisades has no comparable system
Omitted	3.3.10	NA	LCO: SBFAS channels OPERABLE; Modes 1, 2, 3, 4	Palisades has no comparable system
3.3.7	3.3.11	3.17.4	LCO: AMI Instruments (Tabl 3.3.7-1) OPERABLE Modes 1, 2, 3	Unchanged, except name "PAMI" changed to "AMI" to be consistent with plant vernacular. LCO conditions and actions were retained as in TS. Only format changed as in STS

RTS Number	STS Number	TS Number	RTS (STS) requirement Description	Explanation of Differences
3.3.7 A	3.3.11 A	3.17.4.1/5	COND: One AMI channel inoperable,	Unchanged
3.3.7 A.1	3.3.11.A.1	3.17.4.1a/5a	ACTN: Restore in 7 days	Unchanged except STS allows 30 days. No change from TS.
3.3.7 B	3.3.11 C	3.17.4.2/6	COND: Two required channels inop	Unchanged except for deletion STS of note exempting hydrogen monitors. Condition as in TS
3.3.7 B.1	3.3.11 C.1	3.17.4.2.a	ACTN: Restore in 48 hours	Unchanged from STS except STS completion time is 7 days. No change from TS
3.3.7 C	3.3.11 F	3.17.4.4/7	COND: Required actions not met	Eliminated use of STS Condition E to reference STS Condition F. Condition wording cleaner and more straightforward for Palisades AMI without Condition E. Same condition applicability as TS
3.3.7 C.1	3.3.11 F.1	3.17.4.4.a	ACTN: Be in MODE 3; 6 hrs	Unchanged.
3.3.7 C.2	3.3.11 F.2	3.17.4.4.b	ACTN: MODE 4 30 hrs	Unchanged except for Palisades MODE 4 completion Time of 30 hours. TS presently allows 48 hours to MODE 4.
3.3.7 D	3.3.11 B/G	3.17.4.7	COND: Required Actions not met	Eliminated use of STS Condition E to refer to STS Condition G. Condition wording cleaner and more straightforward for Palisades AMI without Condition E. Same condition applicability as in TS.
3.3.7 D.1/2	3.3.11 B.1/G.1	3.17.4.7 c	ACTN: Init. Act. iaw 5.6.7,immed; restore after MODE 6 entry	Same actions as TS. RTS D.1 similar to STS G.1. Added restoration provision as in TS
Omitted	3.3.11 D	NA	COND: Two Hydrogen monitors inoperable	There is no separate provision for hydrogen monitors in TS. TS provisions retained.
Omitted	3.3.11 E	NA	COND: Refer to table for SD Track	Grouping of AMI function at Palisades makes table entry per Cond. E redundant. No other LCO uses this method, which is suitable for involved tables, but confusing otherwise.
3.3.7.1	3.3.11.1	4.17.4t	SR: Channel Check AMI instruments; 31 days	Unchanged from STS, except that STS statement "that is normally energized" is eliminated" since all are normally energized. Containment valve position is exempted since there is only one channel of indication. Same as TS
3.3.7.2	3.3.11.2	4.17.4t	SR: Perform a CHANNEL CALIBRATION, 18 months	Unchanged except note excepting Excore detectors is eliminated since it is included in the definition of CHANNEL CALIBRATION

RTS Number	STS Number	TS Number	RTS (STS) requirement Description	Explanation of Differences
3.3.7-1t	3.3.11-1t	3.17.4t	SR: Table of AMI Instrumentation	Table entries identical to TS. Third column in STS table eliminated since table entry to establish shutdown track is no longer required. Refer to discussion of omitted STS LCO 3.3.11.E, above.
3.3.8	3.3.12	3.17.5	LCO: Alternate Shutdown System (C-150) OPERABLE; Modes 1,2,3	unchanged.
3.3.8 A	3.3.12 A	3.17.5.1	COND: One or more channel inoperable	Unchanged except STS "Functions" replaced with TS actions used throughout this LCO.
3.3.8 A.1	Added	3.17.5.1a	ACTN: Provide alternate monitoring, 7 days	No equivalent STS Action, since table is function based rather than channel based, ability to provide alternate monitoring is implicit in the STS. This action is the same as in TS.
3.3.8 A.2	3.3.12 A.1	3.17.5.1b	ACTN: Restore to OPERABLE, 60 days	Unchanged except STS has 30 day completion time. 60 days is in TS. Note that in RTS alternative monitoring is in place from Action A.1.
3.3.8 B	3.3.12 B	3.17.5.2	COND: Required Action not met	Unchanged.
3.3.8 B.1	3.3.12 B.1	3.17.5.2a	ACTN: Be in Mode 3; 6 hours	Unchanged.
3.3.8 B.2	3.3.12 B.2	3.17.5.2b	ACTN: Be in Mode 4; 30 hours	Used Palisades time to Mode 4. TS allows 48 hours
3.3.8.1	3.3.12.1	4.17.5t	SR: Channel Check C-150 Instruments; 92 days	SR Flux and AFW flow indication omitted from channel check because these instruments will normally have no indication during power operation. Specified 92 days (the frequency specified in existing Palisades Tech Specs), rather than 31 days used in RSTS, since Palisades instruments use same transmitter as one control room channel. A channel check requires switching the control room channel out of service to verify operability of the remote channel, causing the associated alarms, etc., to actuate. The existing SR frequency was approved in TS amendment #85(?).
3.3.8.2	Added	4.17.5t a	SR: channel check neutron flux, 7 days before Startup	This is consistent with CFT of the neutron flux channel in LCO 3.3.1, and per existing TS.
Omitted	3.3.12.2	4.17.5t19,20	SR: verify control circuits, transfer switches, 18 months.	Redundant. All functions use transfer switches. Transfer switches and controls are automatically checked when associated instrumentation is tested.
3.2.8.3	Added	4.17.5t	SR: CHANNEL CHECK of AFW Flow, 18 months	Refer to discussion under SR 3.3.8.1. Same as TS.
3.3.3.4	Added	4.17.5t	SR: CHANNEL FUNCTIONAL TEST AFW controls	Refer to discussion under SR 3.3.8.1. Same as TS.

RTS Number	STS Number	TS Number	RTS (STS) requirement Description	Explanation of Differences
3.3.8.5	3.3.12.3	4.17.5t	SR: CHANNEL CALIBRATION, 18 months	Unchanged, except for deletion of STS note exempting excore detectors. This note is addressed in the definition of CHANNEL CALIBRATION
Omitted	3.3.12.4	NA	SR: Response Time Testing, 18 months	No TS requirement.
3.3.8-1	3.3.12-1	3.17.5t	Tabl: Required AHSD Panel Instruments	Listed Palisades installed equipment, as in existing Tech Specs. Transfer switches omitted, since their operability is demonstrated by performing a channel check.
3.3.9	3.3.13	3.17.6.1	LCO: Two neutron flux channels OPERABLE; Modes 3, 4, 5	Specified "Neutron Flux" channels, since, at Palisades, these are the instruments providing Flux level information during shutdown periods. APPLICABILITY reflects that LCO 3.3.1 protects when more than one rod can be withdrawn
3.3.9 A	3.3.13 A	3.17.6.1	COND: One SR channel inoperable	Unchanged.
3.3.9 A.1	3.3.13 A.1	3.17.6.1a	ACTN: Suspend + reactivity Additions; immediately	Unchanged.
3.3.9 A.2	3.3.13 A.2	3.17.6.1b	ACTN: Perform SDM calculation; 4 hours & every 12	Unchanged.
3.3.9.1	3.3.13.1	4.17.6t1	SR: Channel Check SR channels; 12 hours	Unchanged.
Omitted	3.3.13.2	NA	SR: Channel Functional Test SR channels; 92 days	CFT Consistent with LCO 3.3.1 frequency. Palisades has only two channels which are not tested at power.
3.3.9.2	Added	4.17.6t1	SR: Channel Calibration SR channels; 18 months	Refer to above discussion (STS Omitted SR 3.3.13.2). Neutron detectors omitted from calibration requirement by CHANNEL CALIBRATION definition.
3.3.10	Added	3.17.6.19	LCO: Two SFP Rad Monitors Operable	Unchanged from TS 2.17.6, Item 19 (Fuel Pool Area Radiation Monitor
3.3.10 A	Added	3.17.6.19	COND: One or 2 SFP Monitors Inoperable:	Unchanged in intent
3.3.10.A.1	Added	3.17.6.19.a)	ACTN: Suspend fuel movement.	Unchanged from 3.17.6.19a) in intent. 3.17.6.19 a) Required Action is to "Stop Refueling Operations in the containment".
3.3.10.A.2	Added	3.17.6.19.b)	ACTN: Restore in 72 hrs or provide equivalent monitoring	Unchanged.

ENCLOSURE 1

CONSUMERS POWER COMPANY
PALISADES PLANT
DOCKET 50-255

TECHNICAL SPECIFICATION CHANGE REQUEST

PART 7 - SECTION 3.4

March 28, 1996

CONSUMERS POWER COMPANY
Docket 50-255
Request for Change to the Technical Specifications
License DPR-20

3.4 PRIMARY COOLANT SYSTEM CHANGE REQUEST

It is requested that the Primary Coolant System (PCS) requirements of the Technical Specifications contained in the Facility Operating License DPR-20, Docket 50-255, issued to Consumers Power Company on February 21, 1991, for the Palisades Plant be changed as described below:

I. ARRANGEMENT AND CONTENT OF THIS PART OF THE CHANGE REQUEST:

This section of the Technical Specification Change Request (TSCR) proposes changes to those Palisades Technical Specification requirements addressing the PCS system. These changes are intended to result in requirements which are appropriate for the Palisades plant, but closely emulate those of the Standard Technical Specifications, Combustion Engineering Plants, NUREG 1432, Revision 1.

This discussion and its supporting information frequently refer to three sets of Technical Specifications; the following abbreviations are used for clarity and brevity:

TS - The existing Palisades Technical Specifications,
RTS - The revised Palisades Technical Specifications,
STS - NUREG 1432, Revision 1.

Six attachments are provided to assist the reviewer. The numbering and content of the attachments is consistent with other parts of the TSCR.

1. Proposed RTS pages
2. Bases for the RTS
3. A line by line comparison of the TS and RTS
4. STS pages marked to show the differences between RTS and STS
5. STS Bases pages marked to show differences between RTS and STS Bases.
6. A line by line comparison of RTS and STS.

Attachment 3, the line by line comparison of TS and RTS, is presented in a tabular format. The first page contains an explanation of the syntax and abbreviations used. The table is arranged numerically by TS item number. Each requirement in Sections 1 through 4 of TS is listed individually. In some cases, where a single numbered TS requirement contains more than one requirement, each requirement is listed individually under the same number. Requirements which appear in RTS or STS, but not in TS, do not appear in the Attachment 3 listing.

Attachment 3 Provides the Following Information For Each TS Requirement:

Identifying number of TS item,
Identifying number of closest equivalent RTS item,
Identification of TS item as LCO, Action, SR, etc.,
A short paraphrase of requirement,
A description of each proposed change from TS to RTS.

Classification of Change as One of the Following Categories:

ADMINISTRATIVE - A change which is editorial in nature, which only involves movement of requirements within the TS without affecting their technical content, or clarifies existing TS requirements.

RELOCATED - A change which only moves requirements, not meeting the 10 CFR 50.36(c)(2)(ii) criteria, from the TS to the FSAR, to the Operating Requirements Manual, or to other documents controlled under 10 CFR 50.59.

MORE RESTRICTIVE - A change which only adds new requirements, or which revised an existing requirement resulting in additional operational restriction.

LESS RESTRICTIVE - A change which deletes any existing requirement, or which revises any existing requirement resulting in less operational restriction.

Attachment 6, the line by line comparison of RTS and STS, is also presented in a tabular format. The first page contains an explanation of the syntax and abbreviations used; the second page contains a list of Palisades terminology used in place of the generic STS terminology. The table is arranged numerically by RTS item number. Each requirement in Sections 1 through 3 of RTS or STS is listed individually. Requirements which appear in TS, but not in RTS or STS, do not appear in the Attachment 6 listing.

Attachment 6 Provides the Following Information for Each RTS Requirement:

Identifying number of RTS requirement,
Identifying number of equivalent STS requirement,
Identification of each requirement as LCO, Action, SR, etc.,
Short paraphrase of each requirement,
A description of each proposed change from STS to RTS.

II. TECHNICAL SPECIFICATION CHANGES PROPOSED:

The TS LCOs and action statements for the PCS components appear in Sections 3.1, 3.3, 3.10 and 3.17. The TS surveillance requirements appear in TS Section 4. Requirements for some of the instrumentation used to monitor pressurizer safety valve and PORV flow do not meet the criteria of 10 CFR 50.36(c)(2)(ii) and have been relocated to the Operating Requirements Manual. All RTS requirements for the PCS components appear in proposed Section 3.4. Each proposed change from TS to RTS is discussed in the attachments to this part of the TSCR.

Each proposed change to a requirement in TS is described in Attachment 3.

Those proposed RTS requirements which have no counterpart in TS are described in Attachment 6. These new requirements are identified by the word "New" in the third column of Attachment 6.

The Major Changes From TS to RTS Proposed in This Part of the TSCR are:

1. Power operations with less than four PCPs was deleted.

2. PCS pressure-temperature limits were RELOCATED to the Pressure and Temperature Limits Report (PTLR).

3. TS Action 3.3.3 b (PCS PIVs) requires: "at least two valves in each high pressure line having a non-functional valve must be in and remain in the mode corresponding to the isolated condition." Closing a manual valve or removing power from the normally closed control valve would make one train of Safety Injection inoperable. No completion time is specified in the TS for closing the isolation valves. If both PIVs in the flow path are leaking, the closed and deactivated control valve will be the only OPERABLE isolation valve available in the high pressure piping. Since a second isolation valve is not available in the high pressure piping, the plant would be shutdown using TS LCO 3.0.3.

   RTS Action 3.4.14 A.1 and A.2 allow one PIV in a flow path to be inoperable for 72 hours. If the PIV is not restored, the plant is placed in MODE 5 within 36 hours without requiring one train of Safety Injection to be made inoperable by deactivating the control valve or closing a manual valve. If both PIVs in a flow path do not meet the leakage requirement, then an isolation valve must be closed within 4 hours. One train of Safety Injection will be inoperable and the plant will be placed in MODE 5 within 36 hours.

   This change is considered to be MORE RESTRICTIVE since the allowed operating time with one inoperable PIV in a flow path of 72 hours is specified in the RTS and no completion time to close the isolation valve is specified in the TS. Also, RTS required actions allow the plant to shutdown in the more desirable plant configuration of having all of the Safety Injection flow paths OPERABLE. If both PIVs in a flow path have excessive leakage, the required actions in TS and the RTS are equivalent.

4. In each section of the proposed RTS, new requirements taken from STS have been proposed. Since there is no equivalent requirement in TS, these changes do not appear in Attachment 3. The new requirements do appear in Attachment 6 where they are identified by an entry of "New" or "3.0.3" in the third column.

   The changes identified as "New" are considered MORE RESTRICTIVE because they add requirements and operating restrictions which do not exist in the current Palisades TS.

The changes identified as "3.0.3" are considered LESS RESTRICTIVE because they extend the time available to restore compliance to the LCO (the Allowed Outage Time) beyond that allowed by LCO 3.0.3. In these cases, the proposed RTS contain a specific Action where the existing TS do not contain any Action for the associated LCO. These instances do not involve a loss of safety function, but occur due to the lack of structure of Technical Specifications circa 1970. There was not necessarily an intent that failure to meet these LCOs would force a plant shutdown or an entry into LCO 3.0.3 (the original TS contained no equivalent of LCO 3.0.3).

<u>The major differences between RTS and STS in this part of the TSCR are</u>:

1. The RTS allows reduced Shutdown Cooling (SDC) flow rate for testing and maintenance activities. Additional charging pump restrictions and Shutdown Margin (SDM) surveillance are required based on requirements in the TS.

2. Restrictions and actions in LCO 3.4.11, "Pressurizer Power Operated Relief Valves (PORVs)" reflect plant operations above 430°F with the block valve being closed.

3. When the PCS temperature is less than 300°F, the HPSI pumps must be rendered incapable of injecting into the PCS as required by the LTOP analysis. The HPSI pumps are available for inventory makeup.

4. PCS leakage detection instrument requirements are more lenient reflecting Palisades installed equipment.

5. The required steam generator secondary water level with forced circulation is much lower (-84% wide range) than the level specified in the STS (25% narrow range).

III. NO SIGNIFICANT HAZARDS ANALYSIS:

Each change proposed is classified in Attachment 3 as either ADMINISTRATIVE, RELOCATED, MORE RESTRICTIVE, or LESS RESTRICTIVE.

<u>Analysis of ADMINISTRATIVE, RELOCATED, and MORE RESTRICTIVE Changes</u>:

ADMINISTRATIVE changes and RELOCATED changes move requirements, either within the TS or to documents controlled under 10 CFR 50.59, or clarifying existing TS requirements, without affecting their technical content. Since ADMINISTRATIVE and RELOCATED changes do not alter the technical content of any requirements, they cannot involve a significant increase in the probability or consequences of an accident previously evaluated, create the possibility of a new or different kind of accident from any previously evaluated, or involve a significant reduction in a margin of safety.

MORE RESTRICTIVE changes only add new requirements, or revise existing requirements to result in additional operational restrictions. Since the TS, with all MORE RESTRICTIVE changes incorporated, will still contain all of the requirements which existed prior to the changes; MORE RESTRICTIVE changes cannot involve a significant increase in the probability or consequences of an accident previously evaluated, create the possibility of a new or different kind of accident from any previously evaluated, or involve a significant reduction in a margin of safety.

Analysis of LESS RESTRICTIVE Changes:

The LESS RESTRICTIVE changes proposed in this part of the TSCR are:

1. TS Action 3.1.1.g(1) requires the reactor inlet temperature to be restored to within limits within 30 minutes. The corresponding completion time in RTS LCO 3.4.1 C.1 (PCS Pressure, Temperature and Flow Limits) is 2 hours which is the same completion time specified in STS.

2. TS LCO 3.1.1.g does not contain specific actions to be taken if the reactor inlet temperature is not restored to within limits within 30 minutes. Therefore the requirements in TS LCO 3.0.3 are applicable. TS LCO 3.0.3 requires that the plant be in COLD SHUTDOWN within 24 hours when the inlet temperature is not restored to within limits during the allowed completion time. RTS LCO 3.4.1 D.1 allows continued power operation at $\leq$ 30% Rated Thermal Power (RTP) which is the same action specified in the STS.

3. TS LCO 3.1.4.b allows the specific activity to be between 1.0 and 40 μCi/gm for a maximum of 36 days per calendar year. This restriction was not included in RTS 3.4.16 (PCS Specific Activity). The required actions in the STS did not include a similar restriction.

4. TS LCO 3.1.7.1 requires pressurizer safety valves to be OPERABLE above COLD SHUTDOWN. RTS LCO 3.4.10 (Pressurizer Safety Valves) applicability is MODES 1, 2 and 3 with PCS temperature above 430°F which is very similar to the applicability statement in the STS.

5. TS Action 1.b of 3.1.9.1 requires maintaining the PCS temperature as low as practical with available equipment. The LCOs in the RTS and the STS provide the necessary decay heat removal requirements to ensure safe plant operations.

6. TS Action 1.b of 3.1.9.2 requires maintaining the PCS temperature as low as practical with available equipment. The LCOs in the RTS and the STS provide the necessary decay heat removal requirements to ensure safe plant operations.

7. TS Action 1.b of 3.1.9.3 requires maintaining the PCS temperature as low as practical with available equipment. The LCOs in the RTS and the STS provide the necessary decay heat removal requirements to ensure safe plant operations.

8. TS Surveillance Requirement in 4.2.1.1 specifics a frequency for gross activity determination of 3 times/7 days with a maximum of 72 hours between samples. RTS Surveillance Requirement 3.4.16.1 frequency for the measurement is 7 days which is the same frequency specified in STS.

9. TS Surveillance Requirement in Table 4.2.2 for item number 7 specifies a daily evaluation of primary system LEAKAGE. The corresponding frequency in RTS Surveillance Requirement 3.4.13.1 frequency for RTS LCO 3.4.13 (PCS Operational LEAKAGE) is 72 hours which is the same frequency specified in STS.

10. TS Surveillance Requirement in Section 4.15 specifies that the PCS flow rate measurement shall be made within the first 31 days of rated power operation. RTS Surveillance Requirement 3.4.1 does not include the 31 day requirement, but requires the PCS flow rate measurement to be performed 24 hours after ≥ 90% RTP. The RST flow rate surveillance will normally occur within 10 days of power operations following startup from the refueling outage. Since the 31 day requirement was deleted and steady state operations above 90% RTP may occur after the 31 day period, the RTS frequency could be considered to be LESS RESTRICTIVE.

11. The proposed Action to be taken if both PORVs become inoperable differs from both TS and STS. Both TS Action 3.1.8.2 b and STS Action 3.4.12 G.1 require the PCS to be depressurized and vented within 8 hours, if both PORVs become inoperable. The proposed RTS extend the time allowed to depressurize the PCS to 24 hours, but add a requirement to cool the PCS to Shutdown Cooling entry conditions (i.e., MODE 4) and open the shutdown cooling suction valves within 8 hours.

    This difference between RTS and STS is necessary because of the different LTOP LCO applicabilities of the RTS and STS. RTS require the PORVs to be operable for LTOP when the PCS temperature is below 430°F; STS require the PORVs to be operable for LTOP when RCS temperature is below 285°F. The RTS applicability is derived from the Palisades Appendix G analyses, and was approved as Amendments 117, 131, and 160 to the existing license. The maximum temperature at which the condition could be discovered for the RTS is 430°F as opposed to 285°F for the STS. It is not desirable to attempt to cool the PCS from 430°F to ≤ 200°F within 8 hours when no PORVs are available for LTOP. The proposed RTS Action requires that the shutdown cooling suction valves be opened within 8 hours. With those valves open, the Shutdown Cooling relief valves provide the required overpressure protection. The RTS allowed outage time for operation without overpressure protection of 8 hours is unchanged from STS. The Action to depressurize and vent the PCS has been retained, but the completion time has been extended to 24 hours.

The existing TS contain the same requirement as the STS to depressurize and vent the PCS within 8 hours. That action was added to the TS on December 21, 1982, by Amendment 72. At that time the applicability for the associated LCO (3.1.8) was 250°F, so the 8 hour completion time was not overly restrictive. Subsequently, TS Amendment 117 revised the applicability for LCO 3.1.8 to ≤ 430°F, but did not make a corresponding revision to the completion time for depressurizing and venting the PCS. LCO 3.1.8 has subsequently been revised by Amendment 160, but the applicability and the 8 hour completion time remains unchanged. The requirement to cool the PCS from 430°F to ≤ 212°F is within the TS limitations for PCS cooldown, but does not allow sufficient time to cool the pressurizer to allow PCS depressurization.

This change is classified as LESS RESTRICTIVE due to the extension of the PORV AOT (the Completion Time for venting of the PCS).

12. Exception 1 to TS 3.1.9.2 allows intentionally stopping SDC flow for up to 1 hour when PCS temperature is less than 200 °F and the PCS loops are filled. Part a of the exception states that: "No operations are permitted that would cause reduction of PCS boron concentration or PCS inventory." Note 1 of STS LCO 3.4.7 RCS Loops-MODE 5, Loops Filled prohibits operations that would reduce boron concentration, but it does not prohibit an inventory reduction. The circumstances for stopping both SDC trains are limited to situations where pressure and temperature increases can be maintained well within the allowable pressure and 10°F subcooling limits. The note prohibits boron dilution when SDC forced flow is stopped because an even concentration distribution cannot be ensured. With the PCS in the solid condition, the plant operators will need to use the PCS letdown system to control PCS pressure as the temperature increases after stopping the SDC flow rate. The proposed RTS LCO 3.4.7 contains the same note as the STS. This change is considered to be LESS RESTRICTIVE since the no inventory reduction requirement contained in the TS was not added to the RTS.

13. The proposed RTS add specific Action for failure to meet an LCO where no loss of function occurs, but the existing TS do not contain any. With the existing TS an entry into LCO 3.0.3 is required. Each of these changes is identified by an entry of "3.0.3" in the third column of Attachment 6. These changes are considered Less Restrictive because they extend the time available to restore compliance to the LCO (the Allowed Outage Time) beyond that allowed by LCO 3.0.3.

Do these LESS RESTRICTIVE changes involve a significant increase in the probability or consequences of an accident previously evaluated?

Changes 1, 8, 9, 10, 11, and 13:

These changes are LESS RESTRICTIVE only in their allowance of a longer Allowed Outage Time (AOT) for inoperable equipment or a longer surveillance testing interval. The proposed times are those stipulated in the STS. Changing an AOT or a surveillance interval, alone, does not alter any plant design, operating conditions, operating practices, equipment settings, or equipment capabilities. Since these items are unchanged, changing an AOT or a surveillance interval would not increase the probability of any accident previously evaluated.

During the evaluation of potential accidents, the safety analyses assume the occurrence of the most limiting single failure. Typically, this single failure is assumed to disable one of the two trains of the equipment installed to mitigate an accident. In accordance with this assumption, the Technical Specifications allow continued operation with required equipment inoperable for limited periods of time (AOTs) only if the assumed level of equipment remains operable. Extending an AOT does not change level of safety equipment required to be available, and does not allow that level to drop below the level assumed to be available in the safety analyses. Therefore, changing an AOT cannot increase the consequences of an accident previously evaluated.

Excessively extending a surveillance interval could affect the probability that a piece of equipment will function properly upon demand. An overly restrictive surveillance interval could also affect the ability of the equipment to mitigate an accident by imposing unnecessary testing wear, equipment manipulations, and system transients on the plant, and thereby affect the consequences of an accident. The existing surveillance intervals were based on the operating experience available when they were added to the TS. Typically this was done during the initial plant licensing, circa 1970. In each of these changes where it is proposed that a surveillance interval be extended, the time proposed is that stipulated in the STS. The surveillance intervals stipulated in the STS are based on a much larger accumulation of operating experience and have been judged by the NRC and by the industry to be appropriate for typical situations. There are no special features of the Palisades plant which would invalidate those judgements for these changes. Therefore, operation of the facility in accordance with the requirements proposed by these changes does not involve a significant increase in the probability of an accident previously evaluated.

Change 2:

Change 2 is LESS RESTRICTIVE because the TS LCO 3.0.3 requires that the plant be in COLD SHUTDOWN within 24 hours if the inlet temperature is not restored to within limits during the allowed completion time while RTS LCO 3.4.1 D.1 allows continued power operation at $\leq$ 30% Rated Thermal Power (RTP). Continued reduced power operations is the same action specified in the STS. Allowing continued plant operation, alone, cannot alter any other plant operating conditions, plant operating practices, equipment settings, or equipment capabilities. All required Reactor Protective System (RPS) trips are required to be OPERABLE providing the necessary DNB protection for the core. The combination of reduced Variable High Power (VHP) trip setpoint and the maintenance of normal core flow rate requirements provided sufficient DNB margin to ensure that the allowed continued power operation with the increased reactor inlet temperature cannot increase the probability or consequences of an accident previously evaluated.

Change 3:

Change 3 is LESS RESTRICTIVE because TS LCO 3.1.4.b allows the specific activity to be between 1.0 and 40 μCi/gm for a maximum of 36 days per calendar year and this restriction was not included in the RTS. TS LCO 3.1.3.b requires the specific activity to be restored within 72 hours while the RTS LCO 3.4.16 A.2 completion time is 48 hours. Improved fuel performance has significantly reduced DOSE EQUIVALENT I-131 measured values in the PCS coolant. During the past two fuel cycles, measured values have not been near the 1.0 μCi/gm limit making the 36 days/calendar year limit unnecessary. Not imposing an integrated time limit, alone, cannot alter any plant operating conditions, operating practices, equipment settings, or equipment capabilities. The RTS limit on DOSE EQUIVALENT I-131 ensures the 2 hour thyroid dose to an individual at the sit 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. Therefore, deleting the TS requirement noted in Change 3 cannot increase the probability or consequences of an accident previously evaluated.

Change 4:

Change 4 is LESS RESTRICTIVE because TS LCO 3.1.7.1 requires pressurizer safety valves to be OPERABLE above COLD SHUTDOWN while RTS LCO 3.4.10 applicability is MODES 1, 2 and 3 with PCS temperature above 430°F. TS Section 3.1.8, "Over Pressure Protection Systems," is applicable when the temperature of any of the PCS cold legs is < 430°F, unless the vessel head is removed. The LTOP setpoint decreases rapidly as the reactor cold leg temperature decreases below 430°F. Since the LTOP system is designed to meet the single failure criteria, the pressurizer safety valves are not relied upon when the LTOP system is OPERABLE. RTS LCO 3.4.12, "Low Temperature Overpressure Protection (LTOP) System," is applicable when the PCS cold leg temperature is ≤ 430°F to provide the same protection as the TS. Therefore, the revised applicability requirement for the pressurizer safety valves noted in Change 3 cannot significantly increase the probability or consequences of an accident previously evaluated.

Changes 5, 6, and 7:

Changes 5, 6 and 7 are LESS RESTRICTIVE because Action 1.b of TS LCOs 3.1.9.1, 3.1.9.2, and 3.1.9.3 requires maintaining the PCS temperature as low as practical with available equipment when fewer OPERABLE means of decay heat removal are available than is required. This requirement was not included in the RTS because the LCOs in the STS were judged by the NRC and by the industry to provide adequate decay heat removal requirements ensuring safe plant operations. Each OPERABLE decay heat path is capable of removing the core decay heat to maintain the PCS within the specified temperature range. RTS LCO 3.4.6, PCS Loops - MODE 4, LCO 3.4.7, PCS Loops - MODE 5 Loops Filled, and LCO 3.4.7, PCS Loops - MODE 5 Loops Not Filled require one decay heat path to be OPERABLE and operating and a second decay heat path to be OPERABLE. When the available plant equipment does not meet the applicable LCO requirements, the RTS LCOs required action is to reduce PCS temperature until the requirements of an approved LCO are met.

Making this operating practice change does not alter any other plant operating conditions, operating practices, equipment settings, or equipment capabilities. Since the same decay heat removal paths will be available when the appropriate RTS LCOs are met, incorporating Changes 5, 6 and 7 does not significant increase the probability or consequences of an accident previously evaluated.

Changes 12:

This change deletes the TS requirement of no PCS inventory reductions when SDC flow is intentionally stopped for less than 1 hour and the PCS loops are filled. Any inventory reduction from the PCS when the loops are filled would come from the pressurizer. The inventory reduction would not disrupt the available natural circulation flow path available for decay heat removal through the steam generators. If the loop seal was broken, the loops would no longer be filled and the restrictions in RTS LCO 3.4.8 PCS Loops - MODE 5, Loops Not Filled would be applicable. This change alone does not alter any plant design, operating conditions, operating practices, equipment settings, or equipment capabilities. Therefore, it would not increase the probability of any accident previously evaluated.

<u>Do these LESS RESTRICTIVE changes create the possibility of a new or different kind of accident from any previously evaluated?</u>

Changes 1, 8, 9, 10, 11, and 13:

These changes are LESS RESTRICTIVE only in their allowance of a longer Allowed Outage Time (AOT) for inoperable equipment or a longer surveillance testing interval. The proposed times are those stipulated in the STS. Changing an AOT or surveillance interval, alone, cannot alter any plant operating conditions, operating practices, equipment settings, or equipment capabilities. Therefore, changing an AOT or a surveillance interval cannot create the possibility of a new or different kind of accident from any previously evaluated.

Change 2:

Change 2 is LESS RESTRICTIVE because the TS LCO 3.0.3 requires that the plant be in COLD SHUTDOWN within 24 hours if the inlet temperature is not restored to within limits during the allowed completion time. RTS LCO 3.4.1 D.1 allows continued power operation at $\leq$ 30% Rated Thermal Power (RTP) which is the same action specified in the STS. Allowing continued plant operation, alone, cannot alter any plant operating practices, equipment settings, or equipment capabilities. All required Reactor Protective System (RPS) trips are required to be OPERABLE providing the necessary DNB protection for the core. Therefore, continued plant operations at a reduced power level and higher reactor inlet temperature cannot create the possibility of a new or different kind of accident from any previously evaluated.

Change 3:

Change 3 is LESS RESTRICTIVE because TS LCO 3.1.4.b allows the specific activity to be between 1.0 and 40 μCi/gm for a maximum of 36 days per calendar year and this restriction was not included in the RTS. This restriction on plant operations was not included in the RTS because the STS does not include a similar restriction. TS LCO 3.1.3.b requires the specific activity to be restored within 72 hours while the RTS LCO 3.4.16 A.2 completion time is 48 hours. Not imposing an integrated time limit, alone, cannot alter any plant operating conditions, operating practices, equipment settings, or equipment capabilities. Therefore, deleting the TS requirement noted in Change 3 cannot create the possibility of a new or different kind of accident from any previously evaluated.

Change 4:

Change 4 is LESS RESTRICTIVE because TS LCO 3.1.7.1 requires pressurizer safety valves to be OPERABLE above COLD SHUTDOWN. RTS LCO 3.4.10 applicability is MODES 1, 2 and 3 with PCS temperature above 430°F which is very similar to the applicability statement in the STS. The LTOP system is designed to meet the single failure criteria, therefore, the pressurizer safety valves are not relied upon when the LTOP system is OPERABLE. RTS LCO 3.4.12, "Low Temperature Overpressure Protection (LTOP) System," is applicable when the PCS cold leg temperature is ≤ 430°F to provide the required overpressure protection when the pressurizer safety valves are not required to be OPERABLE. The same overpressure protection required by the TS will be available with the combined RTS LCOs 3.4.10 and 3.4.12. Therefore, the revised applicability requirement for the pressurizer safety valves noted in Change 4 cannot create the possibility of a new or different kind of accident from any previously evaluated.

Changes 5, 6, and 7:

Changes 5, 6 and 7 are LESS RESTRICTIVE because Action 1.b of TS LCOs 3.1.9.1, 3.1.9.2 and 3.1.9.3 requires maintaining the PCS temperature as low as practical with available equipment when fewer OPERABLE means of decay heat removal are available than is required. The actions in the RTS applicable LCOs are the same actions specified in the STS. Each OPERABLE decay heat path is capable of removing the core decay heat to maintain the PCS within the specified temperature range. When the available plant equipment does not meet the applicable LCO requirements, the RTS LCOs required action is to reduce PCS temperature until the requirements of an approved LCO are met. Making this operating practice change does not alter any other plant operating conditions, operating practices, equipment settings, or equipment capabilities. Since the plant is in a safe condition when all of the requirement of the applicable LCO are met, incorporating Changes 5, 6 and 7 cannot create the possibility of a new or different kind of accident from any previously evaluated.

Changes 12:

This change deletes the TS requirement of no PCS inventory reductions when SDC flow is intentionally stopped for less than 1 hour and the PCS loops are filled. The plant conditions for decay heat removal and boron dilution in MODE 5, Loops Filled will always be bounded by the conditions in MODE 5, Loops Not Filled. Therefore, making this change cannot create the possibility of a new or different kind of accident from any previously evaluated.

Do these LESS RESTRICTIVE changes involve a significant reduction in a margin of safety?

Changes 1, 8, 9, 10, 11, and 13:

These changes are LESS RESTRICTIVE only in their allowance of an extension to an Allowed Outage Time (AOT) for inoperable equipment or to a surveillance testing interval. Extending an AOT or a surveillance interval, alone, cannot alter any plant operating conditions, operating practices, equipment settings, or equipment capabilities.

An excessive AOT extension could reduce the margin of safety by allowing operation for an excessive period with less capability to mitigate an accident, or with parameters outside those assumed in the safety analysis. An overly restrictive AOT could also reduce the margin of safety by imposing unnecessary transients on the plant for minor deviations from the requirements of the LCOs. Similarly, an excessive surveillance interval extension could reduce the margin of safety by reducing assurance that required equipment will function as designed or that parameters are within the required limits. An overly restrictive surveillance interval could also reduce the margin of safety by imposing unnecessary testing wear, equipment manipulations, and system transients on the plant.

The existing AOTs and surveillance intervals were based on the operating experience available when they were added to the TS. Typically this was done during the initial plant licensing, circa 1970. In each of these changes where it is proposed that an AOT or surveillance interval be extended, the time proposed is that stipulated in the STS. The AOTs and surveillance intervals stipulated in the STS are based on a much larger accumulation of operating experience and have been judged by the NRC and by the industry to be appropriate for typical situations. There are no special features of the Palisades plant which would invalidate those judgements for these changes. Therefore, operation of the facility in accordance with the requirements proposed by these changes does not involve a significant reduction in a margin of safety.

Change 2:

Change 2 is LESS RESTRICTIVE because the TS LCO 3.0.3 requires that the plant be in COLD SHUTDOWN within 24 hours if the inlet temperature is not restored to within limits during the allowed completion time. RTS LCO 3.4.1 D.1 allows continued power operation at $\leq$ 30% Rated Thermal Power (RTP) which is the same action specified in the STS. All required Reactor Protective System (RPS) trips are required to be OPERABLE providing the necessary DNB protection for the core. At 30% RTP, the TM/LP trip setpoints are based on maintaining the hot leg temperature below the saturation temperature to maintain validity of the hot leg temperature measurement. The TM/LP trip will retain its safety function when the reactor inlet temperature is above the specified limit. The maximum power level that will be allowed by the VHP trip during any transient that might occur during the extended plant operation is 45% RTP. At the reduced power level, the potential for violation of the DNB limits is greatly reduced. Therefore, the combination of reduced VHP trip setpoint and the maintenance of normal core flow rate requirements provided sufficient DNB margin to ensure that the allowed continued power operation with the increased reactor inlet temperature as proposed by change 2 does not involve a significant reduction in a margin of safety.

Change 3:

Change 3 is LESS RESTRICTIVE because TS LCO 3.1.4.b allows the specific activity to be between 1.0 and 40 μCi/gm for a maximum of 36 days per calendar year and this restriction was not included in the RTS. This restriction on plant operations was not included in the RTS because the STS does not include a similar restriction. TS LCO 3.1.3.b requires the specific activity to be restored within 72 hours while the RTS LCO 3.4.16 A.2 completion time is 48 hours. The RTS limit on DOSE EQUIVALENT I-131 ensures the 2 hour thyroid dose to an individual at the sit 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.

The PCS specific activity requirements stipulated in the STS are based on a larger accumulation of operating experience and have been judged by the NRC and by the industry to be appropriate for typical situations. There are no special characteristics of the Palisades plant which would invalidate those judgements. Therefore, operation of the facility in accordance with the requirements proposed by change 3 does not involve a significant reduction in a margin of safety.

Change 4:

Changes 4 is LESS RESTRICTIVE because TS LCO 3.1.7.1 requires pressurizer safety valves to be OPERABLE above COLD SHUTDOWN. RTS LCO 3.4.10 applicability is MODES 1, 2 and 3 with PCS temperature above 430°F which is very similar to the applicability statement in the STS. The LTOP system is designed to meet the single failure criteria, therefore, the pressurizer safety valves are not relied upon when the LTOP system is OPERABLE. RTS LCO 3.4.12, "Low Temperature Overpressure Protection (LTOP) System," is applicable when the PCS cold leg temperature is ≤ 430°F to provide the required overpressure protection when the pressurizer safety valves are not required to be OPERABLE. The same overpressure protection required by the TS will be available with the combined RTS LCOs 3.4.10 and 3.4.12. Therefore, the revised applicability requirement for the pressurizer safety valves noted in Change 4 does not involve a significant reduction in a margin of safety.

Changes 5, 6, and 7:

Changes 5, 6 and 7 are LESS RESTRICTIVE because Action 1.b of TS LCOs 3.1.9.1, 3.1.9.2 and 3.1.9.3 requires maintaining the PCS temperature as low as practical with available equipment when fewer OPERABLE means of decay heat removal are available than is required. This requirement was not included in the RTS because the STS did not include a similar requirement. Each OPERABLE decay heat path is capable of removing the core decay heat to maintain the PCS within the specified temperature range. RTS LCO 3.4.6, PCS Loops - MODE 4, LCO 3.4.7, PCS Loops - MODE 5 Loops Filled, and LCO 3.4.7, PCS Loops - MODE 5 Loops Not Filled require one decay heat path to be OPERABLE and operating and a second decay heat path to be OPERABLE. Requiring the plant operators to maintain the PCS temperature as low as practical with available equipment could provide the operators additional time to respond to additional equipment failures. When the available plant equipment does not meet the applicable LCO requirements, the RTS LCOs required action is to reduce PCS temperature until the requirements of an approved LCO are met. Making this operating practice change does not alter any other plant operating conditions, operating practices, equipment settings, or equipment capabilities. Since the plant is in a safe condition when all of the requirement of the applicable LCO are met, incorporating Changes 5, 6 and 7 does not involve a significant reduction in a margin of safety.

Changes 12:

This change deletes the TS requirement of no PCS inventory reductions when SDC flow is intentionally stopped for less than 1 hour and the PCS loops are filled. The requirements in the Note 1 of the proposed RTS LCO 3.4.7 are the same requirements in the STS. A PCS inventory reduction while maintaining the loops in the filled condition will not adversely affect the results of a unplanned boron dilution event. The requirements in the STS have been judged by the NRC and by the industry to be appropriate for typical situations. There are no special features of the Palisades plant which would invalidate those judgements for this change. Therefore, operation of the facility in accordance with the requirements proposed by this change does not involve a significant reduction in a margin of safety.

IV. CONCLUSION

The Palisades Plant Review Committee has reviewed this part of the STS conversion Technical Specifications Change Request and has determined that proposing this change does not involve an unreviewed safety question. Further, the change involves no significant hazards consideration. This change has been reviewed by the Nuclear Performance Assessment Department.

ATTACHMENT 1

CONSUMERS POWER COMPANY
PALISADES PLANT
DOCKET 50-255

STS CONVERSION TECHNICAL SPECIFICATION CHANGE REQUEST

3.4 PRIMARY COOLANT SYSTEM

Proposed Technical Specifications Pages

3.4 **PRIMARY COOLANT SYSTEM (PCS)**

3.4.1 PCS Pressure, Temperature, and Flow Departure from Nucleate Boiling (DNB) Limits

LCO 3.4.1 PCS DNB parameters for pressurizer pressure, cold leg temperature, and PCS total flow rate shall be within the limits specified below:

a. Pressurizer pressure $\geq$ 2010 psia and $\leq$ 2100 psia;

b. The indicated reactor inlet temperature (T_c) shall not exceed the value given by the following equation at steady state power operation:

$$T_c \leq 542.99 + .0580(P-2060) + .00001(P-2060)^2 + 1.125(W-138) - .0205(W-138)^2$$

Where: T_c = Reactor inlet temperature in °F
P = Nominal Operation Pressure in psia
W = Total recirculating mass flow in 10^6 lb/h corrected to the operating temperature conditions.

If the measured primary coolant system flow rate is greater than 150 M lb/hr, the maximum inlet temperature shall be less than or equal to the T_c LCO at 150 M lbm/hr.

c. PCS total flow rate $\geq$ 138.6 E6 lb/hour.

APPLICABILITY: MODE 1.

---------------------------------------NOTES---------------------------------

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. Pressurizer pressure or PCS flow rate not within limits.	A.1 Restore parameter(s) to within limit.	2 hours

(continued)

ACTIONS (continued)

CONDITION	REQUIRED ACTION	COMPLETION TIME
B. Required Action and associated Completion Time of Condition A not met.	B.1 Be in MODE 2.	6 hours
C. PCS cold leg temperature not within limits.	C.1 Restore cold leg temperature to within limits.	2 hours
D. Required Action and associated Completion Time of Condition C not met.	D.1 Reduce THERMAL POWER to ≤ 30% RTP.	6 hours

SURVEILLANCE REQUIREMENTS

SURVEILLANCE		FREQUENCY
SR 3.4.1.1	Verify pressurizer pressure ≥ 2010 psia and ≤ 2100 psia.	12 hours
SR 3.4.1.2	Verify PCS cold leg temperature ≤ 542.99 + .0580(P-2060) + .00001$(P-2060)^2$ + 1.125(W-138) - .0205$(W-138)^2$	12 hours
SR 3.4.1.3	-------------------NOTE------------------- Not required to be performed until 24 hours after ≥ 90% RTP. -- Verify by precision heat balance that PCS total flow rate ≥ 138.6 E6 lb/hour.	18 months <u>AND</u> after plugging 10 or more steam generator tubes.

3.4 **PRIMARY COOLANT SYSTEM (PCS)**

3.4.2 PCS Minimum Temperature for Criticality

LCO 3.4.2 Each PCS loop average temperature (T_{ave}) shall be ≥ 525°F.

APPLICABILITY: MODE 1 with T_{ave} in one or more PCS loops < 535°F,
MODE 2 with T_{ave} in one or more PCS loops < 535°F and K_{eff} ≥ 1.0.

ACTIONS

CONDITION	REQUIRED ACTION	COMPLETION TIME
A. T_{ave} in one or more PCS loops not within limit.	A.1 Be in MODE 2 with K_{eff} < 1.0.	30 minutes

SURVEILLANCE REQUIREMENTS

SURVEILLANCE	FREQUENCY
SR 3.4.2.1 Verify PCS T_{ave} in each loop ≥ 525°F.	1 hour

3.4 PRIMARY COOLANT SYSTEM (PCS)

3.4.3 PCS Pressure and Temperature (P/T) Limits

LCO 3.4.3 PCS pressure, PCS temperature, and PCS heatup and cooldown rates shall be maintained within the limits specified in the PTLR.

APPLICABILITY: At all times.

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.	30 minutes
	<u>AND</u>		
	A.2	Determine PCS is acceptable for continued operation.	72 hours
B. Required Action and associated Completion Time of Condition A not met.	B.1	Be in MODE 3.	6 hours
	<u>AND</u>		
	B.2	Be in MODE 5 with PCS pressure < 270 psia.	36 hours
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.	Immediately
	<u>AND</u>		
	C.2	Determine PCS is acceptable for continued operation.	Prior to entering MODE 4

SURVEILLANCE REQUIREMENTS

	SURVEILLANCE	FREQUENCY
SR 3.4.3.1	-------------------NOTE------------------- Only required to be performed during PCS heatup and cooldown operations and PCS hydrostatic testing. --- Verify PCS pressure, PCS temperature, and PCS heatup and cooldown rates within limits specified in the PTLR.	30 minutes

3.4 PRIMARY COOLANT SYSTEM (PCS)

3.4.4 PCS Loops - MODES 1 and 2

LCO 3.4.4 Two PCS 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 PCS loop is in operation.	12 hours

3.4 **PRIMARY COOLANT SYSTEM (PCS)**

3.4.5 PCS Loops - MODE 3

LCO 3.4.5 Two PCS loops shall be OPERABLE and one PCS loop shall be in operation.

---------------------------------------NOTES---------------------------------------

1. All primary 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 PCS boron concentration; and

   b. Core outlet temperature is maintained at least 10°F below saturation temperature.

2. Forced circulation (starting the first primary coolant pump) shall not be initiated unless one of the following conditions is met:

   a. PCS cold leg temperature (T_c) is > 430°F.

   b. S/G secondary temperature is ≤ T_c.

   c. S/G secondary temperature is < 100°F above T_c, and shutdown cooling is isolated from the PCS, and PCS heatup/cooldown rate is ≤ 10°F/hour.

   d. S/G secondary temperature is < 100°F above T_c, and shutdown cooling is isolated from the PCS, and pressurizer level is ≤ 57%.

APPLICABILITY: MODE 3.

ACTIONS

CONDITION	REQUIRED ACTION	COMPLETION TIME
A. One required PCS loop inoperable.	A.1 Restore required PCS 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 PCS loop OPERABLE. OR No PCS loop in operation.	C.1 Suspend all operations involving a reduction of PCS boron concentration. AND C.2 Initiate action to restore one PCS loop to OPERABLE status and operation.	Immediately Immediately

SURVEILLANCE REQUIREMENTS

SURVEILLANCE		FREQUENCY
SR 3.4.5.1	Verify required PCS loop is in operation.	12 hours
SR 3.4.5.2	Verify secondary side water level in each steam generator ≥ -84%.	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 **PRIMARY COOLANT SYSTEM (PCS)**

3.4.6 PCS Loops - MODE 4

LCO 3.4.6 Two loops or trains consisting of any combination of PCS loops and Shutdown Cooling (SDC) trains shall be OPERABLE and at least one loop or train providing ≥ 2810 gpm through the core shall be in operation.

-----------------------------------NOTES-----------------------------------

1. All Primary Coolant Pumps (PCPs) 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 PCS boron concentration; and

   b. Core outlet temperature is maintained at least 10°F below saturation temperature.

2. Forced circulation (starting the first primary coolant pump) shall not be initiated unless one of the following conditions is met:

   a. S/G secondary temperature is ≤ T_c.

   b. S/G secondary temperature is < 100°F above T_c, and shutdown cooling is isolated from the PCS, and PCS heatup/cooldown rate is ≤ 10°F/hour.

   c. S/G secondary temperature is < 100°F above T_c, and shutdown cooling is isolated from the PCS, and pressurizer level is ≤ 57%.

3. When the PCS cold leg temperature is < 300°F, Primary Coolant Pumps P-50A and P-50B shall not be operated simultaneously.

APPLICABILITY: MODE 4.

ACTIONS

CONDITION	REQUIRED ACTION	COMPLETION TIME
A. One required PCS 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 PCS loops inoperable.	B.1 Be in MODE 5.	24 hours
C. Required PCS loop or SDC train inoperable. OR No PCS loop or SDC train in operation.	C.1 Suspend all operations involving reduction of PCS boron concentration. AND C.2 Initiate action to restore one loop or train to OPERABLE status and operation.	Immediately Immediately

(continued)

ACTIONS (continued)

CONDITION	REQUIRED ACTION	COMPLETION TIME
D. Required SDC train flow rate < 2810 gpm.	D.1 Suspend all operations involving reduction of PCS boron concentration.	Immediately
	AND	
	D.2 Initiate action to assure SDC flow ≥ 1000 gpm.	Immediately
	AND	
	D.3.1 Verify two of three charging pumps are electrically disabled.	15 minutes
	OR	
	D.3.2 Initiate action to perform SR 3.1.2.1 (verify SDM).	Within 15 minutes following dilution flow to the PCS. AND Every 15 minutes thereafter until stable PCS boron concentration exists.
E. One of two SDC suction valve interlock channels inoperable.	E.1 Place circuit breaker for the associated valve operator in "OPEN" position.	1 hour

SURVEILLANCE REQUIREMENTS

SURVEILLANCE		FREQUENCY
SR 3.4.6.1	Verify one PCS loop or SDC train providing ≥ 2810 gpm through the core is in operation.	12 hours
SR 3.4.6.2	Verify secondary side water level in required SG(s) is ≥ -84%.	12 hours
SR 3.4.6.3	Verify correct breaker alignment and indicated power available to the required pump that is not in operation.	7 days
SR 3.4.6.4	Calibrate SDC suction interlocks.	18 months

3.4 **PRIMARY COOLANT SYSTEM (PCS)**

3.4.7 PCS Loops - MODE 5, Loops Filled

LCO 3.4.7 One Shutdown Cooling (SDC) train shall be OPERABLE and in operation, providing ≥ 2810 gpm through the core 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% wide range.

-----------------------------------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 PCS 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. Forced circulation (starting the first primary coolant pump) shall not be initiated unless one of the following conditions is met:

   a. S/G secondary temperature is ≤ T_c.

   b. S/G secondary temperature is < 100°F above T_c, and shutdown cooling is isolated from the PCS, and PCS heatup/cooldown rate is ≤ 10°F/hour.

   c. S/G secondary temperature is < 100°F above T_c, and shutdown cooling is isolated from the PCS, and pressurizer level is ≤ 57%.

4. When the PCS cold leg temperature is < 300°F, Primary Coolant Pumps P-50A and P-50B shall not be operated simultaneously.

5. All SDC trains may be removed from operation during planned heatup to MODE 4 when at least one PCS loop is in operation.

APPLICABILITY: MODE 5 with PCS 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 PCS boron concentration. AND B.2 Initiate action to restore one SDC train to OPERABLE status and operation.	Immediately Immediately

(continued)

ACTIONS (continued)

CONDITION	REQUIRED ACTION	COMPLETION TIME
C. Required SDC train flow rate < 2810 gpm.	C.1 Suspend all operations involving reduction of PCS boron concentration.	Immediately
	<u>AND</u>	
	C.2 Initiate action to assure SDC flow $\geq$ 1000 gpm.	Immediately
	<u>AND</u>	
	C.3.1 Verify two of three charging pumps are electrically disabled.	15 minutes
	<u>OR</u>	
	C.3.2 Initiate action to perform SR 3.1.2.1 (verify SDM).	Within 15 minutes following dilution flow to the PCS. <u>AND</u> Every 15 minutes thereafter until stable PCS boron concentration exists.

SURVEILLANCE REQUIREMENTS

SURVEILLANCE		FREQUENCY
SR 3.4.7.1	Verify one SDC train providing ≥ 2810 gpm through the core is in operation.	12 hours
SR 3.4.7.2	Verify required SG secondary side water level is ≥ 25% wide range.	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 PRIMARY COOLANT SYSTEM (PCS)

3.4.8 PCS Loops - MODE 5, Loops Not Filled

LCO 3.4.8 Two Shutdown Cooling (SDC) trains shall be OPERABLE and one SDC train providing ≥ 2810 gpm flow through the reactor core shall be in operation.

-----NOTES-----

1. All SDC pumps may be de-energized for ≤ 1 hour provided:

   a. The core outlet temperature is maintained > 10°F below saturation temperature;

   b. No operations are permitted that would cause a reduction of the PCS boron concentration; and

   c. No draining operations to further reduce the PCS 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 PCS 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 trains inoperable. OR No SDC train in operation.	B.1 Suspend all operations involving reduction of PCS boron concentration. AND B.2 Initiate action to restore one SDC train to OPERABLE status and operation.	Immediately Immediately
C. Required SDC train flow rate < 2810 gpm.	C.1 Suspend all operations involving reduction of PCS boron concentration. AND C.2 Initiate action to assure SDC flow ≥ 1000 gpm. AND C.3.1 Verify two of three charging pumps are electrically disabled. OR C.3.2 Initiate action to perform SR 3.1.2.1 (verify SDM).	Immediately Immediately 15 minutes Within 15 minutes following dilution flow to the PCS. AND Every 15 minutes thereafter until stable PCS boron concentration exists.

SURVEILLANCE REQUIREMENTS

SURVEILLANCE		FREQUENCY
SR 3.4.8.1	Verify one SDC train is in operation providing $\geq$ 2810 gpm through the core 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 **PRIMARY COOLANT SYSTEM (PCS)**

3.4.9 Pressurizer

LCO 3.4.9 The pressurizer shall be OPERABLE with:

a. Pressurizer water level < 62.8%; and

b. A minimum of 375 kW of pressurizer heater capacity is available from Bus 1D and Bus 1E.

APPLICABILITY: MODES 1, 2, and 3 with all PCS cold leg temperatures ≥ 430°F.

ACTIONS

CONDITION	REQUIRED ACTION	COMPLETION TIME
A. Pressurizer water level not within limit.	A.1 Be in MODE 3 with reactor tripped. AND A.2 Be in MODE 4.	6 hours 12 hours
B. Less than 375 kW of pressurizer heater capacity OPERABLE from Bus 1D or Bus 1E.	B.1 Restore required pressurizer heaters to OPERABLE status.	72 hours
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 < 62.8%.	12 hours
SR 3.4.9.2	Verify capacity of each required group of pressurizer heaters from each Bus 1D and 1E ≥ 375 kW.	92 days

3.4 PRIMARY COOLANT SYSTEM (PCS)

3.4.10 Pressurizer Safety Valves

LCO 3.4.10 Three pressurizer safety valves shall be OPERABLE with lift settings as specified in Table 3.4.10-1.

APPLICABILITY: MODES 1, 2, and 3 with all PCS cold leg temperatures ≥ 430°F.

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 3 with all PCS cold leg temperatures ≤ 430°F.	6 hours 12 hours

SURVEILLANCE REQUIREMENTS

SURVEILLANCE		FREQUENCY
SR 3.4.10.1	Verify each pressurizer safety valve lift setpoint per Table 3.4.10-1 in accordance with the Inservice and Testing Program. Following testing, lift settings shall be within ± 1%.	In accordance with the Inservice Testing Program.

TABLE 3.4.10-1

PRESSURIZER SAFETY VALUE LIFT SETTINGS

VALUE NUMBER	LIFT SETTING (psia ± 3%)
RV-1039	2580
RV-1040	2540
RV-1041	2500

3.4 **PRIMARY COOLANT SYSTEM (PCS)**

3.4.11 Pressurizer Power Operated Relief Valves (PORVs)

LCO 3.4.11 Each PORV and associated block valve shall be OPERABLE.

APPLICABILITY: MODES 1, 2, and 3 with all PCS cold leg temperatures ≥ 430°F.

ACTIONS

------------------------------------NOTES------------------------------------

1. Separate Condition entry is allowed for each PORV.

2. LCO 3.0.4 is not applicable.

CONDITION	REQUIRED ACTION	COMPLETION TIME
A. One PORV inoperable (not capable of being manually cycled).	A.1 Close associated block valve. <u>AND</u> A.2 Remove power from associated block valve. <u>AND</u> A.3 Restore PORV to OPERABLE status.	1 hour 1 hour 72 hours
B. One block valve inoperable.	B.1 Place associated PORV in the "CLOSE" position. <u>AND</u> B.2 Restore block valve to OPERABLE status.	1 hour 72 hours
C. Required Action and associated Completion Time of Condition A or B not met.	C.1 Be in MODE 3. <u>AND</u> C.2 Reduce T_{ave} to ≤ 430°F.	6 hours 12 hours

(continued)

ACTIONS (continued)

CONDITION	REQUIRED ACTION	COMPLETION TIME
D. Two PORVs inoperable (not capable of being manually cycled).	D.1 Close associated block valves. <u>AND</u> D.2 Remove power from associated block valves. <u>AND</u> D.3 Restore one PORV to OPERABLE.	1 hour 1 hour 2 hours
E. More than one block valve inoperable.	E.1 Place associated PORVs in the "CLOSE" position. <u>AND</u> E.2 Restore at least one block valve to OPERABLE status.	1 hour 2 hours
F. Required Action and associated Completion Time of Condition D or E not met.	F.1 Be in MODE 3. <u>AND</u> F.2 Reduce T_{ave} to < 430°F.	6 hours 12 hours

SURVEILLANCE REQUIREMENTS

SURVEILLANCE		FREQUENCY
SR 3.4.11.1	-------------------NOTE------------------ Not required to be performed with block valve closed in accordance with the Required Actions of this LCO. --- Perform a complete cycle of each block valve.	Once prior to heatup from MODE 5 if not cycled within 92 days.
SR 3.4.11.2	Perform a complete cycle of each PORV with the plant above MODE 5.	18 months

3.4 **PRIMARY COOLANT SYSTEM (PCS)**

3.4.12 Low Temperature Overpressure Protection (LTOP) System

LCO 3.4.12 An LTOP System shall be OPERABLE with both High Pressure Safety Injection (HPSI) pumps rendered incapable of injecting into the PCS when PCS temperature is < 300°F:

a. Two OPERABLE Power Operated Relief Valves (PORVs) with lift settings less than specified in the PTLR; or

b. The PCS depressurized and a PCS vent capable of relieving ≥ 167 gpm at a PCS pressure of 315 psia.

APPLICABILITY: MODE 3 when any PCS cold leg temperature is < 430°F, MODE 4, 5 and MODE 6 when the reactor vessel head is on.

-------------------------------------NOTE-------------------------------------
Specifications 3.4.12 does not prohibit use of HPSI pumps for emergency addition of makeup to the PCS.

ACTIONS

CONDITION	REQUIRED ACTION	COMPLETION TIME
A. One or more HPSI pumps capable of injecting into the PCS when PCS temperature < 300°F.	A.1 Initiate action to verify no HPSI pump is capable of injecting into the PCS.	Immediately
B. One required PORV inoperable with pressurizer level ≤ 57%.	B.1 Restore required PORV to OPERABLE status.	7 days

(continued)

ACTIONS (continued)

CONDITION	REQUIRED ACTION		COMPLETION TIME
C. One required PORV inoperable with pressurizer level > 57%.	C.1	Restore required PORV to OPERABLE status.	24 hours
D. Two required PORVs inoperable. OR Required Action and associated Completion Time of Condition not met. OR LTOP System inoperable for any reason other than Condition A, B,or C.	D.1	Be in MODE 4 with both SDC inlet valves open.	8 hours
	AND		
	D.2	Depressurize PCS and establish PCS vent capable of relieving $\geq$ 167 gpm at a PCS pressure of 315 psia.	24 hours

SURVEILLANCE REQUIREMENTS

SURVEILLANCE		FREQUENCY
SR 3.4.12.1	Verify both HPSI pumps are incapable of injecting into the PCS when PCS temperature is < 300°F.	12 hours
SR 3.4.12.2	Verify PCS vent capable of relieving ≥ 167 gpm at a PCS pressure of 315 psia is open.	12 hours for unlocked open vent valve(s). <u>AND</u> 31 days for locked open vent valve(s) or other vent paths.
SR 3.4.12.3	Verify PORV block valve is open for each required PORV.	72 hours
SR 3.4.12.4	-------------------NOTE------------------- Not required to be performed until 12 hours after decreasing PCS cold leg temperature to < 430°F. -- Perform CHANNEL FUNCTIONAL TEST on each required PORV, excluding actuation.	31 days
SR 3.4.12.5	Perform CHANNEL CALIBRATION on each required PORV actuation channel.	18 months

3.4 PRIMARY COOLANT SYSTEM (PCS)

3.4.13 PCS Operational Leakage

LCO 3.4.13 PCS operational LEAKAGE shall be limited to:

a. No pressure boundary LEAKAGE;

b. 1 gpm unidentified LEAKAGE;

c. 10 gpm identified LEAKAGE;

d. 0.3 gpm total primary to secondary LEAKAGE through any one Steam Generator (SG) for any period of steady state operation greater than 24 consecutive hours; and

e. 0.6 gpm primary to secondary LEAKAGE through any one SG during periods of startup and major load changes for any period greater than 24 consecutive hours.

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

ACTIONS

CONDITION	REQUIRED ACTION	COMPLETION TIME
A. PCS 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

SURVEILLANCE REQUIREMENTS

SURVEILLANCE		FREQUENCY
SR 3.4.13.1	-------------------NOTE------------------- Not required to be performed in MODE 3 or 4 until 12 hours of steady state operation. -- Perform PCS water inventory balance.	------NOTE------- Only required to be performed during steady state operation. ---------------- 72 hours
SR 3.4.13.2	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 PRIMARY COOLANT SYSTEM (PCS)

3.4.14 PCS Pressure Isolation Valve (PIV) Leakage

LCO 3.4.14 Leakage from each PCS PIV shall be within limits.

APPLICABILITY: MODES 1, 2, 3, and 4

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.

ACTIONS

CONDITION	REQUIRED ACTION	COMPLETION TIME
A. One or more flow paths with leakage from one or more PCS 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 3.4.14.1 (PIV leakage verification) and be on the PCS pressure boundary or the high pressure portion of the system. ----------------------------	(continued)

CONDITION	REQUIRED ACTION		COMPLETION TIME
A. (continued)	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 PCS PIV to within limits.	72 hours
B. Required Action and associated Completion Time for Condition A not met.	B.1	Be in MODE 3.	6 hours
	<u>AND</u>		
	B.2	Be in MODE 5.	36 hours

SURVEILLANCE REQUIREMENTS

SURVEILLANCE		FREQUENCY
SR 3.4.14.1	-------------------NOTES------------------ 1. Not required to be performed in MODES 3 and 4. 2. PCS 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. 3. Leakage rates less than or equal to 1.0 gpm are considered acceptable. 4. Leakage rates greater than 1.0 gpm but less than or equal to 5.0 gpm are considered acceptable if the latest measured rate has not exceeded the rate determined by the previous test by an amount that reduces the margin between measured leakage rate and the maximum permissible rate of 5.0 gpm by 50% or greater. 5. Leakage rates greater than 1.0 gpm but less than or equal to 5.0 gpm are considered unacceptable if the latest measured rate exceeded the rate determined by the previous test by an amount that reduces the margin between measured leakage rate and the maximum permissible rate of 5.0 gpm by 50% or greater. 6. Leakage rates greater than 5.0 gpm are considered unacceptable. --	(continued)

SURVEILLANCE REQUIREMENTS (continued)

SURVEILLANCE		FREQUENCY
SR 3.4.14.1 (continued)	Verify leakage from each of the following PCS PIV is to ≤ a maximum of 5 gpm at a PCS pressure of 2060 psia. Valve Name / Valve No Loop 1A SIS Check ES-3101 Loop 1B SIS Check ES-3116 Loop 2A SIS Check ES-3131 Loop 2B SIS Check ES-3146 Loop 1A LPSI Check ES-3103 Loop 1B LPSI Check ES-3118 Loop 2A LPSI Check ES-3133 Loop 2B LPSI Check ES-3148 Loop 1A HPSI Check ES-3104 Loop 1B HPSI Check ES-3119 Loop 2A HPSI Check ES-3134 Loop 2B HPSI Check ES-3149 Loop 1 HLI Check ES-3410 Verify the following PCS PIV is closed. Valve Name / Valve No Loop 1 HLI Check ES-3408	In accordance with the Inservice Testing Program or 18 months. AND Prior to entering MODE 2 whenever the plant has been in MODE 5 for 72 hours or more, if leakage testing has not been performed in the previous 9 months. AND Prior to returning the check valve to service after maintenance, repair or replacement work is performed on the valves.
SR 3.4.14.2	Verify all four LPSI check valves are closed.	Prior to entering MODE 2 after use of the LPSI system for SDC.
SR 3.4.14.3	The integrity of the remaining check valve in each high pressure line having a leaking valve shall be determined and recorded and the position of the other closed valve located in that pressure line shall be recorded.	24 hours

3.4 **PRIMARY COOLANT SYSTEM (PCS)**

3.4.15 PCS Leakage Detection Instrumentation

LCO 3.4.15 The following PCS leakage detection instrumentation shall be OPERABLE:

a. One containment sump level indicator; and

b. One containment atmosphere gaseous activity monitor ; and

c. One containment air cooler condensate level switch; and

d. One containment humidity monitor.

APPLICABILITY: MODES 1, 2, and 3.

ACTIONS

CONDITION	REQUIRED ACTION	COMPLETION TIME
A. With one required leak detection instrument inoperable.	-------------NOTE----------- LCO 3.0.4 is not applicable. ---------------------------	
	A.1 Restore the required PCS leak detection instrument to OPERABLE.	Prior to entering MODE 3 after entry into MODE 5.

(continued)

ACTIONS (continued)

CONDITION	REQUIRED ACTION	COMPLETION TIME
B. With two or three required leak detection instruments inoperable.	------------NOTE----------- LCO 3.0.4 is not applicable. ---------------------------	
	B.1 Perform SR 3.4.13.1 (PCS water inventory balance).	Once per 24 hours
	AND	
	B.2 Restore three required PCS leak detection instruments to OPERABLE.	30 days
C. Required Action and associated Completion Time not met.	C.1 Be in MODE 3.	6 hours
	AND	
	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 3.4.15.1	Perform CHANNEL CHECK of each required containment sump level, atmosphere gaseous activity monitor, and humidity monitor.	12 hours
SR 3.4.15.2	Perform CHANNEL FUNCTIONAL TEST of the required containment atmosphere humidity monitor.	18 months
SR 3.4.15.3	Perform CHANNEL CALIBRATION of the required containment sump level indicator.	18 months

(continued)

SURVEILLANCE REQUIREMENTS (continued)

SURVEILLANCE		FREQUENCY
SR 3.4.15.4	Perform CHANNEL CALIBRATION of the required containment atmosphere gaseous activity monitor.	18 months
SR 3.4.15.5	Perform CHANNEL CALIBRATION of the required containment air cooler condensate level switch.	18 months

3.4 **PRIMARY COOLANT SYSTEM (PCS)**

3.4.16 PCS Specific Activity

LCO 3.4.16 The specific iodine activity of the primary coolant shall be within limits.

APPLICABILITY: MODES 1 and 2,
MODE 3 with PCS average temperature (T_{ave}) ≥ 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 < 40 μCi/gm.	Once per 4 hours
	AND	
	A.2 Restore DOSE EQUIVALENT I-131 to within limit.	48 hours
B. Required Action and associated Completion Time of Condition A not met. OR DOSE EQUIVALENT I-131 ≥ 40 μCi/gm.	B.1 Be in MODE 3 with T_{ave} < 500°F.	6 hours
C. Gross specific activity of the primary coolant not within limit.	C.1 Perform SR 3.4.16.2.	4 hours
	AND	
	C.2 Be in MODE 3 with T_{ave} < 500°F.	6 hours

SURVEILLANCE REQUIREMENTS

SURVEILLANCE		FREQUENCY
SR 3.4.16.1	Verify primary coolant gross specific activity $\leq 100/\bar{E}$ μCi/gm.	7 days
SR 3.4.16.2	-------------------NOTE------------------- Only required to be performed in MODE 1. -- Verify primary coolant DOSE EQUIVALENT I-131 specific activity $\leq$ 1.0 μCi/gm.	14 days <u>AND</u> Between 2 and 6 hours after THERMAL POWER change of $\geq$ 15% RTP within a 1 hour period.
SR 3.4.16.3	-------------------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 $\geq$ 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 $\geq$ 48 hours.	184 days

3.4 **PRIMARY COOLANT SYSTEM (PCS)**

3.4.17 Special Test Exception (STE) PCS Loops

LCO 3.4.17 The requirements of LCO 3.4.2, "PCS Minimum Temperature for Criticality may be suspended provided:

a. THERMAL POWER ≤ 5% RTP; and

b. The reactor trip setpoints of the OPERABLE power level channels are set ≤ 30% RTP.

c. $T_{ave} \geq 500°F$.

APPLICABILITY: MODE 2, during PHYSICS TESTS with T_{ave} in one or more Loops < 530°F.

ACTIONS

CONDITION	REQUIRED ACTION	COMPLETION TIME
A. THERMAL POWER not within limit.	A.1 Trip reactor.	Immediately
B. T_{ave} in any one or more loops < 500°F.	B.1 Be in MODE 2 with $K_{eff} < 1.0$.	30 minutes

SURVEILLANCE REQUIREMENTS

SURVEILLANCE		FREQUENCY
SR 3.4.17.1	Verify THERMAL POWER ≤ 5% RTP.	1 hour
SR 3.4.17.2	Perform a CHANNEL FUNCTIONAL TEST on each logarithmic power level and linear power level neutron flux monitoring channel.	12 hours prior to critical approach.
SR 3.4.17.3	Verify PCS T_{ave} in each loop ≥ 500°F.	Once within 30 minutes and every 30 minutes thereafter.

ATTACHMENT 2

CONSUMERS POWER COMPANY
PALISADES PLANT
DOCKET 50-255

STS CONVERSION TECHNICAL SPECIFICATION CHANGE REQUEST

3.4 PRIMARY COOLANT SYSTEM

Bases for the Revised Technical Specifications

B 3.4 **PRIMARY COOLANT SYSTEM (PCS)**

B 3.4.1 PCS Pressure, Temperature, and Flow Departure from Nucleate Boiling (DNB) Limits

BASES

BACKGROUND

These Bases address requirements for maintaining PCS 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 PCS 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 maximum PCS cold leg temperature is consistent with operation at the indicated power level and bounds those used as the initial temperatures in the analyses.

The LCO limit for minimum PCS flow rates is bounded by those used as the initial flow rates in the analyses. The PCS 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 Safety Limit (SL 2.1.1). This is the acceptance limit for the PCS 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 struck control rod 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 Rod Insertion Limits"; LCO 3.2.3, "QUADRANT POWER TILT"; and LCO 3.2.4, "AXIAL SHAPE INDEX." The safety analyses are performed over the following range of initial values: PCS pressure 1700 - 2300 psia, core inlet temperature 500-580°F, and minimum reactor vessel inlet coolant flow rate.

BASES

LCO

This LCO specifies limits on the monitored process variables PCS pressurizer pressure, PCS cold leg temperature, and PCS 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 flow rate are given for the measurement location but have 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.

A DNB analysis was performed in a parametric fashion to determine the core inlet temperature as a function of pressure and flow which the minimum DNBR is equal to the DNB correlation safety limit. This analysis includes the following uncertainties and allowances: 2% of rated power for power measurement; ± 0.06 for ASI measurement; ± 50 psi for pressurizer pressure; ± 7°F for inlet temperature; and 3% measurement and 3% bypass for core flow. In addition, transient biases were included in the determination of the allowable reactor inlet temperature.

The limits of validity of the T_{inlet} equation are:

$1800 \leq$ pressure ≤ 2200 psia
$100.0 \times 10^6 \leq$ Vessel Flow $\leq 150 \times 10^6$ lb/h
ASI as shown in COLR, Figure 2.1

With measured primary coolant system flow rates > 150 M lbm/hr, limiting the maximum allowed inlet temperature to the T_{inlet} LCO at 150 M lbm/hr increases the margin to DNB for higher PCS flow rates.

APPLICABILITY

In MODE 1, the limits on PCS pressurizer pressure, PCS cold leg temperature, and PCS 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.

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.

BASES

APPLICABILITY (continued)

These conditions represent short term perturbations where actions to control pressure variations might be counterproductive. Also, since they represent transients initiated from power levels < 100% RTP, an increased 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." Should a violation of this LCO occur, the operator should check whether or not an SL may have been exceeded.

ACTIONS

A.1

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.

PCS 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 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.

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.

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.

BASES

ACTIONS (continued)

C.1

Cold leg temperature is a controllable and measurable parameter. If this 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 the parameter can be restored in this time period.

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, 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.

SURVEILLANCE REQUIREMENTS

SR 3.4.1.1

Since Required Action A.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.

Since Required Action A.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 PCS 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.

BASES

SURVEILLANCE REQUIREMENTS (continued)

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 PCS 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 shown by operating practice to be sufficient to regularly assess for safety analysis assumptions.

SR 3.4.1.3

Measurement of PCS total flow rate by performance of a precision calorimetric heat balance once every 18 months. This verifies that the actual PCS 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. Plugging 10 or more steam generator tubes during a maintenance outage could also increase PCS 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 Surveillance cannot be performed in MODE 2 or below, and will yield more accurate results if performed above 90% RTP.

REFERENCE

1. FSAR, Section 14.1.3

B 3.4 PRIMARY COOLANT SYSTEM (PCS)

B 3.4.2 PCS 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 primary coolant moderator temperature coefficient used in core operating and accident analysis is typically defined for the normal operating temperature range (532°F to 570°F). The Reactor Protection System receives inputs from the hot leg temperature detectors, which have a range of 50°F to 700°F. The PCS loop average temperature (T_{ave}) is controlled using inputs of the same range. Nominal T_{ave} for making the reactor critical is 532°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 existing transient analysis are bounding of operation at low power with an inlet temperature of 525°F (Ref 1).

LCO

The purpose of the LCO is to prevent criticality outside the normal operating regime (532°F to 570°F) and to prevent operation in an unanalyzed condition.

The LCO is only applicable below 535°F and provides a reasonable distance to the limit of 525°F. This allows adequate time to trend its approach and take corrective actions prior to exceeding the limit.

BASES

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 $K_{eff} \geq 1.0$. Coupled with the applicability definition for criticality is a temperature limit. Monitoring is required at or below a T_{ave} of 535°F.

ACTIONS

A.1

PCS average temperature is a controlled and measurable parameter. With this parameter not within the LCO limits, action must be taken to restore the parameter. If T_{ave} stays below 525°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 2 with $K_{eff} < 1.0$ 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_{ave} is required to be verified ≥ 525°F every hour. The specified time period is frequent enough to prevent inadvertent violation of the LCO. While the Surveillance is required whenever the reactor is critical and temperature is below 535°F, in practice, the Surveillance is most appropriate during the period when the reactor is brought critical.

REFERENCE

1. FSAR, Section 14.1.3

B 3.4 **PRIMARY COOLANT SYSTEM (PCS)**

B 3.4.3 PCS Pressure and Temperature (P/T) Limits

BASES

BACKGROUND

All components of the PCS 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 PCS heatup and cooldown, within the design assumptions and the stress limits for cyclic operation.

The Pressure and Temperature Limits Report (PTLR) contains P/T limit curves for heatup, cooldown, and In Service Leak and Hydrostatic (ISLH) testing, and data for the maximum rate of change of reactor coolant temperature (Ref. 1).

Each P/T limit curve defines an acceptable region for normal operation. The P/T limit curves include an allowance to account for the fact that pressure is measured in the pressurizer rather than at the vessel beltline and to account for PCP discharge pressure. 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. 2), requires the establishment of P/T limits for material fracture toughness requirements of the RCPB materials. Reference 2 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. 3).

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. 4) and Appendix H of 10 CFR 50 (Ref. 5). The operating P/T limit curves will be adjusted, as necessary, based on the evaluation findings and the recommendations of Reference 3.

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 2 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 the ISLH testing. However, the criticality limit is not operationally limiting; a more restrictive limit exists in LCO 3.4.2, " PCS Minimum Temperature for Criticality."

The consequence of violating the LCO limits is that the PCS has been operated under conditions that can result in brittle failure of the RCPB, possibly leading to a non-isolable 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. 6), 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. Reference 1 establishes the methodology for determining the P/T limits. 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 un-analyzed condition.

BASES

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 PCS, 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

c. The existences, sizes, and orientations of flaws in the vessel material.

APPLICABILITY

The PCS P/T limits Specification provides a definition of acceptable operation for prevention of non-ductile 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 in keeping with the concern for non-ductile failure. The limits do not apply to the pressurizer.

BASES

APPLICABILITY (continued)

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, "PCS Pressure, Temperature, and Flow Departure from Nucleate Boiling (DNB) Limits"; LCO 3.4.2, "PCS 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 non-ductile 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.

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 PCS 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. 6), 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.

BASES

ACTIONS (continued)

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 PCS remained in an unacceptable P/T region for an extended period of increased stress; or

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 PCS 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 PCS pressure $\leq$ 270 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.

BASES

ACTIONS (continued)

Besides restoring operation to within limits, an evaluation is required to determine if PCS 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. 6), 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 the PTLR limits is required every 30 minutes when PCS pressure and temperature conditions are undergoing planned changes. This frequency is considered reasonable in view of the control room indication available to monitor PCS 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. Calculation of average hourly cooldown rate must consider changes in reactor vessel inlet temperature caused by initiating shutdown cooling, by starting primary coolant pumps with a temperature difference between the steam generator and PCS, or by stopping primary coolant pumps with shutdown cooling in service.

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.

BASES

SURVEILLANCE REQUIREMENTS (continued)

This SR is modified by a Note that requires this SR be performed only during PCS 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. EGAD-RSA-26, "Pressure - Temperature and LTOP Limits"
2. 10 CFR 50, Appendix G
3. ASME, Boiler and Pressure Vessel Code, Section III, Appendix G, July 1974 Edition
4. ASTM E 185-82, July 1982
5. 10 CFR 50, Appendix H
6. ASME, Boiler and Pressure Vessel Code, Section XI, Appendix E

B 3.4 **PRIMARY COOLANT SYSTEM (PCS)**

B 3.4.4 PCS Loops - MODES 1 and 2

BASES

BACKGROUND

The primary function of the PCS 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 PCS 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 PCS configuration for heat transport uses two PCS loops. Each PCS loop contains a SG and two Primary Coolant Pumps (PCPs). A PCP 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 PCS loops with both PCPs in operation in each loop. The intent of the Specification is to require core heat removal with forced flow during power operation. Specifying two PCS loops provides the minimum necessary paths (two SGs) for heat removal.

BASES

APPLICABLE SAFETY ANALYSES

Safety analyses contain various assumptions for the Design Bases Accident (DBA) initial conditions including PCS pressure, PCS temperature, reactor power level, core parameters, and safety system setpoints. The important aspect for this LCO is the primary coolant forced flow rate, which is represented by the number of PCS 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 PCP s 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 PCP operation are the four pump coastdown, single pump locked rotor, single pump (broken shaft or coast-down), 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 106.5% RTP. This is the design overpower condition for four pump operation. The 106.5% value is the accident analysis setpoint of the VHP (variable high power) 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.

LCO

The purpose of this LCO is to require adequate forced flow for core heat removal. Flow is represented by having both PCS loops with both PCP s 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 PCP s providing forced flow for heat transport to a SG that is OPERABLE in accordance with the Steam Generator Tube Surveillance Program. SG, and hence PCS 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 MODE 3 if any SG level is ≤ 25.9% as sensed by the RPS. The minimum water level to declare the SG OPERABLE in MODES 1 and 2 is 25.9%.

BASES

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 PCS 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, "PCS Loops - MODE 3";
LCO 3.4.6, "PCS Loops - MODE 4";
LCO 3.4.7, "PCS Loops - MODE 5, Loops Filled";
LCO 3.4.8, "PCS 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 PCP s 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.

Tripping the reactor from C-06 panel opening the 42-01 and 42-02 breakers prevents control rod withdrawal with less than four PCP operating. This additional action was added in response to NRC request that positive means be provided to prevent rod bank withdrawal in MODE 3 with less than four PCPs operating (T.S. Amendment 118.) LCO 3.3.1 (Reactor Protective System (RPS) Instrumentation - Operating) requires all RPS trip functions to be OPERABLE when more than one Control Rod is capable of being withdrawn. Since the Low PCS flow trip will be OPERABLE, compliance with the LCO 3.3.1 requirements prevents a rod bank withdraw in MODE 3 with less than four PCPs operating.

BASES

SURVEILLANCE REQUIREMENTS

SR 3.4.4.1

This SR requires verification every 12 hours of the required number of loops in operation. Verification includes temperature and primary coolant 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.

REFERENCE

1. FSAR, Section 14.1.3

B 3.4 **PRIMARY COOLANT SYSTEM (PCS)**

B 3.4.5 PCS Loops - MODE 3

BASES

BACKGROUND

The primary function of the primary 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 primary coolant is to act as a carrier for soluble neutron poison, boric acid.

In MODE 3, Primary Coolant Pumps (PCPs) 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 PCS loop with one PCP is sufficient to remove core decay heat. However, two PCS loops are required to be OPERABLE to provide redundant paths for decay heat removal. Only one PCP needs to be OPERABLE to declare the associated PCS loop OPERABLE.

Primary 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 PCS cannot be ensured.

APPLICABLE SAFETY ANALYSES

Failure to provide heat removal may result in challenges to a fission product barrier. The PCS 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.

LCO

The purpose of this LCO is to require two PCS 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 (> -84% 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 PCP meets the LCO requirement for one loop in operation.

BASES

LCO (continued)

The first Note permits a limited period of operation without PCPs. All PCPs may be deenergized 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 PCS cannot be ensured. 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.

Note 2 requires that one of the following conditions be satisfied before forced circulation (starting the first PCP) may be started:

a. PCS cold leg temperature (T_c) is > 430.

b. S/G secondary temperature is ≤ T_c.

c. S/G secondary temperature is < 100°F above T_c, and shutdown cooling is isolated from the PCS, and PCS heatup/cooldown rate is ≤ 10°F/hour.

d. S/G secondary temperature is < 100°F above T_c, and shutdown cooling is isolated from the PCS, and pressurizer level is ≤ 57%.

Satisfying any of the above conditions will preclude a large pressure surge in the PCS when the PCP is started. Energy additions from the steam generators could occur if a primary coolant pump was started when the steam generator secondary temperature is significantly above the PCS temperature. The maximum pressurizer level at which credit is taken for having a bubble (57%, which provides about 700 cubic feet of steam space) is based on engineering judgement and verified by LTOP analysis. This level provides the same steam volume to dampen pressure transients as would be available at full power. Additional discussion on Pressure - Temperature and LTOP limits is contained in the PTLR.

In MODES 3, 4, and 5, it is sometimes necessary to stop all PCPs or Shutdown Cooling (SDC) pump forced circulation (e.g., to change operation from one SDC train to the other, to perform surveillance or startup testing, to perform the transition to and from SDC System cooling, or to avoid operation below the PCP 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.

BASES

LCO (continued)

An OPERABLE loop consists of at least one PCP providing forced flow for heat transport and an SG that is OPERABLE in accordance with the Steam Generator Tube Surveillance Program. A PCP 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 PCS loop in operation is adequate for transport and heat removal. A second PCS loop is required to be OPERABLE but not in operation for redundant heat removal capability.

Operation in other MODES is covered by:

LCO 3.4.4, "PCS Loops - MODES 1 and 2";
LCO 3.4.6, "PCS Loops - MODE 4";
LCO 3.4.7, "PCS Loops - MODE 5, Loops Filled";
LCO 3.4.8, "PCS 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 PCS loop is inoperable, redundancy for forced flow heat removal is lost. The Required Action is restoration of the required PCS 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.

BASES

ACTIONS (continued)

C.1 and C.2

If no PCS loop is in operation, except as provided in Note 1 in the LCO section, all operations involving a reduction of PCS boron concentration must be immediately suspended. This is necessary because boron dilution requires forced circulation for proper homogenization. Action to restore one PCS loop to OPERABLE status and operation shall be initiated immediately and continued until one PCS 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 PCS loops are in operation. Verification includes temperature and 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 ≥ -84%. 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.

SR 3.4.5.3

Verification that the required number of PCPs are OPERABLE ensures that the single failure criterion is met and that an additional PCS 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 PCPs. 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 PRIMARY COOLANT SYSTEM (PCS)

B 3.4.6 PCS Loops - MODE 4

BASES

BACKGROUND

In MODE 4, the primary function of the primary 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 primary coolant is to act as a carrier for soluble neutron poison, boric acid.

In MODE 4, either Primary Coolant Pumps (PCPs) or SDC trains can be used for coolant circulation. The intent of this LCO is to provide forced flow from at least one PCP or one SDC train for decay heat removal and transport. The flow provided by one PCP 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.

The purposes of the SDC System in MODE 4 are to remove decay heat and sensible heat from the Primary Coolant System (PCS), as required by GDC 34, to provide mixing of borated coolant, to provide sufficient coolant circulation to minimize the effects of a boron dilution accident, and to prevent boron stratification (Ref. 1). Heat is removed from the PCS by circulating primary coolant through the shutdown heat exchangers, where the heat is transferred to the Component Cooling Water System via the shutdown heat exchangers. The coolant is then returned to the PCS cold legs. Operation of the SDC System for normal cooldown or decay heat removal is manually accomplished from the control room. The heat removal rate is adjusted by controlling the flow of primary coolant through the shutdown heat exchangers and bypassing the heat exchangers. Mixing of the primary coolant is maintained by this continuous circulation of primary coolant through the SDC System.

When primary coolant boron concentration is being changed, the process must be uniform throughout the primary coolant system volume to prevent stratification of primary coolant at lower boron concentration which could result in a reactivity insertion. Sufficient mixing of the primary coolant is assured if one shutdown cooling pump or one primary coolant pump is in operation. The shutdown cooling pump will circulate the primary system volume in less than 60 minutes when operated at rated capacity. By imposing a minimum shutdown cooling pump flow rate of 2810 gpm, sufficient time is provided for the operator to terminate the boron dilution under asymmetric flow conditions. The pressurizer volume is relatively inactive, therefore, it will tend to have a boron concentration higher than the rest of the primary coolant system during a dilution operation.

BASES

BACKGROUND (continued)

Administrative procedures will provide for use of pressurizer sprays to maintain a nominal spread between the boron concentration in the pressurizer and the primary system during the addition of boron.

This LCO allows the Shutdown Cooling (SDC) system to be OPERABLE. When both of the SDC system inlet valves are open, the pressure relief valves in the SDC system provide the required over pressure protection. Inadvertent starting of a HPSI pump would exceed the relief capacity of the SDC system relief valves. The HPSI pump operating restrictions Surveillance Requirement (SR 3.4.12.1) verifies that both HPSI pumps are incapable of injecting into the PCS when the PCS temperature is less than 300°F. Since the SDC system is not placed into service until the PCS pressure is less than 270 psia and PCS temperature is less than 300°F, the HPSI Surveillance Requirement (SR 3.4.12.1) provides the required HPSI pump operating restrictions when the SDC system sees PCS pressure conditions.

APPLICABLE SAFETY ANALYSES

In MODE 4, PCS circulation is considered in the determination of the time available for mitigation of the accidental boron dilution event. The PCS loops and SDC trains provide this circulation.

PCS Loops MODE 4 have been identified in the NRC Policy Statement as important contributors to risk reduction.

LCO

The purpose of this LCO is to require that at least two loops or trains, PCS 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 PCS 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.

Note 1 permits all PCPs and SDC pumps to be de-energized $\leq$ 1 hour per 8 hour period. This means that natural circulation has been established using the SGs. The Note prohibits boron dilution when forced flow is stopped because an even concentration distribution cannot be ensured. 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 PCS without the PCPs 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 PCS temperature and pressure diminish.

LCO (continued)

Without cooling by forced flow, higher heat loads will cause the primary 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 PCPs 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 one of the following conditions be satisfied before forced circulation (starting the first PCP) may be started:

a. S/G secondary temperature is $\leq T_c$.

b. S/G secondary temperature is < 100°F above T_c, and shutdown cooling is isolated from the PCS, and PCS heatup/cooldown rate is $\leq$ 10°F/hour.

c. S/G secondary temperature is < 100°F above T_c, and shutdown cooling is isolated from the PCS, and pressurizer level is $\leq$ 57%.

Satisfying any of the above conditions will preclude a large pressure surge in the PCS when the PCP is started. Energy additions from the steam generators could occur if a primary coolant pump was started when the steam generator secondary temperature is significantly above the PCS temperature. The maximum pressurizer level at which credit is taken for having a bubble (57%, which provides about 700 cubic feet of steam space) is based on engineering judgement and verified by LTOP analysis. This level provides the same steam volume to dampen pressure transients as would be available at full power. Additions discussion on Pressure - Temperature and LTOP limits is contained in the PTLR.

Note 3 limitation on operating P-50A and P-50B together with T_c below 300°F allows the pressure temperature limits in LCO 3.4.3 and LCO 3.4.12 to be higher than they would be without this limit.

An OPERABLE PCS loop consists of at least one OPERABLE PCP 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.

BASES

LCO (continued)

Similarly, for the SDC System, an OPERABLE SDC train is composed of the OPERABLE SDC pump(s) capable of providing forced flow to the SDC heat exchanger(s). PCPs and SDC pumps are OPERABLE if they are capable of being powered and are able to provide flow 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 PCS loops and SGs or the SDC System.

Operation in other MODES is covered by:

LCO 3.4.4, "PCS Loops - MODES 1 and 2";
LCO 3.4.5, "PCS Loops - MODE 3";
LCO 3.4.7, "PCS Loops - MODE 5, Loops Filled";
LCO 3.4.8, "PCS 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 PCS loop or SDC train is OPERABLE and in operation, redundancy for heat removal is lost. Action must be initiated immediately to restore a second loop or train to OPERABLE status. The immediate Completion Time reflects the importance of maintaining the availability of two paths for decay heat removal.

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 (≤ 200°F) rather than MODE 4 (200°F to 300°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.

BASES

ACTIONS (continued)

C.1 and C.2

If no PCS loops or SDC trains are OPERABLE or in operation, except during conditions permitted by Note 1 in the LCO section, all operations involving reduction of PCS boron concentration must be suspended and action to restore one PCS 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.

D.1 and D.2

When the SDC flow rate is throttled to less than 2810 gpm, all of the assumptions of the dilution accident analysis are no longer met. Actions must be initiated immediately to suspend all activities which could lead to a reduction of PCS boron concentration.

D.3.1

With SDC flow less than 2810 gpm, but at least 1000 gpm, the dilution accident analysis shows satisfactory results if the assumed dilution flow is less than the capacity of a single charging pump. Action is therefore required to assure that SDC flow through the core is at least 1000 gpm, and that two charging pumps are electrically disabled. By disabling two charging pumps, the potential source of unborated PCS make-up from charging pumps or primary make-up pumps is limited to 53 gpm.

D.3.2

Plant conditions exist when it is desired to have charging pumps available for immediate make up, but when it is also desired to reduce SDC flow for testing or maintenance activities. Action D.3.2 provides an allowance for these conditions to exist if periodic verifications assure that no charging pump is operating. If during conditions when SDC flow is less than 2810 gpm, a dilution does occur, SHUTDOWN MARGIN must be verified by performance of SR 3.1.2.1. Action required to take PCS boron samples shall be initiated within 15 minutes after the dilution and every 15 minutes thereafter until a stable PCS boron concentration exists or a flow of 2810 gpm has been re-established.

BASES

ACTIONS (continued)

E.1

With one of two SDC suction valve interlock channels inoperable, the required action is to place the circuit breaker for the associated valve operator in the "OPEN" position within 1 hour. The breaker may be "Racked In" only during operation of the associated valve when the PCS pressure is less than the SDC System design pressure.

SURVEILLANCE REQUIREMENTS

SR 3.4.6.1

This SR requires verification every 12 hours that one required loop or train is in operation. 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 PCS loop status. In addition, control room indication and alarms will normally indicate loop status.

SR 3.4.6.2

This SR requires verification every 12 hours of secondary side water level in the required SG(s) $\geq$ -84%. 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 PCS 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.

BASES

SURVEILLANCE REQUIREMENTS (continued)

SR 3.4.6.4

The SDC suction interlock allows closed isolation valves (MO-3015 and MO-3016) to be opened when the PCS pressure is less than 270 psia. The frequency of 18 months is based on a typical fuel cycle and industry accepted practice.

REFERENCE

1. FSAR 14.3

B 3.4 **PRIMARY COOLANT SYSTEM (PCS)**

B 3.4.7 PCS Loops - MODE 5, Loops Filled

BASES

BACKGROUND

In MODE 5 with the PCS loops filled (loops filled means the PCS loops are intact, not blocked by dams, and totally filled with coolant), the primary function of the PCS is to remove the decay heat and transfer this heat either to the Steam Generator (SG) secondary side coolant or to the component 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 PCS 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 purposes of the SDC System in MODE 5 are to remove decay heat and sensible heat from the Primary Coolant System (PCS), as required by GDC 34, to provide mixing of borated coolant, to provide sufficient coolant circulation to minimize the effects of a boron dilution accident, and to prevent boron stratification (Ref. 1). Heat is removed from the PCS by circulating primary coolant through the shutdown heat exchangers, where the heat is transferred to the Component Cooling Water System via the shutdown heat exchangers. The coolant is then returned to the PCS cold legs. Operation of the SDC System for normal cooldown or decay heat removal is manually accomplished from the control room. The heat removal rate is adjusted by controlling the flow of primary coolant through the shutdown heat exchangers and bypassing the heat exchangers. Mixing of the primary coolant is maintained by this continuous circulation of primary coolant through the SDC System.

BASES

BACKGROUND (continued)

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.

This LCO allows the Shutdown Cooling (SDC) system to be OPERABLE. When both of the SDC system inlet valves are open, the pressure relief valves in the SDC system provide the required over pressure protection. Inadvertent starting of a HPSI pump would exceed the relief capacity of the SDC system relief valves. The HPSI pump operating restrictions Surveillance Requirement (SR 3.4.12.1) verifies that both HPSI pumps are incapable of injecting into the PCS when the PCS temperature is less than 300°F. Since the SDC system is not placed into service until the PCS pressure is less than 270 psia and PCS temperature is less than 300°F, the HPSI Surveillance Requirement (SR 3.4.12.1) provides the required HPSI pump operating restrictions when the SDC system sees PCS pressure conditions.

APPLICABLE SAFETY ANALYSES

In MODE 5, PCS circulation is considered in the determination of the time available for mitigation of the accidental boron dilution event. The SDC trains provide this circulation. PCS Loops - MODE 5 (Loops Filled) have been identified in the NRC Policy Statement 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%. 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%. 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.

BASES

LCO (continued)

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. 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 PCS loop flow path is to be maintained with subcooled liquid.

In MODE 5, it is sometimes necessary to stop all PCP 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 PCP 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 one of the following conditions be satisfied before forced circulation (starting the first PCP) may be started :

a. S/G secondary temperature is $\leq T_c$.

b. S/G secondary temperature is < 100°F above T_c, and shutdown cooling is isolated from the PCS, and PCS heatup/cooldown rate is $\leq$ 10°F/hour.

c. S/G secondary temperature is < 100°F above T_c, and shutdown cooling is isolated from the PCS, and pressurizer level is $\leq$ 57%.

Satisfying any of the above conditions will preclude a low temperature overpressure event due to a thermal transient when the PCP is started. Energy additions from the steam generators could occur if a primary coolant pump was started when the steam generator secondary temperature is significantly above the PCS temperature. The maximum pressurizer level at which credit is taken for having a bubble (57%, which provides about 700 cubic feet of steam/air space) is based on engineering judgement and verified by LTOP analysis. This level provides the same volume to dampen pressure transients as would be available at full power. Additions discussion on Pressure Temperature and LTOP limits is contained in the PTLR.

BASES

LCO (continued)

Note 4 limitation on operating P-50A and P-50B together with T_c below 300°F allows the pressure temperature limits in LCO 13.4.3 and LCO 13.4.12 to be higher than they would be without this limit.

Note 5 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 PCP is in operation. This Note provides for the transition to MODE 4 where a PCP is permitted to be in operation and replaces the PCS circulation function provided by the SDC trains.

An OPERABLE SDC train is composed of an OPERABLE SDC pump and an OPERABLE SDC heat exchanger, along with the appropriate flow and temperature instrumentation for control and indication. Closing the SDC heat exchanger control valves diverting all SDC flow through the bypass line does not make the SDC train inoperable.

SDC pumps are OPERABLE if they are capable of being powered and are able to provide flow if required. An OPERABLE SG can perform as a heat sink when it has an adequate water level and is OPERABLE in accordance with the SG Tube Surveillance Program.

APPLICABILITY

In MODE 5 with PCS 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, "PCS Loops - MODES 1 and 2";
LCO 3.4.5, "PCS Loops - MODE 3";
LCO 3.4.6, "PCS Loops - MODE 4";
LCO 3.4.8, "PCS 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).

BASES

ACTIONS

A.1 and A.2

If the required SDC train is inoperable and any SGs have secondary side water levels < 25%, 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.

B.1 and B.2

If no SDC train is in operation, except as permitted in Note 1, all operations involving the reduction of PCS 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.

C.1 and C.2

When the SDC flow rate is throttled to less than 2810 gpm, all of the assumptions of the dilution accident analysis are no longer met. Actions must be initiated immediately to suspend all activities which could lead to a reduction of PCS boron concentration.

C.3.1

With SDC flow less than 2810 gpm, but at least 1000 gpm, the dilution accident analysis shows satisfactory results if the assumed dilution flow is less than the capacity of a single charging pump. Action is therefore required to assure that SDC flow through the core is at least 1000 gpm, and that two charging pumps are electrically disabled. By disabling two charging pumps, the potential source of unborated PCS make-up from charging pumps or primary make-up pumps is limited to 53 gpm.

BASES

ACTIONS (continued)

C.3.2

Plant conditions exist when it is desired to have charging pumps available for immediate make up, but when it is also desired to reduce SDC flow for testing or maintenance activities. Action C.3.2 provides an allowance for these conditions to exist if periodic verifications assure that no charging pump is operating. If during conditions when SDC flow is less than 2810 gpm, a dilution does occur, SHUTDOWN MARGIN must be verified by performance of SR 3.1.2.1. Action required to take PCS boron samples shall be initiated within 15 minutes after the dilution and every 15 minutes thereafter until a stable PCS boron concentration exists or a flow of 2810 gpm has been re-established.

SURVEILLANCE REQUIREMENTS

SR 3.4.7.1

This SR requires verification every 12 hours that one SDC train is in operation. 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 swap-over 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 $\geq$ 25% 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.

BASES

SURVEILLANCE REQUIREMENTS (continued)

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., one or both SGs have < 25% 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.

REFERENCES

FSAR 14.3

B 3.4 PRIMARY COOLANT SYSTEM (PCS)

B 3.4.8 PCS Loops - MODE 5, Loops Not Filled

BASES

BACKGROUND

In MODE 5 with the PCS loops not filled, the primary function of the primary 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 primary 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.

The purposes of the SDC System in MODE 5 are to remove decay heat and sensible heat from the Primary Coolant System (PCS), as required by GDC 34, to provide mixing of borated coolant, to provide sufficient coolant circulation to minimize the effects of a boron dilution accident, and to prevent boron stratification (Ref. 1). Heat is removed from the PCS by circulating primary coolant through the shutdown heat exchangers, where the heat is transferred to the Component Cooling Water System via the shutdown heat exchangers. The coolant is then returned to the PCS cold legs. Operation of the SDC System for normal cooldown or decay heat removal is manually accomplished from the control room. The heat removal rate is adjusted by controlling the flow of primary coolant through the shutdown heat exchangers and bypassing the heat exchangers. Mixing of the primary coolant is maintained by this continuous circulation of primary coolant through the SDC System.

This LCO allows the Shutdown Cooling (SDC) system to be OPERABLE. When both of the SDC system inlet valves are open, the pressure relief valves in the SDC system provide the required over pressure protection. Inadvertent starting of a HPSI pump would exceed the relief capacity of the SDC system relief valves. The HPSI pump operating restrictions Surveillance Requirement (SR 3.4.12.1) verifies that both HPSI pumps are incapable of injecting into the PCS when the PCS temperature is less than 300°F. Since the SDC system is not placed into service until the PCS pressure is less than 270 psia and PCS temperature is less than 300°F, the HPSI Surveillance Requirement (SR 3.4.12.1) provides the required HPSI pump operating restrictions when the SDC system sees PCS pressure conditions.

BASES

APPLICABLE SAFETY ANALYSES

In MODE 5, PCS circulation is considered in determining the time available for mitigation of the accidental boron dilution event. In MODE 5, Loops not not filled, the SDC trains provide this circulation. The flow provided by one SDC train is adequate for decay heat removal and for boron mixing.

PCS loops - MODE 5 (loops not filled) have been identified in the NRC Policy Statement 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.

Note 1 permits the SDC pumps to be de-energized for 1 hour. 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 capable of providing forced flow to an OPERABLE SDC heat exchanger, along with the appropriate flow and temperature instrumentation for control and indication. Closing the SDC heat exchanger control valves diverting all SDC flow through the bypass line does not make the train inoperable. SDC pumps are OPERABLE if they are capable of being powered and are able to provide flow if required.

BASES

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, "PCS Loops - MODES 1 and 2";
LCO 3.4.5, "PCS Loops - MODE 3";
LCO 3.4.6, "PCS Loops - MODE 4";
LCO 3.4.7, "PCS 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 the required 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.

B.1 and B.2

If no SDC train is OPERABLE or in operation, except as provided in Note 1, all operations involving the reduction of PCS 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.

C.1 and C.2

When the SDC flow rate is throttled to less than 2810 gpm, all of the assumptions of the dilution accident analysis are no longer met. Actions must be initiated immediately to suspend all activities which could lead to a reduction of PCS boron concentration.

ACTIONS (continued)

C.3.1

With SDC flow less than 2810 gpm, but at least 1000 gpm, the dilution accident analysis shows satisfactory results if the assumed dilution flow is less than the capacity of a single charging pump. Action is therefore required to assure that SDC flow through the core is at least 1000 gpm, and that two charging pumps are electrically disabled. By disabling two charging pumps, the potential source of unborated PCS make-up from charging pumps or primary make-up pumps is limited to 53 gpm.

C.3.2

Plant conditions exist when it is desired to have charging pumps available for immediate make up, but when it is also desired to reduce SDC flow for testing or maintenance activities. Action C.3.2 provides an allowance for these conditions to exist if periodic verifications assure that no charging pump is operating. If during conditions when SDC flow is less than 2810 gpm, a dilution does occur, SHUTDOWN MARGIN must be verified by performance of SR 3.1.2.1. Action required to take PCS boron samples shall be initiated within 15 minutes after the dilution and every 15 minutes thereafter until a stable PCS boron concentration exists or a flow of 2810 gpm has been re-established.

SURVEILLANCE REQUIREMENTS

SR 3.4.8.1

This SR requires verification every 12 hours that one SDC train is in operation. 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 additional trains 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.

REFERENCE

FSAR 14.3

B 3.4 **PRIMARY COOLANT SYSTEMS (PCS)**

B 3.4.9 Pressurizer

BASES

BACKGROUND

The pressurizer provides a point in the PCS where liquid and vapor are maintained in equilibrium under saturated conditions for pressure control purposes to prevent bulk boiling in the remainder of the PCS. Key functions include maintaining required primary system pressure during steady state operation and limiting the pressure changes caused by primary 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 Power Operated Relief Valves (PORVs) are addressed by LCO 3.4.10, "Pressurizer Safety Valves," and LCO 3.4.11, "Pressurizer Power Operated Relief Valves (PORVs)," respectively.

The maximum water level limit has been established to ensure that a liquid to vapor interface exists to permit PCS pressure control, using the sprays and heaters during normal operation and proper pressure response for anticipated design basis transients. The 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 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 (PORVs or 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 PCS pressure might exceed the Safety Limit of 2750 psia.

BASES

BACKGROUND (continued)

The requirement to have two groups of pressurizer heaters ensures that PCS pressure can be maintained. The pressurizer heaters maintain PCS pressure to keep the primary coolant subcooled. Inability to control PCS 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, with all PCS cold leg temperatures ≥ 430°F, 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 FSAR do not take credit for pressurizer heater operation; however, an implicit initial condition assumption of the safety analyses is that the PCS is operating at normal pressure.

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.

LCO

The LCO requirement for the pressurizer to be OPERABLE with water level < 62.8% 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 (Ref. 2). Requiring the presence of a steam bubble is also consistent with analytical assumptions.

BASES

LCO (continued)

The LCO requires two groups of OPERABLE pressurizer heaters, each with a capacity ≥ 375 kW. The minimum heater capacity required is sufficient to maintain the PCS 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. The exact design value of 375 kW is derived from the use of 30 heaters rated at 12.5 kW each. The amount needed to maintain pressure is dependent on the ambient heat losses.

APPLICABILITY

The need for pressure control is most pertinent when core heat can cause the greatest effect on PCS temperature resulting in the greatest effect on pressurizer level and PCS pressure control. Thus, Applicability has been designated for MODES 1 and 2. The Applicability is also provided for MODE 3 when PCS cold leg temperature is ≥ 430°F. The purpose is to prevent solid water PCS operation during heatup and cooldown to avoid rapid pressure rises caused by normal operational perturbation, such as primary coolant pump startup. The LCO does not apply to other MODES because LCO 3.4.12, "Low Temperature Overpressure Protection (LTOP) System," applies. The LCO does not apply to MODES 5 and 6 with partial loop operation.

In MODES 1, 2, and 3, with all PCS cold leg temperatures ≥ 430°F, 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 PCS in a hot pressurized condition with loop subcooling for an extended period. The required actions do not allow extened plant operations in MODE 3 with PCS cold leg temperatures < 430°F. For MODE 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.

In the event of a loss of offsite power, one half of the heater capacity (750 kW nominally) is normally connected to the 1D emergency bus and can be manually controlled via a hand switch in the control room. This would provide sufficient heater capacity to establish and maintain natural circulation in a hot standby condition.

BASES

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.

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.

BASES

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.

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 determining the current used by the heaters.) 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
2. FSAR 14.12
3. FSAR 4.3.7

B 3.4 **PRIMARY COOLANT SYSTEM (PCS)**

B 3.4.10 Pressurizer Safety Valves

BASES

BACKGROUND

The purpose of the three spring loaded pressurizer safety valves is to provide PCS overpressure protection. Operating in conjunction with the Reactor Protection System, two 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 portions of MODE 3. For the remainder of MODE 3, MODE 4, MODE 5, and MODE 6 with the head on, overpressure protection is provided by operating procedures and the LCO 3.4.12, "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 pressures are given in Table 3.4.10-1. 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, acoustic monitoring, and by an increase in the quench tank temperature and level.

The upper and lower pressure limits are based on the ± 1% tolerance requirement (Ref. 1) for lifting pressures above 1000 psig. 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 PCS pressure will be limited to 110% of design pressure. The consequences of exceeding the ASME pressure limit (Ref. 1) could include damage to PCS components, increased leakage, or a requirement to perform additional stress analyses prior to resumption of reactor operation.

BASES

APPLICABLE SAFETY ANALYSES

All accident analyses in the FSAR that require safety valve actuation assume operation of one or more pressurizer safety valves to limit increasing reactor coolant pressure. The overpressure protection analysis assumes that the valves open at the high range of the settings. 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 startup accident establishes the minimum safety valve capacity. The startup accident assumed to occur at < 15% power for MODES 2 and 3 is terminated by the Variable High Power (VHP) trip at 30% RTP. The VHP trip limits the pressurizer insurge and the resulting PCS pressure increase due to the available steam bubble in the pressurizer. The limiting event for overpressure protection in MODES 1, 2 and 3 is the Loss of Load event at 100% RTP. Compliance with this specification is required to ensure that the accident analysis and design basis calculations remain valid.

LCO

The three pressurizer safety valves are set to open near the PCS design pressure (2500 psia) and within the ASME specified tolerance to avoid exceeding the maximum PCS design pressure SL, to maintain accident analysis assumptions, and to comply with ASME Code requirements. The upper and lower pressure tolerance limits are based on the ± 1% tolerance requirements (Ref. 1) for lifting pressures above 1000 psig. The limit protected by this specification is the Reactor Coolant Pressure Boundary (RCPB) SL of 110% of design pressure. Inoperability of two or three 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 PCS components, increased leakage, or additional stress analysis being required prior to resumption of reactor operation.

APPLICABILITY

In MODES 1, 2, and portions of MODE 3 above the LTOP temperature. OPERABILITY of three valves is required because the combined capacity is required to keep reactor coolant pressure below 110% of its design value during certain accidents.

The LCO is not applicable in MODE 3 when any PCS cold leg temperatures is < 430°F, MODE 4, and MODE 5 because LTOP protection is provided. Overpressure protection is not required in MODE 6 with the reactor vessel head detensioned.

BASES

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 PCS overpressure protection system. An inoperable safety valve coincident with an PCS 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 3 at or below 430°F 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 reduce PCS average temperature below 430°F without challenging plant systems. At or below 430°F, overpressure protection is provided by LTOP. The change from MODE 1, 2, or 3 to MODE 3 with T_{ave} < 430°F reduces the PCS energy (core power and pressure), lowers the potential for large pressurizer insurges, and thereby removes the need for overpressure protection by the pressurizer safety valves.

SURVEILLANCE REQUIREMENTS

SR 3.4.10.1

SRs are specified in the Inservice and 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% for OPERABILITY; however, the valves are reset to ± 1% during the Surveillance to allow for drift.

REFERENCE

1. ASME, Boiler and Pressure Vessel Code, Section III, Section XI

B 3.4 **PRIMARY COOLANT SYSTEM (PCS)**

B 3.4.11 Pressurizer Power Operated Relief Valves (PORVs)

BASES

BACKGROUND

The pressurizer is equipped with two types of devices for pressure relief: pressurizer safety valves and PORVs. The PORV is a solenoid - pilot operated valve that may be manually operated using controls installed in the control room.

An electric, motor operated block valve, normally closed during plant operation in MODES 1 and 2 is installed between the pressurizer and the PORV. The function of the block valve is to isolate the PORV. Block valve closure is accomplished manually using controls in the control room and may be used to isolate a leaking PORV to permit continued power operation. Most importantly, the block valve is used to isolate a stuck open PORV to isolate the resulting small break Loss Of Coolant Accident (LOCA). Closure terminates the PCS depressurization and coolant inventory loss.

The PORV and its block valve controls are powered from safety class power supplies. Power supplies for the PORV are separate from those for the block valve. Power supply requirements are defined in NUREG-0737, Paragraph III, G.1 (Ref. 1).

Since the pressurizer safety valves provide the necessary automatic protection against excessive pressure when the PCS is above 430°F, automatic actuation of the PORVs is not required to be OPERABLE.

The PORVs and their block valves must provide two safety functions; maintenance of PCS integrity and PCS pressure control capability. If either of these safety functions is unavailable, corrective action must be taken.

Normally, during operation at MODE 2 and above, the PORV controls are in the CLOSE position, and the block valves are closed. The PORVs, valves, and the associated manual controls must be operable. If either valve in a PORV flow path is inoperable, the other valve in the flow path must provide PCS integrity assurance. When a PORV is inoperable, the block valve must be closed; when a block valve is inoperable, the PORV must have its control in the "CLOSE" position.

The primary purpose of this LCO is to ensure that the PORV, its setpoint, and the block valve are operating correctly so the potential for a small break LOCA through the PORV pathway is minimized, or if a small break LOCA were to occur through a failed open PORV, the block valve could be manually operated to isolate the path.

BASES

BACKGROUND (continued)

The PORV may be manually operated to depressurize the PCS as deemed necessary by the operator in response to normal or abnormal transients. The PORV may be used for depressurization when the pressurizer spray is not available, a condition that may be encountered during loss of offsite power. Operators can manually open the PORVs to reduce PCS pressure in the event of a Steam Generator Tube Rupture (SGTR) with offsite power unavailable.

The PORV may also be used for feed and bleed core cooling in the case of multiple equipment failure events that are not within the design basis, such as a total loss of feedwater. The safety analyses do not take credit for PORV actuation, but do take credit for the safety valves.

The PORV also provides Low Temperature Overpressure Protection (LTOP) during heatup and cooldown. LCO 3.4.12, "Low Temperature Overpressure Protection (LTOP) System," addresses this function.

APPLICABLE SAFETY ANALYSES

The PORV small break LOCA break size is bounded by the spectrum of piping breaks analyzed for plant licensing. Because the PORV small break LOCA is located at the top of the pressurizer, the PCS response characteristics are different from PCS loop piping breaks; analyses have been performed to investigate these characteristics.

The possibility of a small break LOCA through the PORV is reduced when the PORV flow path is OPERABLE and the PORV opening setpoint is established to be reasonably remote from expected transient challenges. The possibility is minimized if the flow path is isolated.

Overpressure protection is provided by safety valves, and analyses do not take credit for the PORV opening for accident mitigation.

LCO

The LCO requires the PORV and its associated block valve to be OPERABLE. The block valve is required to be OPERABLE so it may be used to isolate the flow path if the PORV is not OPERABLE.

Valve OPERABILITY also means the PORV setpoint is correct. By ensuring that the PORV opening setpoint is correct, the PORV is not subject to frequent challenges from possible pressure increase transients. Also, the block valves are closed during normal operation in MODES 1 and 2. Therefore, the possibility of a small break LOCA through a failed open PORV is not a frequent event.

APPLICABILITY

In MODES 1, 2, and 3, with all PCS cold leg temperatures ≥ 430°F, the PORV and its block valve are required to be OPERABLE to limit the potential for a small break LOCA through the flow path. Imbalances in the energy output of the core and heat removal by the secondary system can cause the PCS pressure to increase. Pressure increase transients can occur any time the steam generators are used for heat removal. The most rapid increases will occur at higher operating power and pressure conditions of MODES 1 and 2 when the block valves are normally closed.

Pressure increases are less prominent in MODE 3 because the core input energy is reduced, but the PCS pressure is high. Therefore, this LCO is applicable in MODES 1, 2, and 3 with all PCS cold leg temperatures ≥ 430°F. The LCO is not applicable for PCS temperatures < 430°F when both pressure and core energy are decreased and the pressure surges become much less significant. The PORV setpoint is reduced for LTOP in MODES 4, 5, and 6 with the reactor vessel head in place. LCO 3.4.12 addresses the PORV requirements in these MODES.

ACTIONS

The ACTIONS are modified by two Notes. Note 1 clarifies that all pressurizer PORVs are treated as separate entities, each with separate Completion Times (i.e., the Completion Time is on a component basis). Note 2 is an exception to LCO 3.0.4. The exception for LCO 3.0.4 permits entry into MODES 1, 2, and 3 to perform cycling of the PORV or block valve to verify their OPERABLE status.

<u>A.1, A.2, and A.3</u>

If one PORV is inoperable and not capable of being manually cycled, it must either be isolated, by closing the associated block valve and removing the power from the block valve, or restored to OPERABLE status. The Completion Time of 1 hour is reasonable, based on challenges to the PORVs during this time period, and provides the operator adequate time to correct the situation. If the inoperable valve cannot be restored to OPERABLE status, it must be isolated within the specified time. Because there is at least one PORV that remains OPERABLE, an additional 72 hours is provided to restore the inoperable PORV to OPERABLE status.

ACTIONS (continued)

B.1 and B.2

If one block valve is inoperable, then it must be restored to OPERABLE status, or the associated PORV placed in manual control. The prime importance for the capability to close the block valve is to isolate a stuck open PORV. Therefore, if the block valve cannot be restored to OPERABLE status within 1 hour, the Required Action is to place the PORV in manual control to preclude its automatic opening for an overpressure event and to avoid the potential for a stuck open PORV at a time that the block valve is inoperable. The Completion Times of 1 hour are reasonable based on the small potential for challenges to the system during this time period and provide the operator time to correct the situation. Because at least one PORV remains OPERABLE, the operator is permitted a Completion Time of 72 hours to restore the inoperable block valve to OPERABLE status. The time allowed to restore the block valve is based upon the Completion Time for restoring an inoperable PORV in Condition B since the PORVs are not capable of mitigating an overpressure event when placed in manual control. If the block valve is restored within the Completion Time of 72 hours, the power will be restored and the PORV restored to OPERABLE status.

C.1 and C.2

If the Required Action cannot be met within the associated Completion Time, 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 reduce PCS temperature below 430°F within 12 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.

ACTIONS (continued)

D.1, D.2 and D.3

If more than one PORV is inoperable and not capable of being manually cycled, it is necessary to either restore at least one valve within the Completion Time of 1 hour or isolate the flow path by closing and removing the power to the associated block valves. The Completion Time of 1 hour is reasonable based on the small potential for challenges to the system during this time and provides the operator time to correct the situation. If one PORV is restored and one PORV remains inoperable, then the plant will be in Condition B with the time clock started at the original declaration of having two PORVs inoperable. If no PORVs are restored within the Completion Time, then 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. 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 plant systems.

E.1 and E.2

If more than one block valve is inoperable, it is necessary to either restore the block valves within the Completion Time of 1 hour or place the associated PORVs in manual control and restore at least one block valve to OPERABLE status within 2 hours and the remaining block valve in 72 hours. The Completion Time of 1 hour to either restore the block valves or place the associated PORVs in manual control is reasonable based on the small potential for challenges to the system during this time and provides the operator time to correct the situation.

F.1 and F.2

If the Required Actions and associated Completion Times of Condition D or E are not met, then the plant must be brought to a MODE in which the LCO does not apply. The plant must be brought to at least MODE 3 within 6 hours and to reduce PCS temperature below 430°F 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 to reach reduce PCS temperature below 430°F is reasonable considering that a plant can cool down within that time frame on one safety system train. In MODES 4 and 5, maintaining PORV OPERABILITY may be required. See LCO 3.4.12.

BASES

SURVEILLANCE REQUIREMENTS

SR 3.4.11.1

Block valve cycling verifies that it can be closed if necessary. The basis for the frequency of 92 days is ASME XI (Ref. 3). If the block valve is closed to isolate a PORV that is capable of being manually cycled, the OPERABILITY of the block valve is of importance because opening the block valve is necessary to permit the PORV to be used for manual control of reactor pressure. If the block valve is closed to isolate an otherwise inoperable PORV Completion Time to restore the PORV is 72 hours. Periodic testing of the block valves is not required since they are closed when PCS temperature is above 430°F.

The Note modifies this SR by stating that this SR is not required to be performed with the block valve closed in accordance with the Required Actions of this LCO.

SR 3.4.11.2

SR 3.4.11.2 requires complete cycling of each PORV. PORV cycling demonstrates its function. The frequency of 18 months is based on a typical refueling cycle and industry accepted practice.

REFERENCES

1. NUREG-0737, Paragraph III, G.I, November 1980

2. Inspection and Enforcement (IE) Bulletin 79-05B, April 21, 1979

3. ASME, Boiler and Pressure Vessel Code, Section XI

B 3.4 **PRIMARY COOLANT SYSTEM (PCS)**

B 3.4.12 Low Temperature Overpressure Protection (LTOP) System

BASES

BACKGROUND

The LTOP System controls PCS 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, "PCS 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). PCS 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 PCS is water solid, occurring only while shut down; a pressure fluctuation can occur more quickly than an operator can react to relieve the condition. Exceeding the PCS P/T limits by a significant amount could cause brittle cracking of the reactor vessel. LCO 3.4.3 requires administrative control of PCS pressure and temperature during heatup and cooldown to prevent exceeding the P/T limits.

This LCO provides PCS overpressure protection by having a minimum coolant input capability and having adequate pressure relief capacity. Limiting coolant input capability requires all High Pressure Safety Injection (HPSI) pumps incapable of injection into the PCS when PCS temperature is below 300°F. The pressure relief capacity requires either two OPERABLE redundant Power Operated Relief Valves (PORVs), or the PCS depressurized and a PCS vent of sufficient size. One PORV or the PCS vent is the overpressure protection device that acts to terminate an increasing pressure event. With minimum coolant input capability, the ability to provide core coolant addition is restricted. The LCO does not require the makeup control system deactivated or the Safety Injection (SI) actuation circuits blocked. Due to the lower pressures in the LTOP MODES and the expected core decay heat levels, the makeup system can provide adequate flow. If conditions require the use of HPSI pumps for makeup in the event of loss of inventory, then pumps can be made available through manual actions.

BASES

BACKGROUND (continued)

The LTOP System for pressure relief consists of two PORVs with temperature dependent lift settings or a PCS vent of sufficient size. Two relief valves are required for redundancy. One PORV has adequate relieving capability to prevent overpressurization for the required coolant input capability.

PORV Requirements

As designed for the LTOP System, each PORV is signaled to open if the PCS pressure approaches a limit determined by the LTOP actuation logic. The actuation logic monitors PCS pressure and cold leg temperature to determine when the LTOP overpressure setting is approached. If the indicated pressure meets or exceeds the calculated value, a PORV is signaled to open.

The LCO presents the PORV setpoints for LTOP. Having the variable setpoints of both valves within the limits of the LCO ensures the P/T limits will not be exceeded in any analyzed event.

When a PORV is opened in an increasing pressure transient, the release of coolant causes the pressure increase to slow and reverse. As the PORV releases coolant, the system pressure decreases until a reset pressure is reached and the valve is signaled to close. The pressure continues to decrease below the reset pressure as the valve closes.

PCS Vent Requirements

Once the PCS is depressurized, a vent exposed to the containment atmosphere will maintain the PCS at containment ambient pressure in a PCS 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.

Reference 7 has determined that any vent path capable of relieving 167 gpm at a PCS pressure of 315 psia is acceptable. The 167 gpm flow rate is based on an assumed charging imbalance due to interruption of letdown flow with three charging pumps operating, a 40°F per hour PCS heatup rate, a 60°F per hour pressurizer heatup rate, and an initially depressurized and vented PCS. Neither HPSI pump nor PCP starts need to be assumed with the PCS initially depressized, because LCO 3.4.12 requires both HPSI pumps to be incapable of injection into the PCS and operating procedures prohibit PCP operation.

BASES

BACKGROUND (continued)

The pressure relieving ability of a vent path depends not only upon the area of the vent opening, but also upon the configuration of the piping connecting the vent opening to the PCS. A long, or restrictive piping connection may prevent a larger vent opening from providing adequate flow, while a smaller opening immediately adjacent to the PCS would be adequate. The areas of multiple vent paths cannot simply be added to determine the necessary vent area.

The following vent path examples are acceptable:

1. Removal of the reactor vessel head;

2. Removal of a steam generator primary manway;

3. Removal of the pressurizer manway;

4. Removal of a PORV or pressurizer safety valve;

5. Both PORVs and associated block valves open;

6. Opening of both PCS vent Valves PC-514 and PC-515.

Reference 8 determined that venting the PCS through PC-514 and PC-515 provided adequate flow area. The other listed examples provide greater flow areas with less piping restriction and are therefore acceptable. Other vent paths shown to provide adequate capacity could also be used. The vent path(s) must be above the level of reactor coolant, so as not to drain the PCS when open.

One open PORV provides sufficient flow area to prevent excessive PCS pressure. However, if the PORVs are elected as the vent path, both valves must be used to meet the single failure criterion, since the PORVs are held open against spring pressure by energizing the operating solenoid.

When the shutdown cooling system is in service with MO-3015 and MO-3016 open, additional overpressure protection is provided by the relief valves on the shutdown cooling system. References 9 and 10 show that this relief capacity will prevent the PCS pressure from exceeding its pressure limits during any of the above mentioned events.

BASES

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 with all PCS cold leg temperatures exceeding 430°F, the pressurizer safety valves prevent PCS pressure from exceeding the Reference 1 limits. At about 430°F and below, overpressure prevention falls to the OPERABLE PORVs or to a depressurized PCS and a sufficient sized PCS 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 PORV method or the depressurized and vented PCS condition.

Reference 3 contains the acceptance limits that satisfy the LTOP requirements. Any change to the PCS 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 PCS 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. Primary Coolant Pump (PCP) startup with temperature asymmetry within the PCS or between the PCS and steam generators.

The following is required during the LTOP MODES to ensure that mass and heat input transients do not occur, which either of the LTOP overpressure protection means cannot handle:

Rendering all HPSI pumps incapable of injection when PCS temperature is below 300°F.

BASES

APPLICABLE SAFETY ANALYSES (continued)

The Reference 3 analyses demonstrate that either one PORV or the PCS vent can maintain PCS pressure below limits when three charging pumps are actuated. The maximum SIT pressure is less than the minimum LTOP setpoint pressure.

Fracture mechanics analyses established the temperature of LTOP Applicability at 430°F and below. Above this temperature, the pressurizer safety valves provide the reactor vessel pressure protection. The vessel materials were assumed to have a neutron irradiation accumulation equal to 2.192 x 10^{19} nvt.

PORV Performance

The fracture mechanics analyses show that the vessel is protected when the PORVs are set to open at or below the setpoint curve in the PTLR. The setpoint is derived by modeling the performance of the LTOP System, assuming the limiting allowed LTOP transients. These analyses consider pressure overshoot and undershoot beyond the PORV opening and closing setpoints, resulting from signal processing and valve stroke times. The PORV setpoints at or below the derived limits ensure the Reference 1 limits will be met.

The PORV setpoints will be re-evaluated for compliance when the P/T limits are revised. 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, " PCS Pressure and Temperature (P/T) Limits," discuss these examinations.

The PORVs are considered active components. Thus, the failure of one PORV represents the worst case, single active failure.

PCS Vent Performance

With the PCS depressurized, analyses show the required vent size is capable of mitigating the limiting allowed LTOP overpressure transient. In that event, this size vent maintains PCS pressure less than the minimum PCS pressure on the P/T limit curve.

The PCS 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 PCS vent is passive and is not subject to active failure.

LCO

This LCO is required to ensure that the LTOP System is OPERABLE. The LTOP System is OPERABLE when the minimum coolant input and 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 PORVs; or

b. The depressurized PCS and a PCS vent.

A PORV is OPERABLE for LTOP when its block valve is open, its lift setpoint is set at the VLTOP setpoint in the PTLR or less and testing has proven its ability to open at that setpoint, and motive power is available to the two valves and their control circuits.

A PCS vent is OPERABLE when open with an area capable of relieving ≥ 167 gpm at a PCS pressure of 315 psia.

Each of these methods of overpressure prevention is capable of mitigating the limiting LTOP transient.

APPLICABILITY

This LCO is applicable in MODE 3 when the temperature of any PCS cold leg is < 430°F, in MODE 4, 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 430°F. When the reactor vessel head is off, overpressurization cannot occur.

LCO 3.4.3 provides the operational P/T limits for all MODES. LCO 3.4.10, "Pressurizer Safety Valves," requires the OPERABILITY of the pressurizer safety valves that provide overpressure protection during MODES 1, 2, and MODE 3 ≥ 430°F.

Low temperature overpressure prevention is most critical during shutdown when the PCS is water solid, and a mass or heat input transient can cause a very rapid increase in PCS pressure when little or no time allows operator action to mitigate the event.

The Applicability is modified by a Note to assure that this specification does not cause hesitation in the use of a HPSI pump for PCS makeup if it is needed due to loss of shutdown cooling or a loss of PCS inventory.

BASES

ACTIONS

A.1

With one or more HPSI pumps capable of injecting into the PCS, when PCS temperature is below 300°F, overpressurization is possible.

The immediate Completion Time to initiate actions to restore restricted coolant input capability to the PCS reflects the importance of maintaining overpressure protection of the PCS.

B.1

When pressurizer level $\leq$ 57%, with one PORV inoperable, two PORVs 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 fact that a steam bubble exists in the pressurizer. Since the pressure response to a transient is greater if the pressurizer steam space is small or if PCS is solid, the allowed outage time for a PORV flow path out of service is shorter. The maximum pressurizer level at which credit can be taken for having a bubble (57%, which provides about 700 cubic feet of steam space) is based on judgement rather and verified by analysis. This level provides the same steam volume to dampen pressure transients as would be available at full power. This steam volume provides time for operator action, if the PORVs failed to operate, between an inadvertent SIS and PCS pressure reaching the 10 CFR 50, Appendix G pressure limit. The time available for action would depend upon the existing pressure and temperature when the inadvertent SIS occurred.

C.1

The consequences of operational events that will overpressurize the PCS are more severe at lower temperature (Ref. 6). Thus, with one required PORV inoperable when the pressurizer level is higher than 57%, which usually occurs in MODE 5 or in MODE 6 with the head on, the Completion Time to restore two valves to OPERABLE status is 24 hours.

The 24 hour Completion Time to restore two PORVs OPERABLE when the pressurize level is higher than 57% is a reasonable amount of time to investigate and repair several types of PORV failures without exposure to a lengthy period with only one PORV OPERABLE to protect against overpressure events.

BASES

ACTIONS (continued)

D.1 and D.2

If two required PORVs are inoperable, or if a Required Action and the associated Completion Time of Condition A, B, or C are not met, or if the LTOP System is inoperable for any reason other than Condition A through Condition C, over pressurization events must be precluded using alternate methods. Action D.1 requires that the shutdown cooling suction valves be opened within 8 hours. The SDC suction interlock allows closed isolation valves (MO-3015 and MO-3016) to be opened when the PCS pressure is less than 270 psia. There is no automatic closure function. With these valves open, the SDC system relief valves provide the required overpressure protection. To further reduce the possibility of an overpressurization event occurring, Action D.2 requires the PCS must be depressurized and a vent established within 24 hours. The vent must be sized 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 24 hours to depressurize and vent the PCS 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 3.4.12.1

To minimize the potential for a low temperature overpressure event by limiting the mass input capability, both HPSI pumps are verified to be incapable of injections into the PCS when PCS temperature is below 300°F. The HPSI pumps are rendered incapable of injecting into the PCS through pulling control power fuses, racking out pump breakers or closing manual discharge valves under administrative control.

The 12 hour interval considers operating practice to regularly assess potential degradation and to verify operation within the safety analysis.

SURVEILLANCE REQUIREMENTS (continued)

SR 3.4.12.2

SR 3.4.12.2 requires verifying that the required PCS vent is open is proven OPERABLE by verifying its open condition either:

a. Once every 12 hours for a valve that is unlocked open; or

b. Once every 31 days for a valve that is locked open or other vent paths.

The passive vent arrangement must only be open to be OPERABLE. This Surveillance need only be performed if the vent is being used to satisfy the requirements of this LCO. The Frequencies consider operating experience with mispositioning of unlocked and locked vent valves, respectively.

SR 3.4.12.3

The PORV block valve must be verified open every 72 hours to provide the flow path for each required PORV to perform its function when actuated. The valve can be remotely verified open in the main control room.

The block valve is a remotely controlled, motor operated valve. The power to the valve motor operator is not required to be removed, and the manual actuator is not required locked in the inactive position. Thus, the block valve can be closed in the event the PORV develops excessive leakage or does not close (sticks open) after relieving an overpressure event.

The 72 hour frequency considers operating experience with accidental movement of valves having remote control and position indication capabilities available where easily monitored. These considerations include the administrative controls over main control room access and equipment control.

SR 3.4.12.4

Performance of a CHANNEL FUNCTIONAL TEST is required every 31 days to verify and, as necessary, adjust the PORV open setpoints. The CHANNEL FUNCTIONAL TEST will verify on a monthly basis that the PORV lift setpoints are within the LCO limit. PORV actuation could depressurize the PCS and is not required. The 31 day frequency considers experience with equipment reliability.

A Note has been added indicating this SR is required to be performed 12 hours after decreasing PCS cold leg temperature to $\leq$ 430°F if not performed within the past 31 days. The test must be performed within 12 hours after entering the LTOP MODES.

SURVEILLANCE REQUIREMENTS (continued)

SR 3.4.12.5

Performance of a CHANNEL CALIBRATION on each required PORV actuation channel is required every 18 months to adjust the whole channel so that it responds and the valve opens within the required LTOP range and with accuracy to known input.

The 18 month frequency considers operating experience with equipment reliability and matches the typical refueling outage schedule.

REFERENCES

1. 10 CFR 50, Appendix G
2. Generic Letter 88-11
3. FSAR, Section 14.12
4. 10 CFR 50.46
5. 10 CFR 50, Appendix K
6. Generic Letter 90-06
7. CPC Engineering Analysis, EA-A-PAL-92095-01
8. CPC Engineering Analysis, EA-TCD-91-01-01
9. CPC Engineering Analysis, EA-PAL-89-040-1
10. CPC Corrective Action Document, A-PAL-91-011

B 3.4 PRIMARY COOLANT SYSTEM (PCS)

B 3.4.13 PCS Operational Leakage

BASES

BACKGROUND

Components that contain or transport the coolant to or from the reactor core make up the PCS. Component joints are made by welding, bolting, rolling, or pressure loading, and valves isolate connecting systems from the PCS.

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 PCS 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 PCS 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% leak tight. Leakage from these systems should be detected, located, and isolated from the containment atmosphere, if possible, to not interfere with PCS 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).

BASES

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 FSAR (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).

LCO

PCS operational LEAKAGE shall be limited to:

a. Pressure Boundary LEAKAGE

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.

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.

BASES

LCO (continued)

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 PCS makeup system. Identified LEAKAGE includes LEAKAGE to the containment from specifically known and located sources, but does not include pressure boundary LEAKAGE or controlled Primary Coolant Pump (PCP) 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, " PCS 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 PCS LEAKAGE when the other is leak tight. If both valves leak and result in a loss of mass from the PCS, the loss may be included in the allowable identified LEAKAGE.

d/e Primary to Secondary LEAKAGE through Any One Steam Generator (SG)

Primary to secondary LEAKAGE amounting to 0.3 gpm through any one SG produces acceptable offsite doses in the SLB accident analysis. This LEAKAGE, of 0.3 gpm each during steady state or 0.6 gpm during startups and major load changes, may exist in one or both steam generators. 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.

Operating during short periods of time when leakage measurement sensitivity is reduced is provided for by an added allowance (0.6 gpm) to the leakage rate.

APPLICABILITY

In MODES 1, 2, 3, and 4, the potential for RCPB LEAKAGE is greatest when the PCS 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.

BASES

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.

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.

SURVEILLANCE REQUIREMENTS

SR 3.4.13.1

Verifying PCS 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 a PCS water inventory balance. Primary to secondary LEAKAGE is also measured by performance of a PCS water inventory balance in conjunction with effluent monitoring within the secondary steam and feedwater systems.

The PCS 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.

BASES

SURVEILLANCE REQUIREMENTS (continued)

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 PCS operational LEAKAGE determination by water inventory balance, steady state is defined as stable PCS pressure, temperature, power level, pressurizer and makeup tank levels, makeup and letdown, and PCP 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, " PCS 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 3.4.13.2

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. FSAR, Section 14.15

B 3.4 **PRIMARY COOLANT SYSTEM (PCS)**

B 3.4.14 PCS Pressure Isolation Valve (PIV) Leakage

BASES

BACKGROUND

The Reactor Safety Study (RSS), WASH-1400, identified in a PWR an inter-system Loss Of Coolant Accident (LOCA) which is a significant contributor to risk of core melt accidents (Event V). The design examined in the RSS contained in-series check valves isolating the high pressure Primary Coolant System (PCS) from the Low Pressure Safety Injection (LPSI) piping. The scenario which leads to the Event V accident is initiated by the failure of these check valves to function as a pressure isolation barrier. This causes an overpressurization and rupture of the LPSI low pressure piping which results in a LOCA that bypasses containment.

When pressure isolation is provided by two in-series check valves, and when failure of one valve in the pair can go undetected for a substantial length of time, verification of valve integrity is required. Since these valves are important to safety, they should be tested periodically to ensure low probability of gross failure. Periodic examination of check valves must be undertaken to verify that each valve is seated properly and functioning as a pressure isolation device. The testing will reduce the overall risk of an inter-system LOCA. The testing may be accomplished by direct volumetric leakage measurement or by other equivalent means capable of demonstrating that leakage limits are not exceeded.

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 3.4.13, "PCS Operational LEAKAGE." This is true during operation only when the loss of PCS mass through two valves in series is determined by a water inventory balance (SR 3.4.13.1). 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 PCS operational LEAKAGE if the other is leak tight.

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 PCS 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.

BASES

BACKGROUND (continued)

PIVs are provided to isolate the PCS from the following typically connected systems:

a. Shutdown Cooling (SDC) System;

b. Safety Injection System; and

c. Chemical and Volume Control System.

The PIVs are listed in SR 3.4.14.1.

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 inter system LOCAs as a significant contributor to the risk of core melt. The dominant accident sequence in the inter-system LOCA category is the failure of the low pressure portion of the LPSI/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 LPSI/SDC System downstream of the PIVs from the PCS. Because the low pressure portion of the LPSI/SDC System is typically designed for 285 psig, overpressurization failure of the 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 inter system LOCAs. This study concluded that periodic leakage testing of the PIVs can substantially reduce the probability of an inter system LOCA.

LCO

To ensure the continued integrity of selected check valves which are relied upon to preclude a postulated LOCA outside containment, special requirements for periodic leak tests are specified.

PCS PIV leakage is identified LEAKAGE into closed systems connected to the PCS. Isolation valve leakage is usually on the order of drops per minute. Leakage that increases significantly suggests that something is operationally wrong and corrective action must be taken.

LCO (continued)

The LCO PIV leakage limit is:

a. Leakage rates less than or equal to 1.0 gpm are considered acceptable;

b. Leakage rates greater than 1.0 gpm but less than or equal to 5.0 gpm are considered acceptable if the latest measured rate has not exceeded the rate determined by the previous test by an amount that reduces the margin between measured leakage rate and the maximum permissible rate of 5.0 gpm by 50% or greater;

c. Leakage rate greater than 1.0 gpm but less than or equal to 5.0 gpm are considered unacceptable if the latest measured rate exceeded the rate determined by the previous test by an amount that reduces the margin between measured leakage rate and the maximum permissible rate of 5.0 gpm by 50% or greater;

d. Leakage rates greater than 5.0 gpm are considered unacceptable.

Reference 6 permits leakage testing at a lower pressure differential than between the specified maximum PCS pressure and the normal pressure of the connected system during PCS 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. Minimum test differential pressure shall not be less than 150 psid.

APPLICABILITY

In MODES 1, 2, 3, and 4, this LCO applies because the PIV leakage potential is greatest when the PCS is pressurized.
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 have degraded the ability of the interconnected system to perform its safety function.

ACTIONS (continued)

A.1 and A.2

The flow path 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 the PIVs and must be in the RCPB or the high pressure portion of the system.

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 time frame 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. If the flow path has at least one OPERABLE PIV, the required plant shutdown can be accomplished without making a train safety injection inoperable by deactivating the automatic control valve. 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 3.4.14.1

Performance of leakage testing on each PCS 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 5 gpm maximum applies to each valve. Plant configuration would have to be changed to measure a leakage rate for Check Valve ES-3408. Therefore, the surveillance for this check valve is to ensure that the valve is closed. Leakage testing requires a stable pressure condition.

BASES

SURVEILLANCE REQUIREMENTS (continued)

For the two PIVs in series, the leakage requirement applies to each valve individually and not to the combined leakage across both valves. The MOV in series with the two check valves in this flow path is normally closed. 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 a maximum of 18 months, a typical refueling cycle, if the plant does not go into MODE 5 for at least 72 hours. The 18 month frequency is consistent with 10 CFR 50.55a(g) (Ref. 7), as contained in the Inservice Testing Program, is within frequency allowed by the American Society of Mechanical Engineers (ASME) Code, Section XI (Ref. 6), 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 prior to returning the check valve to service after maintenance, repair or replacement work is performed on the check valve.

The leakage limit is to be met at the PCS 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.

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 72 hours 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 PCS in the shutdown cooling mode of operation.

BASES

SURVEILLANCE REQUIREMENTS (continued

SR 3.4.14.2

The valve position check for the LPSI check valves ensures that the four LPSI check valves have reclosed upon cessation of SDC flow.

SR 3.4.14.3

This SR is only required when one or more PIVs is not within limits.

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. ASME, Boiler and Pressure Vessel Code, Section XI
7. 10 CFR 50.55a(g)

B 3.4 **PRIMARY COOLANT SYSTEM (PCS)**

B 3.4.15 PCS 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 PCS 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.

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 gaseous activities, because of their sensitivities and rapid responses to PCS LEAKAGE.

An increase in humidity of the containment atmosphere would indicate release of water vapor to the containment. The affect of changed dew point temperature can thus be used to monitor humidity levels of the containment atmosphere as an indicator of potential PCS LEAKAGE. A 10% increase in relative humidity 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 and condensate flow from air coolers. Humidity level monitoring is considered most useful as an indirect indication to alert the operator to a potential problem.

BASES

BACKGROUND (continued)

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 PCS 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 rapid and 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 system response times and sensitivities are described in the FSAR (Ref. 3). Multiple instrument locations are utilized, if needed, to ensure the transport delay time of the LEAKAGE from its source to an instrument location yields an acceptable overall response time.

The safety significance of PCS LEAKAGE varies widely depending on its source, rate, and duration. Therefore, detecting and monitoring PCS 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.

LCO

One method of protecting against large PCS LEAKAGE derives from the ability of instruments to rapidly 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 PCS 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 gaseous radioactivity monitor, a containment humidity monitor, and a containment air cooler condensate level switch, provides an acceptable minimum.

BASES

APPLICABILITY

Because of elevated PCS temperature and pressure in MODES 1, 2, and 3, PCS leakage detection instrumentation is required to be OPERABLE.

In MODE 4, 5 or 6, the temperature is ≤ 300°F and pressure is maintained low or at atmospheric pressure. Since the temperatures and pressures are far lower than those for MODES 1, 2, and 3, the likelihood of leakage and crack propagation is much smaller and because the PCS is accessible for local inspection. Therefore, the requirements of this LCO are not applicable in MODES 4, 5, and 6.

ACTIONS

A.1

Operation may continue with one of the required four types of leak detection systems inoperable, but one instrument of each type must be restored to OPERABLE status prior to the next startup from MODE 5. Several of the instruments cannot be conveniently repaired with the plant at elevated temperature due to their location or their impact on containment integrity. Three separate leak detection systems, together with PCS inventory checks, are considered adequate for continued operation.

B.1 and B.2

Daily PCS inventory calculations provide adequate leakage detection for limited periods. Thirty days is considered adequate time in which to accomplish repairs necessary to return at least three of the required instruments to operable status.

C.1 and C.2

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.

BASES

SURVEILLANCE REQUIREMENTS

SR 3.4.15.1

SR 3.4.15.1 requires the performance of a CHANNEL CHECK of the required PCS leakage instrumentation. The check gives reasonable confidence the channels are operating properly. The frequency of 12 hours is based on instrument reliability and is reasonable for detecting off normal conditions.

SR 3.4.15.2

SR 3.4.15.2 requires the performance of a CHANNEL FUNCTIONAL TEST of the required containment humidity monitors. The test ensures that the monitor can perform its function in the desired manner. The Frequency of 18 months is a typical refueling cycle and considers channel reliability. Operating experience has shown this Frequency is acceptable.

SR 3.4.15.3, SR 3.4.15.4, and SR 3.4.15.5

These SRs require the performance of a CHANNEL CALIBRATION for the PCS 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. FSAR, Section 4.7

B 3.4 **PRIMARY COOLANT SYSTEM (PCS)**

B 3.4.16 PCS 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 PCS specific activity LCO limits the allowable concentration level of radionuclides in the primary 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 also assumes a reactor trip and a turbine trip at the same time as the SGTR event.

The analysis for the SGTR accident establishes the acceptance limits for PCS specific activity. Reference to this analysis is used to assess changes to the facility that SAFETY ANALYSES could affect PCS specific activity as they relate to the acceptance limits.

BASES

APPLICABLE SAFETY ANALYSES (continued)

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 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 limit of 40 μ Ci/gm for more than 72 hours.

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.

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 PCS average temperature $\geq$ 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 PCS average 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

A Note to the ACTIONS 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.

A.1 and A.2

With the DOSE EQUIVALENT I-131 greater than the LCO limit, samples at intervals of 4 hours must be taken to demonstrate the limit of 40 μ Ci/gm is 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.

B.1

If a Required Action and associated Completion Time of Condition A is not met or if the DOSE EQUIVALENT I-131 is above 40μ Ci/gm, the reactor must be brought to MODE 3 with PCS average 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 PCS average temperature < 500°F lowers the saturation pressure of the reactor coolant below the setpoints of the main steam safety valves and prevents 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.

BASES

SURVEILLANCE REQUIREMENTS

SR 3.4.16.1

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 PCS average temperature at least 500°F. The 7 day frequency considers the unlikelihood of a gross fuel failure during the time.

SR 3.4.16.2

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 $\geq$ 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 3.4.16.3

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 at least 48 hours. 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.

BASES

REFERENCES

1. 10 CFR 100.11, 1973
2. FSAR, Section 14.15

B 3.4 **PRIMARY COOLANT SYSTEM (PCS)**

B 3.4.17 Special Test Exception (STE) PCS Loops

BASES

BACKGROUND	This special test exception to LCO 3.4.2, " PCS Minimum Temperature for Activity," permits reactor criticality at lower temperatures during PHYSICS TESTS while at low THERMAL POWER levels. Section XI of 10 CFR Part 50, Appendix B (Ref. 1), requires that a test program be established to ensure that structures, systems, and components will perform satisfactorily in service. All functions necessary to ensure that the specified design conditions are not exceeded during normal operation and anticipated operational occurrences must be tested. This testing is an integral part of the design, construction, and operation of the power plant as specified in 10 CFR 50, Appendix A, GDC 1 (Ref. 2). The key objectives of a test program are to provide assurance that the facility has been adequately designed to validate the analytical models used in the design and analysis, to verify the assumptions used to predict plant response, to provide assurance that installation of equipment at the facility has been accomplished in accordance with the design, and to verify that the operating and emergency procedures are adequate. Testing is performed prior to initial criticality, during startup, and following low power operations.
APPLICABLE SAFETY ANALYSES	Special Test Exception (STE) - PCS loops does not satisfy any Criterion in the NRC Policy Statement, but is included as they support other LCOs that meet a Criterion for inclusion.
LCO	This LCO is provided to allow for the performance of PHYSICS TESTS in MODE 2 (after a refueling), where the core cooling requirements are significantly different than after the core has been operating. Without this LCO, plant operations would be held bound to the normal operating LCOs for reactor coolant loops and circulation (MODES 1 and 2), and the appropriate tests could not be performed.

BASES

LCO (continued)

In MODE 2, where core power level is considerably lower and the associated PHYSICS TESTS must be performed, low temperatures operation is allowed provided THERMAL POWER is < 5% RTP and the reactor trip setpoints of the OPERABLE power level channels are set ≤ 30% RTP. These limits ensure no Safety Limits or fuel design limits will be violated.

The exception is allowed even though there are no bounding safety analyses. These tests are allowed since they are performed under close supervision during the test program and provide valuable information on the plant.

APPLICABILITY

This LCO ensures that the plant will not be operated in MODE 1. It only allows testing under these conditions while in MODE 2. No safety or fuel design limits will be violated as a result of the associated tests.

ACTIONS

A.1

If THERMAL POWER increases to > 5% RTP, the reactor must be tripped immediately. This ensures the plant is not placed in an unanalyzed condition and prevents exceeding the specified acceptable fuel design limits.

B.1

If T_{ave} in any loop decreases below 500°F, the reactor must be made subcritical (k_{eff} < 1.0) within 30 minutes.

SURVEILLANCE REQUIREMENTS

SR 3.4.17.1

THERMAL POWER must be verified to be within limits once per hour to ensure that the fuel design criteria are not violated during the performance of the PHYSICS TESTS. The hourly frequency has been shown by operating practice to be sufficient to regularly assess conditions for potential degradation and verify operation is within the LCO limits. Plant operations are conducted slowly during the performance of PHYSICS TESTS, and monitoring the power level once per hour is sufficient to ensure that the power level does not exceed the limit.

BASES

SURVEILLANCE REQUIREMENTS (continued)

SR 3.4.17.2

Within 12 hours prior to critical approach for the PHYSICS TESTS, a CHANNEL FUNCTIONAL TEST must be performed on each logarithmic power level and linear power level neutron flux monitoring channel to verify OPERABILITY and adjust setpoints to proper values. This will ensure that the Reactor Protection System is properly aligned to provide the required degree of core protection during startup or the performance of the PHYSICS TESTS. The interval is adequate to ensure that the appropriate equipment is OPERABLE prior to the tests to aid the monitoring and protection of the plant during these tests.

SR 3.4.17.3

T_{ave} is required to be verified $\geq$ 500°F every 30 minutes. The 30 minute time period is frequent enough to prevent inadvertent violation of the LCO.

REFERENCES

1. 10 CFR 50, Appendix B, Section XI

2. 10 CFR 50, Appendix A, GDC 1, 1988

ATTACHMENT 3

CONSUMERS POWER COMPANY
PALISADES PLANT
DOCKET 50-255

STS CONVERSION TECHNICAL SPECIFICATION CHANGE REQUEST

3.4 PRIMARY COOLANT SYSTEM

Comparison of Existing and Revised Technical Specifications

Palisades Tech Spec Requirement List. Corrected through Amendment 170

A list of the existing Palisades Tech Specs (TS) correlated to Palisades Revised Technical Specifications (RTS).

First Column; Existing Palisades Tech Spec (TS) number

Each numbered TS item is listed in the left-most column. Items which contain more than one requirement are listed once for each requirement.

Second Column; Palisades Revised Tech Spec (RTS) number

The nearest corresponding numbered RTS item is listed in the second column. If the item does not appear in RTS, it is noted as 'Deleted' or 'Relocated.'

Deleted is used where an item has been eliminated as a tech spec, ie deleting, iaw GL 84-15, the requirement to test a D.G. when an ECCS pump in the opposite train becomes inoperable.

Relocated is used where an item has been moved to a controlled program or document because it does not meet the "Criteria" of 10 CFR 50.36(2)(c)(ii).

Where an item is relocated or deleted, the number of the associated RTS section has been added to allow sorting the list by section number. Relocated items, such as heavy load restrictions, which are not associated with any particular RTS section are arbitrarily assigned the number 5.0.

Third Column; TS Item Description

An abbreviation of the TS requirement appears in the third column. Each item is identified as: LCO, ACTION, SR, Admin, Exception, etc. Some items are implied, rather than explicit, ie a LCO is implied when an ACTION exists without a stated LCO.

Description Key; TS requirement type:	Column 3 syntax:
Safety Limit	SL: Safety limit; Applicable conditions
Surveillance Requirement	SR: Equipment to be tested; Test description; Frequency
Limiting Safety Setting	LSS: RPS Trip Channel & required setting
Limiting Condition for Operation	LCO: Equipment to be operable; Applicable conditions
Action	ACTN: Condition requiring action; Required action; Completion time
Administrative Requirement	ADMN: Administrative requirement
Permitted Instrument Bypass	Byps: Bypassable component; conditions when bypass permitted
Defined Term	DEF: Name of defined item
Exception to other Requirement	XCPT: Excepted spec or condition; Applicable conditions
Descriptive material	DESC: Subject matter
Table	TBL: Table

Forth Column; Classification of Changes:

Each change is identified as ADMINISTRATIVE, RELOCATED, MORE RESTRICTIVE, or LESS RESTRICTIVE.

Fifth Column; Discussion of Changes:

Each change is discussed briefly.

TS Number	RTS Number	TS requirement description	Classification and Description of Changes	
3.1	3.4	PCS Requirements		
3.1.1.a	3.4.6	LCO: PCS flow >2810; During boron changes	ADMINISTRATIVE:	Requirement unchanged.
3.1.1.b	3.4.4	LCO: Four PCP's running; >Hot SD	ADMINISTRATIVE:	Requirement unchanged.
3.1.1.b	3.4 Deleted	ACTN: <4 PCPs; Reduce power iaw Tbl 2.3.1	MORE RESTRICTIVE:	Not required to be specifically called out; if power is not reduced before flow, reactor will trip.
3.1.1.b	3.4 Deleted	ACTN: <4 PCPs; restore 4 PCPs; 12 hrs	MORE RESTRICTIVE:	<4 PCP power operations not allowed.
3.1.1.b	3.4 Deleted	ACTN: <4 PCPs >12 hrs; Trip Rx from CO-6	MORE RESTRICTIVE:	<4 PCP power operations not allowed.
3.1.1.b	3.4.4/3.0.4	LCO: No startup; W/ <4 pumps	ADMINISTRATIVE:	Requirement unchanged. LCO 3.4.4 requires 4 pumps to be running, 3.0.4 prohibits changing modes when not in compliance with LCOs.
3.1.1.b	3.4.4	LCO: No power operations; <3 pumps	ADMINISTRATIVE:	Requirement unchanged.
3.1.1.c	3.4.1	LCO: 4 PCP flow >140.7E6 #/hr at 532°F;	ADMINISTRATIVE:	Requirement unchanged - flow rate limit changed to reflect RTP conditions.
3.1.1.d	3.4.4/3.4.5	LCO: Both SG's required operable; >300°F	ADMINISTRATIVE:	Requirement unchanged.
3.1.1.e	3.2.4	LCO: ASI maintained iaw COLR;	ADMINISTRATIVE:	Requirement unchanged.
3.1.1.e.(1)a	3.2.4 A.1	ACTN: ASI not w/in limit; initiate action; 15 min	ADMINISTRATIVE:	RTS does not specify action initiation time, but completion time remains unchanged.
3.1.1.e.(1)b	3.2.4 A.1	ACTN: ASI not w/in limit; Restore w/in 1 hr	ADMINISTRATIVE:	Requirement unchanged.
3.1.1.e.(1)c	3.2.4 B.1	ACTN: ASI >limit >1 hr; Be <70%; 2 hrs	MORE RESTRICTIVE:	Action simplified & single completion time stipulated. RTS requirement is more conservative than TS requirement, and reflects actual plant operating practice.
3.1.1.f	3.4.1	ADMN: Nominal PCS operating pressure <2100#	MORE RESTRICTIVE:	Allowed operating pressure range is specified in RTS.
3.1.1.g	3.4.1	LCO: Rx Tc ≤limit (formula); Power operation	ADMINISTRATIVE:	Requirement unchanged.
3.1.1.g	3.4.1	ADMN: No credit to be taken for flow >150E^6 lb/hr	ADMINISTRATIVE:	Requirement unchanged.
3.1.1.g(1)	3.4.1 C.1	ACTN: T_c ≥limit; Restore <30 minutes	LESS RESTRICTIVE:	Completion Time increased to 2 hrs iaw STS.
3.1.1.g(1)	3.4.1 D.1	ACTN: Actions not met, be in HSD w/in 12 hrs (LCO 3.0.3)	LESS RESTRICTIVE:	Reduce power to ≤30% RTP iaw STS. At the reduced power level, the potential for violation of the DNB limits is greatly reduced.

TS Number	RTS Number	TS requirement description	Classification and Description of Changes	
3.1.1.h	3.4.5 N 2 3.4.6 N 2 3.4.7 N 3	LCO: 1st PCP start prohibited unless condition met	ADMINISTRATIVE:	Requirement unchanged.
3.1.1.h(1)	3.4.5 N 2a	LCO: Tc >430°F	ADMINISTRATIVE:	Requirement unchanged.
3.1.1.h(2)	3.4.5 N 2b 3.4.6 N 2a 3.4.7 N 3a	LCO: SG temp <Tc	ADMINISTRATIVE:	Requirement unchanged.
3.1.1.h(3)	3.4.5 N 2c 3.4.6 N 2b 3.4.7 N 3b	LCO: SG <100>Tc & SDC isolated & isothermal	ADMINISTRATIVE:	Requirement unchanged.
3.1.1.h(4)	3.4.5 N 2d 3.4.6 N 2c 3.4.7 N 3d	LCO: SG <100>Tc & SDC isolated & pressurizer lvl <57%	ADMINISTRATIVE:	Requirement unchanged.
3.1.1.i	3.4.6 N 3 3.4.7 N 4	LCO: PCS <300°F, don't operate P-50 A & B	ADMINISTRATIVE:	Requirement unchanged.
3.1.1.j	3.4.9	LCO: 375 kw Press Heaters from 1D & 1E req'd; >300°F	ADMINISTRATIVE:	Requirement unchanged.
3.1.1.j	3.4.9 B.1	ACTN: Heaters <375 Kw; Restore heaters in 72 hrs or HSD	ADMINISTRATIVE:	Requirement unchanged.
3.1.2	3.4	Heatup and Cooldown Rates		
3.1.2	3.4.3	LCO: PCS P&T & HU & CD iaw following, at all times	ADMINISTRATIVE:	Requirement unchanged.
3.1.2.a	3.4 PTLR	LCO: PCS P&T & HU & CD rates iaw fig 3-1 & 2 and:	RELOCATED:	PTLR - Requirements unchanged.
3.1.2.b	3.4 PTLR	LCO: Pressurizer HU/CD rate 100°F/hr	RELOCATED:	PTLR - Requirements unchanged.
3.1.2.c.1	3.4 PTLR	LCO: HU/CD rate W/T ≤170°F, <20/40°F/hr	RELOCATED:	PTLR - Requirements unchanged.
3.1.2.c.2	3.4 PTLR	LCO: HU/CD rate W/250°F ≥T >170°F <40°F/hr	RELOCATED:	PTLR - Requirements unchanged.
3.1.2.c.3	3.4 PTLR	LCO: HU/CD rate W/350°F >T >250°F <60°F/hr	RELOCATED:	PTLR - Requirements unchanged.
3.1.2.c.4	3.4 PTLR	LCO: HU/CD rate W/T ≥350°F <100°F/hr	RELOCATED:	PTLR - Requirements unchanged.
3.1.2 Aa.1	3.4.3 A.1	ACTN: LCO 3.1.2 limits exceeded, restore w/in 30 min	ADMINISTRATIVE:	Requirement unchanged.
3.1.2 Aa.2	3.4.3 A.2	ACTN: LCO 3.1.2 limits exceeded, determine PCS OK, 72 hrs	ADMINISTRATIVE:	Requirement unchanged.

TS Number	RTS Number	TS requirement description	Classification and Description of Changes	
3.1.2 Ab.1	3.4.3 B.1	ACTN: LCO 3.1.2 Completion Time exceeded, HSD; 12 hrs	MORE RESTRICTIVE:	MODE 3 in 6 hrs iaw STS.
3.1.2 Ab.2	3.4.3 B.2	ACTN: LCO 3.1.2 Completion Time exceeded, CSD; PCS <270 psia 48 hrs	MORE RESTRICTIVE:	MODE 5 in 36 hrs iaw STS.
3.1.3.a	3.4.2	LCO: PCS >525°F; critical	ADMINISTRATIVE:	Requirement unchanged.
3.1.3.a	3.4.17	XCPT: 3.1.3.a (>525°F when critical) N/A; Physics Testing	MORE RESTRICTIVE:	Minimum criticality temperature limit during physics tests increased from fracture mechanics temp limit to 500°F.
3.1.3.b	3.4.17	LCO: PCS >385°F; When critical	MORE RESTRICTIVE:	Minimum temperature is 500°F.
3.1.3.c	3.1.2	LCO: Rx subcritical by required amount; <525°F	LESS RESTRICTIVE:	Using STS requirements.
3.1.3.d	3.1 Deleted	LCO: Only 1 rod out w/o bubble & normal lvl	LESS RESTRICTIVE:	Protection provided by new SDM definition and LCO 3.3.1.
3.1.3.e	3.1 Deleted	LCO: No dilution w/o bubble & normal lvl	LESS RESTRICTIVE:	SDM requirements are given in LCO 3.1.1 and LCO 3.1.2.
3.1.4	3.4	PCS Radioactivity Limits		
3.1.4.a.1	3.4.16	LCO: DE I-131 <1.0 μCi/gm	ADMINISTRATIVE:	Requirement unchanged.
3.1.4.a.2	3.4.16	LCO: Specific activity <100/$\bar{E}$ μCi/gm	ADMINISTRATIVE:	Requirement unchanged.
3.1.4.b	3.4.16 A.2	ACTN: 1.0 <I-131 <40 μCi/gm; fix w/in 72 hrs	MORE RESTRICTIVE:	Completion Time reduced to 48 hrs iaw STS.
3.1.4.b	3.4 Deleted	LCO: Operations w/1.0 <I-131 <40 μCi/gm <36 days/yr	LESS RESTRICTIVE:	Completion Time to restore limits reduced to 48 hrs, but STS has no limit on integrated time above limit (ie, 36 d/yr).
3.1.4.c	3.4.16 B.1	ACTN: I-131 >40 μCi/gm; be <500°F in 6 hrs	ADMINISTRATIVE:	Requirement unchanged.
3.1.4.c	3.4.16 B.1	ACTN: I-131 >1 μCi/gm >72 hrs; be <500°F in 6 hrs	MORE RESTRICTIVE:	Completion Time reduced to 48 hrs iaw STS.
3.1.4.d	3.4.16 C.2	ACTN: >100/$\bar{E}$ μCi/gm; be <500°F in 6 hrs	ADMINISTRATIVE:	Requirement unchanged.
3.1.4.e	3.4.16 A.1/C.1 3.4.16.2	ACTN: Sampling assoc with b, c, & d	ADMINISTRATIVE:	Requirements unchanged.

TS Number	RTS Number	TS requirement description	Classification and Description of Changes	
3.1.4.e	3.4 Deleted	ADMN: Reporting assoc with b, c, & d	ADMINISTRATIVE:	The reporting requirement was added to the TS by Amendment No. 20, dated 04/26/76 following the format of the then existing CE STS. For any operation or condition prohibited by plant TS, the reporting requirements are covered by 10CFR50.73(a)(2)(i)(B).
3.1.5	3.4	PCS Leakage Limits		
3.1.5.a	3.4.13	LCO: PCS unidentified leakage <1 gpm	ADMINISTRATIVE:	Requirement unchanged.
3.1.5.a	3.4.13 A.1	ACTN: >1 gpm unidentified leakage; Fix in 6 hrs or SD	MORE RESTRICTIVE:	Time for restoration reduced to 4 hrs iaw STS.
3.1.5.b	3.4.13 C	LCO: PCS total leakage <10 gpm	ADMINISTRATIVE:	Requirement unchanged.
3.1.5.b	3.4.13 A.1	ACTN: >10 gpm total leakage; Fix in 6 hrs or SD	MORE RESTRICTIVE:	Time for restoration reduced to 4 hrs iaw STS.
3.1.5.c	3.7.13	LCO: Secondary activity <0.1 μCi/gm DE I-131	ADMINISTRATIVE:	Requirement unchanged.
3.1.5.c	3.7.13	ACTN: Secondary activity >limit; SD w/in 6 hrs	ADMINISTRATIVE:	Requirement unchanged.
3.1.5.d	3.4.13.d	LCO: Max pri-sec leakage <0.3 gpm; Steady state	ADMINISTRATIVE:	Requirement unchanged.
3.1.5.d	3.4.13.e	LCO: Max pri-sec leakage <0.6 gpm; Transients	ADMINISTRATIVE:	Requirement unchanged.
3.1.6	3.4 Relocated	PCS Oxygen & Halogen Limits	RELOCATED:	The primary coolant chemistry requirements do not meet the criteria of 10 CFR 50.36(2)(c)(ii), they do not appear in STS, and they have been relocated.
3.1.6.a	3.4 Relocated	LCO: PCS O_2 <0.1 ppm	RELOCATED:	These requirements do not meet the criteria of 10 CFR 50.36(2)(c)(ii) and have been relocated.
3.1.6.a	3.4 Relocated	ACTN: O_2 <0.1 ppm; take action w/in 8 hrs	RELOCATED:	These requirements do not meet the criteria of 10 CFR 50.36(2)(c)(ii) and have been relocated.
3.1.6.b	3.4 Relocated	LCO: PCS Cl <0.12 ppm	RELOCATED:	These requirements do not meet the criteria of 10 CFR 50.36(2)(c)(ii) and have been relocated.
3.1.6.b	3.4 Relocated	ACTN: Cl <0.12 ppm; action w/in 8 hrs	RELOCATED:	These requirements do not meet the criteria of 10 CFR 50.36(2)(c)(ii) and have been relocated.
3.1.6.c	3.4 Relocated	LCO: Fl <0.10 ppm; following welding on PCS	RELOCATED:	These requirements do not meet the criteria of 10 CFR 50.36(2)(c)(ii) and have been relocated.

TS Number	RTS Number	TS requirement description	Classification and Description of Changes	
3.1.6.c	3.4 Relocated	ACTN: Fl <0.10 ppm; Action w/in 8 hrs	RELOCATED:	These requirements do not meet the criteria of 10 CFR 50.36(2)(c)(ii) and have been relocated.
3.1.6.d	3.4 Relocated	ACTN: O_2 & (Cl or Fl) >limit; Immediate action	RELOCATED:	These requirements do not meet the criteria of 10 CFR 50.36(2)(c)(ii) and have been relocated.
3.1.6.e	3.4 Relocated	ACTN: O_2 & (Cl or Fl) >limit >24 hrs; HSD in 12 hrs	RELOCATED:	These requirements do not meet the criteria of 10 CFR 50.36(2)(c)(ii) and have been relocated.
3.1.6.e	3.4 Relocated	ACTN: O_2 & (Cl or Fl) >limit >36 hrs; CSD in 24 hrs	RELOCATED:	These requirements do not meet the criteria of 10 CFR 50.36(2)(c)(ii) and have been relocated.
3.1.7	3.4.10/3.7.1	Primary and Secondary Safety Valves		
3.1.7.1	3.4.10	LCO: 3 Primary safeties; >CSD	LESS RESTRICTIVE:	LCO 3.4.10 applicability is MODES 1, 2, and 3 with PCS temperature >430°F. Primary safeties provide overpressure protection when PCS temperature is above 430°F. Applicability for LCO 3.4.10 written iaw STS.
3.1.7.1 Aa	3.4.10 B.1	ACTN: 1 or more primary safeties inop, HSD in 12 hrs	MORE RESTRICTIVE:	Completion Time to MODE 3 decreased to 6 hrs iaw STS.
3.1.7.1 Ab	3.4.10 B.2	ACTN: 1 or more primary safeties inop, CSD in 48 hrs	LESS RESTRICTIVE:	TS 3.1.7.1 is applicable above cold shutdown (MODES 1-4) while LCO 3.4.10 is applicable for MODES 1, 2, and 3 iaw STS. Cooldown to MODE 5 is not required because LCO 3.4.12 provides overpressure protection when PCS temperature is less than 430°F iaw STS.
3.1.7.2	3.7.1	LCO: 23 Sec safeties; Above CSD	LESS RESTRICTIVE:	Existing TS require safeties to be operable above Cold Shutdown (above 210°F); Proposed RTS require safeties to be operable in MODES 1, 2 and 3 (above 300°F). The required settings are between 985 and 1025 psig; The safeties provided no real function between 210 and 300°F.
3.1.7.2.a	3.7.1.a/b	ACTN: 1 or more secondary safeties inop, HSD in 12 hrs	MORE RESTRICTIVE:	Proposed RTS allow 4 hrs for repair, but only 6 to MODE 3; total hours to hot shutdown (MODE 3) is reduced to 10 hrs.
3.1.7.2.b	3.7.1.b	ACTN: 1 or more secondary safeties inop, CSD in 48 hrs	LESS RESTRICTIVE:	Existing Action requires cooldown to Cold Shutdown; proposed RTS only require cooling plant to MODE 4 because proposed applicability is MODES 1, 2, 3.
3.1.8	3.4.11/3.4.12	PCS Overpressure Protection Systems		
3.1.8.1	3.4.11	LCO: 2 PORV flow paths; Tc ≥430°F	ADMINISTRATIVE:	Requirement unchanged.
3.1.8.1 Aa	3.4.11 A & B	ACTN: 1 path inop; close path in 1 hr & fix in 72 hrs	ADMINISTRATIVE:	Requirement unchanged. (ACTN A.2 is New)

TS Number	RTS Number	TS requirement description	Classification and Description of Changes	
3.1.8.1 Aa.1	3.4.11 B.1	ACTN: PORV "CLOSE" position in 1 hr	ADMINISTRATIVE:	Requirement unchanged.
3.1.8.1 Aa.2	3.4.11 A.1	ACTN: Close block valve in 1 hr	ADMINISTRATIVE:	Requirement unchanged.
3.1.8.1 Aa.3	3.4.11 A.3/B.2	ACTN: Restore PORV flow path in 72 hrs	ADMINISTRATIVE:	Requirement unchanged.
3.1.8.1 Ab	3.4.11 D & E	ACTN: 2 paths inop; Close paths in 1 hr & fix 1 path in 2 hrs	ADMINISTRATIVE:	Requirement unchanged.
3.1.8.2 Ab.1	3.4.11 F.1	ACTN: PORV "CLOSE" position in 1 hr	ADMINISTRATIVE:	Requirement unchanged.
3.1.8.2 Ab.2	3.4.11 D.1	ACTN: Close block valve in 1 hr	ADMINISTRATIVE:	Requirement unchanged. (ACTN D.2 is NEW)
3.1.8.2 Ab.3	3.4.11 D.3/E.2	ACTN: Restore 1 PORV flow path in 2 hrs	ADMINISTRATIVE:	Requirement unchanged.
3.1.8.1 Ac	3.4.11 C & F	ACTN: Required Actions not met, HSD w/in 12 hrs	LESS RESTRICTIVE:	Requirement unchanged - TS 3.1.8.1 is applicable when PCS temperature is less than 430°F. Going to HOT SHUTDOWN (MODE 4 - 300°F >PCS temp >200°F) is not required. Plant placed in condition where LCO is no longer applicable iaw STS.
3.1.8.2	3.4.12	LCO: 2 PORV flow paths; Tc <430°F	ADMINISTRATIVE:	Requirements unchanged - Figure 3-4, LTOP setpoint limit relocated to the PTLR.
3.1.8.2 Aa	3.4.12 B.1/C.1	ACTN: 1 PORV inop; Restore both w/in 1 day with PZR level >57% and 7 days with PZR level ≤57%	ADMINISTRATIVE:	Requirements unchanged.
3.1.8.2 Ab	3.4.12 D.1/D.2	ACTN: 2 PORVs inop; Vent PCS w/in 24 hrs	LESS RESTRICTIVE:	Increased completion time for cooldown and venting to 24 hrs.
3.1.8.2 Ab.1	3.4.12.2	ACTN: 2 PORVs inop; Verify unlocked vent each 12 hrs	ADMINISTRATIVE:	Requirements unchanged.
3.1.8.2 Ab.2	3.4.12.2	ACTN: 2 PORVs inop; verify locked vent each 31 days	ADMINISTRATIVE:	Requirements unchanged.
3.1.9	3.4	Shutdown Cooling (SDC)		
3.1.9.1	3.4.6	LCO: 1 SDC train/PCS loop running& 2 operable; 300 ≥T >200	ADMINISTRATIVE:	Requirements unchanged.
3.1.9.1.1	3.4.6	LCO: Acceptable loop: SDC Train A	ADMINISTRATIVE:	Requirements unchanged.
3.1.9.1.2	3.4.6	LCO: Acceptable loop: SDC Train B	ADMINISTRATIVE:	Requirements unchanged.
3.1.9.1.3	3.4.6	LCO: Acceptable loop: PCS loop 1	ADMINISTRATIVE:	Requirements unchanged.

TS Number	RTS Number	TS requirement description	Classification and Description of Changes	
3.1.9.1.4	3.4.6	LCO: Acceptable loop: PCS loop 2	ADMINISTRATIVE:	Requirements unchanged.
3.1.9.1 E1	3.4.6 N1	XCPT: No flow ok if no dilute & CETs ≥10°F above sat	ADMINISTRATIVE:	Requirements unchanged.
3.1.9.1 A1.a	3.4.6 A.1	ACTN: <req loops operable; take action to restore; Immed	ADMINISTRATIVE:	Requirements unchanged.
3.1.9.1 A1.b	3.4 Deleted	ACTN: <req loops op; Main PCS as cool as possible	LESS RESTRICTIVE:	If PCS temperature increases above applicability range, then a MORE RESTRICTIVE LCO is required.
3.1.9.1 A1.c	3.4.6 B.1	ACTN: <req loops operable but sdc OK; Be <200°F; 24 hrs	ADMINISTRATIVE:	Requirements unchanged.
3.1.9.1 A2.a	3.4.6 C.1	ACTN: <req flow; stop dilution; Immediately	ADMINISTRATIVE:	Requirements unchanged.
3.1.9.1 A2.b	3.4.6 C.2	ACTN: <req flow; take action to restore; Immediately	ADMINISTRATIVE:	Requirements unchanged.
3.1.9.2	3.4.7	LCO: 1 SDC train/PCS loop running & 2 decay heat paths operable; T <200 & filled	MORE RESTRICTIVE:	One SDC train required to be operating and S/G level >25%.
3.1.9.2.1	3.4.7	LCO: Acceptable loop: SDC Train A	ADMINISTRATIVE:	Requirements unchanged.
3.1.9.2.2	3.4.7	LCO: Acceptable loop: SDC Train B	ADMINISTRATIVE:	Requirements unchanged.
3.1.9.2.3	3.4 Deleted	LCO: Acceptable loop: PCS loops 1 & 2	MORE RESTRICTIVE:	Rely only on SDC and natural circulation heat transfer to full SGs.
3.1.9.2 E1	3.4.7 N1	XCPT: No flow ok if no dilute & CETs ≤200°F & 2 SDC trains	ADMINISTRATIVE:	Requirements unchanged.
3.1.9.2 E2	3.4.7 N2	XCPT: No trains ok if flow ok, CETs ≤200°F, & 2 SGs >-84%	MORE RESTRICTIVE:	No credit for PCPs and minimum S/G level increases to 25%.
3.1.9.2 A1.a	3.4.7 A.1	ACTN: <req loops operable; take action to restore; Immed	ADMINISTRATIVE:	Requirements unchanged.
3.1.9.2 A1.b	3.4 Deleted	ACTN: <req loops operable; maintain PCS as cool as possible	LESS RESTRICTIVE:	If PCS temperature increases above applicability range, then a more restrictive LCO is required.
3.1.9.2 A2.a	3.4.7 C.1	ACTN: <req flow; stop dilution; Immediately	ADMINISTRATIVE:	Requirements unchanged.
3.1.9.2 A2.b	3.4.7 C.2	ACTN: <req flow; take action to restore; Immediately	MORE RESTRICTIVE:	Minimum flow rate increased from 650 gpm (TS 3.10.1.6) to 1000 gpm.
3.1.9.3	3.4.8	LCO: 1 SDC train loop running & 2 operable; T<200 & not filled	ADMINISTRATIVE:	Requirements unchanged.
3.1.9.3.1	3.4.8	LCO: Acceptable loop: SDC Train A	ADMINISTRATIVE:	Requirements unchanged.
3.1.9.3.2	3.4.8	LCO: Acceptable loop: SDC Train B	ADMINISTRATIVE:	Requirements unchanged.

TS Number	RTS Number	TS requirement description	Classification and Description of Changes	
3.1.9.3 E1	3.4.8 N1	XCPT: No flow ok if no dilute & CETs ≤200°F & 2 SDC trains	MORE RESTRICTIVE:	Require 10°F subcooling.
3.1.9.3 E2	3.4.8 N2	XCPT: No trains ok if flow ok, CETs ≤200°F, & cavity ≥647'	ADMINISTRATIVE:	Requirement unchanged. One SDC train must be OPERABLE, for MODE 5, Loops not filled iaw STS.
3.1.9.3 E2	3.9.4 N	XCPT: No trains ok if flow ok, CETs ≤200°F, & cavity ≥647'	ADMINISTRATIVE:	Requirements unchanged.
3.1.9.3 A1.a	3.4.8 A.1	ACTN: <2 loops operable; take action to restore; Immed	ADMINISTRATIVE:	Requirements unchanged.
3.1.9.3 A1.b	3.4 Deleted	ACTN: <2 loops op; main PCS as cool as possible	LESS RESTRICTIVE:	If PCS temperature increases above applicability range, then a more restrictive LCO is required.
3.1.9.3 A2.a	3.4.8 C.1	ACTN: <req flow; stop dilution; Immediately	ADMINISTRATIVE:	Requirements unchanged.
3.1.9.3 A2.b	3.4.8 C.2	ACTN: <req flow; take action to restore; Immediately	ADMINISTRATIVE:	Requirements unchanged.

TS Number	RTS Number	TS requirement description	Classification and Description of Changes*	
3.3.3	3.4	Pressure Boundary Valves		
3.3.3	3.4.14.1	SR: Verify Tbl 4.3.1 vlv lkg; B4 power ops	MORE RESTRICTIVE:	Added requirement to test valves w/in 24 hrs after opening and added 2 HLI check valves.
3.3.3.a	3.4.14.1	SR: Verify Tbl 4.3.1 vlv lkg	ADMINISTRATIVE:	Requirement unchanged.
3.3.3.b	3.4.14 A.1/A.2	ACTN: Tbl 4.3.1 not met; Shut 2 vlvs (see 4.3.i)	MORE RESTRICTIVE:	ACTN 3.4.14 A.1 requires isolation of low pressure pipe with 1 valve and 3.4.14 A.2 requires restoration of PIV within 72 hrs. Restoration requirement is required since affected systems do not have a second isolation valve available for closure in the high pressure pipe without making a train of safety inspection inoperable.
3.3.3.c	3.4.14 B.1	ACTN: 3.3.3.a & b not met; HSD in 12 hrs (LCO 3.0.3) or in LCO for inoperable safety injection flow path after deenergizing the flow control valve.	MORE RESTRICTIVE:	Time to HSD (MODE 3) reduced to 6 hrs iaw STS.
3.3.5	3.4.12	LCO: 2 HPSIs inop; <300°F	ADMINISTRATIVE:	Requirement unchanged.
3.3.5(n)	3.4.12 N	XCPT: This LCO doesn't prohibit emerg use	ADMINISTRATIVE:	Requirement unchanged.
3.10.1.c.1.a	3.4.6 D/3.4.7 C 3.4.8 c	ACTN: <525°F, 2810 >flow ≥610; SDM >3.5% & c.1.b	ADMINISTRATIVE:	Requirements unchanged except for higher required minimum flow rate of 1000 gpm. SDM requirement moved to LCO 3.1.2.
3.10.1.c.2	3.4.6 D/3.4.7 C 3.4.8 C	ACTN: <525°F, 2810 >flow ≥610; verify chg off; 15 min	MORE RESTRICTIVE:	Requires continuous monitoring for dilution flow and requires higher minimum flow rate of 1000 gpm.
3.10.1.c.2(a)	3.4.6 D/3.4.7 C 3.4.8 C	ACTN: <525°F, 2810 >flow ≥610, Chg on; Stop Chg, chk SDM	ADMINISTRATIVE:	Requirements unchanged except for higher required minimum flow rate of 100 gpm.
3.17.6.7.1	3.4.15 A.1	ACTN: 1 leak detector inop; restore; Prior to startup	ADMINISTRATIVE:	Requirements unchanged.
3.17.6.7.2	3.4.15 B.1	ACTN: 2 of 3 leak detectors inop; restore; 30 days	ADMINISTRATIVE:	Requirements unchanged.
3.17.6.8	3.4 Relocated	ACTN: 1 Safety Vlv Pos Ind inop; restore; Prior to startup	RELOCATED:	This requirement does not meet the criterion of 10 CFR 50.36.
3.17.6.9	3.4 Relocated	ACTN: 1 PORV Pos Ind inop; restore; Prior to startup	RELOCATED:	This requirement does not meet the criterion of 10 CFR 50.36.
3.17.6.10a	3.4 Relocated	ACTN: 1 Block vlv Pos Ind inop; restore; B4 SU	RELOCATED:	This requirement does not meet the criterion of 10 CFR 50.36

TS Number	RTS Number	TS requirement description	Classification and Description of Changes	
3.17.6.10b	3.4 Relocated	ACTN: 1 LTOP Block Pos Ind inop; verify open; Each 12 hrs	RELOCATED:	This requirement does not meet the criterion of 10 CFR 50.36.
3.17.6.17	3.4.6 E.1	ACTN: SDC interlock inop; Breaker "Racked Out" position; 8 hrs	MORE RESTRICTIVE:	RTS required circuit breaker be in "OPEN" position in 1 hr.
3.17.6T#7	3.4.15	LCO: 4 chnls diverse PCS leak detection; >300°F	ADMINISTRATIVE:	Requirement unchanged.
3.17.6T#8	3.4 Relocated	LCO: 2 chnls pos ind per safety vlv; >300°F	RELOCATED:	This requirement does not meet the criterion of 10 CFR 50.36.
3.17.6T#9	3.4 Relocated	LCO: 3 chnls pos ind per PORV; >210°F	RELOCATED:	This requirement does not meet the criterion of 10 CFR 50.36.
3.17.6T#10	3.4 Relocated	LCO: 2 chnls pos ind per Block Vlv; At all times	RELOCATED:	This requirement does not meet the criterion of 10 CFR 50.36.
3.17.6T#17	3.4.6 E	LCO: 2 SDC interlocks; >200 psia	ADMINISTRATIVE:	Requirements unchanged, interlock not required when SDC in operation.
4.1	3.4.12	Overpressure Protection System Tests		
4.1.1	5.5.7	SR: PORV; ASME sec XI testing	ADMINISTRATIVE:	Moved to Admin Cont Section.
4.1.2	3.4.12.5	SR: PORV actuation chnl; calibration; 18 months	ADMINISTRATIVE:	Requirements unchanged.
4.1.3(a)	3.4.11.2	SR: PORV; cycle when >CSD; 18 months	ADMINISTRATIVE:	Requirements unchanged.
4.1.3(b)	3.4.11.1	SR: Block valve; Cycle in CSD if not done w/in 92 days	ADMINISTRATIVE:	Requirements unchanged.
4.1.4(a)	3.4.12.4	SR: PORV actuation chnl; functional test; 31 days	ADMINISTRATIVE:	Requirements unchanged.
4.1.4(b)	3.4.12.3	SR: Verify block open during PORV use; 72 hrs	ADMINISTRATIVE:	Requirements unchanged.
4.1.5	3.4.12.1	SR: Verify HPSI blocked; Each 12 hrs when <300°F	ADMINISTRATIVE:	Requirements unchanged.
4.2.1.1	3.4.16.1	SR: PCS Gross activity; 3/wk, 72 hrs max (w/>500°F)	LESS RESTRICTIVE:	Frequency increased to 7 days iaw STS.
4.2.1.1	3.4 Relocated	SR: PCS Gross Gamma; Continuously w/>500°F	RELOCATED:	This requirement does not meet the criterion of 10 CFR 50.36.

TS Number	RTS Number	TS requirement description	Classification and Description of Changes	
4.2.1.1	3.4 Relocated	ACTN: Gross Gamma monitor inop; Sample PCS daily	RELOCATED:	This requirement does not meet the criterion of 10 CFR 50.36.
4.2.1.1	3.4.16.2	SR: Dose equiv I-131; 14 days at power	ADMINISTRATIVE:	Requirements unchanged.
4.2.1.1	3.4.16.3	SR: $\bar{E}$ 6 mo (>2 EFPD & 20 days since SD >2 day)	ADMINISTRATIVE:	Requirements unchanged.
4.2.1.1	3.4.16 A.1	ACTN: Iodine Anal; 4 hrs w/DE I-131 >1 μCi/gm	ADMINISTRATIVE:	Requirements unchanged.
4.2.1.1	3.4.16.2	SR: Iodine isotopic Anal; After a 15%/hr pwr inc	ADMINISTRATIVE:	Requirements unchanged.
4.2.1.1	3.4 Relocated	SR: Cl & Ox; 3/wk, 72 hrs max, >210°F	RELOCATED:	This requirement does not meet the criterion of 10 CFR 50.36.
4.2.1.1	3.4 Relocated	SR: Fl; 30 days & after welding on PCS	RELOCATED:	This requirement does not meet the criterion of 10 CFR 50.36.
4.2.2.3	3.4.10.1	SR: Pzr Safety Valves; check set points; Refueling	ADMINISTRATIVE:	Requirement unchanged.
4.2.2T#7	3.4.13.1	SR: Primary Sys Leakage; evaluate; Daily	LESS RESTRICTIVE:	Frequency increased to 72 hrs iaw STS.
4.2.2.14.a	3.4.5.3 3.4.6.3 3.4.7.3 3.4.8.2	SR: Verify PCP alignments during SDC; 7 days	ADMINISTRATIVE:	Requirements unchanged.
4.2.2.14.b	3.4.5.2 3.4.6.2 3.4.7.2	SR: Verify SGs operable during SDC ops; 12 hrs	ADMINISTRATIVE:	Requirement unchanged.
4.2.2.14.c	3.4.5.1 3.4.6.1 3.4.7.1 3.4.8.1	SR: Verify pump operating for SDC; 12 hrs	ADMINISTRATIVE:	Requirement unchanged.
4.3.h	3.4.14.1	SR: Vlvs in Tbl 4.3.1; lk test after CSD, or Maint	ADMINISTRATIVE:	Requirements unchanged.
4.3.i	3.4.14.3	ACTN: SI chk vlv leaking; verify back ups; Daily	ADMINISTRATIVE:	Requirements unchanged.
4.3.j	3.4.14.2	SR: LPSI Chk vlvs; closure check; B4 crit after SDC	ADMINISTRATIVE:	Requirements unchanged.
4.3.1	3.4.14.1	TBL: LPSI & Train 1 HPSI check valves	MORE RESTRICTIVE:	Added HLI check valve in HPSI Train 1.
4.3.1(a)3	3.4.14.1	LCO: Listed chk vlv leakage; Limits rate of change	ADMINISTRATIVE:	Requirements unchanged.
4.3.1(a)4	3.4.14 A	LCO: Listed chk vlv leakage <5 gpm	ADMINISTRATIVE:	Requirements unchanged.

TS Number	RTS Number	TS requirement description	Classification and Description of Changes	
4.3.1(a)5	3.4.14 Bases	ADMN: Adjust meas leakage for test press	ADMINISTRATIVE:	Affect of reducted test pressure was moved to Basis for LCO 3.4.14 iaw STS.
4.15	3.4	Primary System Flow Measurement		
4.15	3.4.1.3	SR: PCS flow; verify >LCO 3.1.1.c; Refueling	ADMINISTRATIVE:	Requirements unchanged.
4.15	3.4.1.3	SR: PCS flow; verify >LCO 3.1.1.c; After plugging	ADMINISTRATIVE:	Requirements unchanged.
4.15	3.4.1.3	SR: PCS flow; verify <31 days	LESS RESTRICTIVE:	RTS frequency based on reaching >90% RTP.
4.17.6T#7-cc	3.4.15.1	SR: 4 chnls diverse PCS leak det; Chnl Check; 12 hrs	ADMINISTRATIVE:	Requirements unchanged.
4.17.6T#7-cft	3.4.15.2	SR: 4 chnls diverse PCS leak det; Chnl func test; 18 mo	ADMINISTRATIVE:	Requirements unchanged.
4.17.6T#7-cal	3.4.15.3 3.4.15.4 3.4.15.5	SR: 4 chnls diverse PCS leak det; Chnl Cal; 18 mo	ADMINISTRATIVE:	Requirements unchanged.
4.17.6T#8-cft	3.4 Relocated	SR: 2 chnls pos ind/safety vlv; Chnl fnc tst; 18 mo	RELOCATED:	This requirement does not meet the criterion of 10 CFR 50.36.
4.17.6T#8-cal	3.4 Relocated	SR: 2 chnls pos ind per safety vlv; Chnl Cal; 18 mo	RELOCATED:	This requirement does not meet the criterion of 10 CFR 50.36.
4.17.6T#9-cc	3.4 Relocated	SR: 3 chnls pos ind per PORV; Chnl Check; 12 hrs	RELOCATED:	This requirement does not meet the criterion of 10 CFR 50.36.
4.17.6T#9-cft	3.4 Relocated	SR: 3 chnls pos ind per PORV; Chnl func test; 18 mo	RELOCATED:	This requirement does not meet the criterion of 10 CFR 50.36.
4.17.6T#9-cal	3.4 Relocated	SR: 3 chnls pos ind per PORV; Chnl Cal; 18 mo	RELOCATED:	This requirement does not meet the criterion of 10 CFR 50.36.
4.17.6T#10-cc	3.4 Relocated	SR: 2 chnls pos ind per Block Vlv; Chnl Check; 12 hrs	RELOCATED:	This requirement does not meet the criterion of 10 CFR 50.36.
4.17.6T#10-cal	3.4 Relocated	SR: 2 chnls pos ind per Block Vlv; Chnl Cal; 18 mo	RELOCATED:	This requirement does not meet the criterion of 10 CFR 50.36.
4.17.6T#17-cft	3.4.6.4	SR: 2 SDC interlocks; Chnl func test; 18 mo	ADMINISTRATIVE:	Requirements unchanged. Calibration includes cft.
4.17.6T#17-cal	3.4.6.4	SR: 2 SDC interlocks; Chnl cal; 18 mo	ADMINISTRATIVE:	Requirement unchanged.
5.3.1	3.4 Bases	DESC: Description of Primary Coolant System	ADMINISTRATIVE:	Description of PCS features moved to Bases of Section 3.4, Primary Coolant System.

ATTACHMENT 4

CONSUMERS POWER COMPANY
PALISADES PLANT
DOCKET 50-255

STS CONVERSION TECHNICAL SPECIFICATION CHANGE REQUEST

3.4 PRIMARY COOLANT SYSTEM

STS Pages marked to Show the Differences Between RTS and STS

3.4 ~~REACTOR~~ PRIMARY COOLANT SYSTEM (~~RCS~~ PCS)

3.4.1 ~~RCS~~ PCS Pressure, Temperature, and Flow ~~{Departure from Nucleate Boiling (DNB)}~~ Limits

LCO 3.4.1 ~~RCS~~ PCS DNB parameters for pressurizer pressure, cold leg temperature, and ~~RCS~~ PCS total flow rate shall be within the limits specified below:

a. Pressurizer pressure ≥ ~~[2025~~2010~~]~~ psia and ≤ ~~[2275~~2100~~]~~ psia;

b. ~~RCS cold leg temperature (T_c) ≥ [535]°F and ≤ [558]°F for < [70]% RTP, or ≥ [544]°F and ≤ [588]°F for ≥ [70]% RTP; and~~
The indicated reactor inlet temperature (T_c) shall not exceed the value given by the following equation at steady state power operation:

$$T_c \leq 542.99 + .0580(P-2060) + .00001(P-2060)^2 + 1.125(W-138) - .0205(W-138)^2$$

Where: T_c = Reactor inlet temperature in °F
P = Nominal Operation Pressure in psia
W = Total recirculating mass flow in 10^6 lb/h corrected to the operating temperature conditions.

If the measured primary coolant system flow rate is greater than 150 M lb/hr, the maximum inlet temperature shall be less than or equal to the T_c LCO at 150 M lbm/hr.

c. ~~RCS~~ PCS total flow rate ≥ ~~[148 E6]~~138.6 E6 lb/hour~~ and ≤ [177.6 E6] lb/hour~~.

APPLICABILITY: MODE 1.

-------------------------------------NOTES-------------------------------------

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. Pressurizer pressure or ~~RCS~~ PCS flow rate not within limits.	A.1	Restore parameter(s) to within limit.	2 hours

(continued)

CONDITION	REQUIRED ACTION		COMPLETION TIME
B. Required Action and associated Completion Time of Condition A not met.	B.1	Be in MODE 2.	6 hours
C. ~~RCS~~ PCS cold leg temperature not within limits.	C.1	Restore cold leg temperature to within limits.	2 hours
D. Required Action and associated Completion Time of Condition C not met.	D.1	Reduce THERMAL POWER to ≤ ~~[~~30~~]~~% RTP.	6 hours

SURVEILLANCE REQUIREMENTS

SURVEILLANCE		FREQUENCY
SR 3.4.1.1	Verify pressurizer pressure ≥ ~~[2025]~~2010 psia and ≤ ~~[2275]~~2100 psia.	12 hours
SR 3.4.1.2	Verify ~~RCS~~ PCS cold leg temperature ~~≥ [535]°F and ≤ [558]°F for < [70]% RTP or ≥ [544]°F and ≤ [558]°F for ≥ [70]% RTP or ≥ [544]°F and ≤ [558]°F for ≥ [70]% RTP.~~ $\leq 542.99 + .0580(P-2060) + .00001(P-2060)^2 + 1.125(W-138) - .0205(W-138)^2$	12 hours
~~SR 3.4.1.3~~	~~NOTE~~ ~~Required to be met in MODE 1 with all RCPs running.~~ ~~Verify RCS total flow rate ≥ [148 E6] lb/hour and ≤ [177.6 E6] lb/hour.~~	~~12 hours~~

SURVEILLANCE REQUIREMENTS (continued)

SURVEILLANCE		FREQUENCY
SR 3.4.1.~~4~~3	-------------------NOTE------------------- Not required to be performed until ~~[~~24~~]~~ hours after ≥ ~~[~~90~~]~~% RTP. -- Verify by precision heat balance that ~~RCS~~ PCS total flow rate ~~within limits specified in the COLR~~ ≥138.6 E6 lb/hour.	~~[~~18~~]~~ months AND after plugging 10 or more steam generator tubes

3.4 ~~REACTOR~~ PRIMARY COOLANT SYSTEM (~~RCS~~ PCS)

3.4.2 ~~RCS~~ PCS Minimum Temperature for Criticality

LCO 3.4.2 Each ~~RCS~~ PCS loop average temperature (~~T_{avg}~~ T_{ave}) shall be $\geq$ ~~[520~~525~~]~~°F.

APPLICABILITY: MODE 1 with ~~T_{avg}~~ T_{ave} in one or more ~~RCS~~ PCS loops < ~~[~~535~~]~~°F,
MODE 2 with ~~T_{avg}~~ T_{ave} in one or more ~~RCS~~ PCS loops < ~~[~~535~~]~~°F and $K_{eff} \geq 1.0$.

ACTIONS

CONDITION	REQUIRED ACTION	COMPLETION TIME
A. ~~T_{avg}~~ T_{ave} in one or more ~~RCS~~ PCS loops not within limit.	A.1 Be in MODE ~~3~~2 with $K_{eff} < 1.0$.	30 minutes

SURVEILLANCE REQUIREMENTS

SURVEILLANCE		FREQUENCY
SR 3.4.2.1	Verify ~~RCS~~ PCS ~~T_{avg}~~ T_{ave} in each loop $\geq$ ~~[520~~525~~]~~°F.	~~30 minutes thereafter~~ 1 hour

3.4 ~~REACTOR~~ PRIMARY COOLANT SYSTEM (~~RCS~~ PCS)

3.4.3 ~~RCS~~ PCS Pressure and Temperature (P/T) Limits

LCO 3.4.3 ~~RCS~~ PCS pressure, ~~RCS~~ PCS temperature, and ~~RCS~~ PCS heatup and cooldown rates shall be maintained within the limits specified in the PTLR.

APPLICABILITY: At all times.

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.	30 minutes
	<u>AND</u>		
	A.2	Determine ~~RCS~~ PCS is acceptable for continued operation.	72 hours
B. Required Action and associated Completion Time of Condition A not met.	B.1	Be in MODE 3.	6 hours
	<u>AND</u>		
	B.2	Be in MODE 5 with ~~RCS~~ PCS pressure < ~~[500] psig~~ 270 psia.	36 hours
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.	Immediately
	<u>AND</u>		
	C.2	Determine ~~RCS~~ PCS is acceptable for continued operation.	Prior to entering MODE 4

SURVEILLANCE REQUIREMENTS

SURVEILLANCE		FREQUENCY
SR 3.4.3.1	-------------------NOTE------------------- Only required to be performed during ~~RCS~~ PCS heatup and cooldown operations and ~~RCS~~ PCS ~~inservice leak and~~ hydrostatic testing. -- Verify ~~RCS~~ PCS pressure, ~~RCS~~ PCS temperature, and ~~RCS~~ PCS heatup and cooldown rates within limits specified in the PTLR.	30 minutes

3.4 ~~REACTOR~~ PRIMARY COOLANT SYSTEM (~~RCS~~ PCS)

3.4.4 ~~RCS~~ PCS Loops - MODES 1 and 2

LCO 3.4.4 Two ~~RCS~~ PCS 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~~ PCS loop is in operation.	12 hours

3.4 ~~REACTOR~~ PRIMARY COOLANT SYSTEM (~~RCS~~ PCS)

3.4.5 ~~RCS~~ PCS Loops - MODE 3

LCO 3.4.5 ~~[Two] RCS~~ PCS loops shall be OPERABLE and one ~~RCS~~ PCS loop shall be in operation.

---------------------------------------NOTES---------------------------------------

1. All ~~reactor~~ primary coolant pumps may be de-energized for $\leq$ 1 hour per 8 hour period, provided:

   a. No operations are permitted that would cause reduction of the ~~RCS~~ PCS boron concentration; and
   b. Core outlet temperature is maintained at least 10°F below saturation temperature.

2. Forced circulation (starting the first primary coolant pump) shall not be initiated unless one of the following conditions is met:

   a. PCS cold leg temperature (T_c) is > 430°F.
   b. S/G secondary temperature is $\leq$ T_c.
   c. S/G secondary temperature is < 100°F above T_c, and shutdown cooling is isolated from the PCS, and PCS heatup/cooldown rate is $\leq$ 10°F/hour.
   d. S/G secondary temperature is < 100°F above T_c, and shutdown cooling is isolated from the PCS, and pressurizer level is $\leq$ 57%.

APPLICABILITY: MODE 3.

ACTIONS

CONDITION	REQUIRED ACTION	COMPLETION TIME
A. One required ~~RCS~~ PCS loop inoperable.	A.1 Restore required ~~RCS~~ PCS 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~~ PCS loop OPERABLE. OR No ~~RCS~~ PCS loop in operation.	C.1 Suspend all operations involving a reduction of ~~RCS~~ PCS boron concentration. AND C.2 Initiate action to restore one ~~RCS~~ PCS loop to OPERABLE status and operation.	Immediately Immediately

SURVEILLANCE REQUIREMENTS

SURVEILLANCE		FREQUENCY
SR 3.4.5.1	Verify required ~~RCS~~ PCS loop is in operation.	12 hours
SR 3.4.5.2	Verify secondary side water level in each steam generator ≥ ~~[25]~~ 84%.	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~~ PRIMARY COOLANT SYSTEM (~~RCS~~ PCS)

3.4.6 ~~RCS~~ PCS Loops - MODE 4

LCO 3.4.6 Two loops or trains consisting of any combination of ~~RCS~~ PCS loops and Shutdown Cooling (SDC) trains shall be OPERABLE and at least one loop or train providing ≥ 2810 gpm through the core shall be in operation.

-----NOTES-----

1. All ~~reactor coolant pumps~~ Primary Coolant Pumps (~~RCPs~~ PCPs) 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~~ PCS 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 ≤ [285]°F unless:~~

~~a. Pressurizer water level is < [60]%; or~~

~~b. Secondary side water temperature in each Steam Generator (SG) is < [100]°F above each of the RCS cold leg temperatures.~~

2. Forced circulation (starting the first primary coolant pump) shall not be initiated unless one of the following conditions is met:

    a. S/G secondary temperature is ≤ T_c.

    b. S/G secondary temperature is < 100°F above T_c, and shutdown cooling is isolated from the PCS, and PCS heatup/cooldown rate is ≤ 10°F/hour.

    c. S/G secondary temperature is < 100°F above T_c, and shutdown cooling is isolated from the PCS, and pressurizer level is ≤ 57%.

3. When the PCS cold leg temperature is < 300°F, Primary Coolant Pumps P-50A and P-50B shall not be operated simultaneously.

APPLICABILITY: MODE 4.

ACTIONS

CONDITION	REQUIRED ACTION	COMPLETION TIME
A. One required ~~RCS~~ PCS loop inoperable. AND Two SDC trains inoperable.	A.1 Initiate action to restore a second loop or train to OPERABLE status.	Immediately
B. One required SDC train inoperable. AND Two required ~~RCS~~ PCS loops inoperable.	B.1 Be in MODE 5.	24 hours
C. Required ~~RCS~~ PCS loop or SDC train inoperable. OR No ~~RCS~~ PCS loop or SDC train in operation.	C.1 Suspend all operations involving reduction of ~~RCS~~ PCS boron concentration. AND C.2 Initiate action to restore one loop or train to OPERABLE status and operation.	Immediately Immediately

(continued)

ACTIONS (continued)

CONDITION	REQUIRED ACTION	COMPLETION TIME
D. Required SDC train flow rate < 2810 gpm.	D.1 Suspend all operations involving reduction of PCS boron concentration. AND D.2 Initiate action to assure SDC flow ≥ 1000 gpm. AND D.3.1 Verify two of three charging pumps are electrically disabled. OR D.3.2 Initiate action to perform SR 3.1.2.1 (verify SDM).	Immediately Immediately 15 minutes Within 15 minutes following dilution flow to the PCS AND Every 15 minutes thereafter until stable PCS boron concentration exists
E. One of two SDC suction valve interlock channels inoperable.	E.1 Place circuit breaker for the associated valve operator in "OPEN" position.	1 hour

SURVEILLANCE REQUIREMENTS

SURVEILLANCE		FREQUENCY
SR 3.4.6.1	Verify one ~~RCS~~ PCS loop or SDC train providing ≥ 2810 gpm through the core is in operation.	12 hours
SR 3.4.6.2	Verify secondary side water level in required SG(s) is ≥ ~~[25]~~ 84%.	12 hours
SR 3.4.6.3	Verify correct breaker alignment and indicated power available to the required pump that is not in operation.	7 days
SR 3.4.6.4	Calibrate SDC suction interlocks.	18 months

3.4 ~~REACTOR~~ PRIMARY COOLANT SYSTEM (~~RCS~~ PCS)

3.4.7 ~~RCS~~ PCS Loops - MODE 5, Loops Filled

LCO 3.4.7 One Shutdown Cooling (SDC) train shall be OPERABLE and in operation, providing ≥ 2810 gpm through the core 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%~~]~~ wide range.

------------------------------------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~~ PCS 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 ≤ [285]°F unless:~~
   ~~a. The pressurizer water level is < [60]%; or~~
   ~~b. The secondary side water temperature in each SG is < [100]°F above each of the RCS cold leg temperatures.~~

3. Forced circulation (starting the first primary coolant pump) shall not be initiated unless one of the following conditions is met:

   a. S/G secondary temperature is ≤ T_c.
   b. S/G secondary temperature is < 100°F above T_c, and shutdown cooling is isolated from the PCS, and PCS heatup/cooldown rate is ≤ 10°F/hour.
   c. S/G secondary temperature is < 100°F above T_c, and shutdown cooling is isolated from the PCS, and pressurizer level is ≤ 57%.

4. When the PCS cold leg temperature is < 300°F, Primary Coolant Pumps P-50A and P-50B shall not be operated simultaneously.

4~~5~~. All SDC trains may be removed from operation during planned heatup to MODE 4 when at least one ~~RCS~~ PCS loop is in operation.

APPLICABILITY: MODE 5 with ~~RCS~~ PCS 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~~ PCS boron concentration. AND B.2 Initiate action to restore one SDC train to OPERABLE status and operation.	Immediately Immediately

CONDITION	REQUIRED ACTION	COMPLETION TIME
C. Required SDC train flow rate < 2810 gpm.	C.1 Suspend all operations involving reduction of PCS boron concentration.	Immediately
	<u>AND</u>	
	C.2 Initiate action to assure SDC flow ≥ 1000 gpm.	Immediately
	<u>AND</u>	
	C.3.1 Verify two of three charging pumps are electrically disabled.	15 minutes
	<u>OR</u>	
	C.3.2 Initiate action to perform SR 3.1.2.1 (verify SDM).	Within 15 minutes following dilution flow to the PCS. <u>AND</u> Every 15 minutes thereafter until stable PCS boron concentration exists

SURVEILLANCE REQUIREMENTS

SURVEILLANCE		FREQUENCY
SR 3.4.7.1	Verify one SDC train providing ≥ 2810 gpm through the core is in operation.	12 hours
SR 3.4.7.2	Verify required SG secondary side water level is ≥ ~~[~~25~~]~~% wide range.	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~~ PRIMARY COOLANT SYSTEM (~~RCS~~ PCS)

3.4.8 ~~RCS~~ PCS Loops - MODE 5, Loops Not Filled

LCO 3.4.8 Two Shutdown Cooling (SDC) trains shall be OPERABLE and one SDC train providing ≥ 2810 gpm flow through the reactor core shall be in operation.

-----NOTES-----

1. All SDC pumps may be de-energized for ≤ ~~15 minutes when switching from one train to another~~ 1 hour provided:

   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~~ PCS boron concentration; and
   c. No draining operations to further reduce the ~~RCS~~ PCS 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~~ PCS 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
B. Required SDC trains inoperable. <u>OR</u> No SDC train in operation.	B.1 Suspend all operations involving reduction of ~~RCS~~ PCS boron concentration. <u>AND</u> B.2 Initiate action to restore one SDC train to OPERABLE status and operation.	Immediately Immediately

(continued)

ACTIONS (continued)

CONDITION	REQUIRED ACTION	COMPLETION TIME
C. Required SDC train flow rate < 2810 gpm.	C.1 Suspend all operations involving reduction of PCS boron concentration. AND C.2 Initiate action to assure SDC flow ≥ 1000 gpm. AND C.3.1 Verify two of three charging pumps are electrically disabled. OR C.3.2 Initiate action to perform SR 3.1.2.1 (verify SDM).	Immediately Immediately 15 minutes Within 15 minutes following dilution flow to the PCS. AND Every 15 minutes thereafter until stable PCS boron concentration exists

SURVEILLANCE REQUIREMENTS

SURVEILLANCE		FREQUENCY
SR 3.4.8.1	Verify one SDC train is in operation providing ≥ 2810 gpm through the core 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~~ PRIMARY COOLANT SYSTEM (~~RCS~~ PCS)**

3.4.9 Pressurizer

LCO 3.4.9 The pressurizer shall be OPERABLE with:

a. Pressurizer water level < ~~[60]~~62.8%; and

b. ~~Two groups of pressurizer heaters OPERABLE with the capacity of each group ≥ [150] kW [and capable of being powered from an emergency power supply].~~
A minimum of 375 kW of pressurizer heater capacity is available from Bus 1D and Bus 1E.

APPLICABILITY: MODES 1, 2, and 3 with all PCS cold leg temperatures 430°F.

ACTIONS

CONDITION	REQUIRED ACTION		COMPLETION TIME
A. Pressurizer water level not within limit.	A.1	Be in MODE 3 with reactor ~~trip breakers open~~ tripped.	6 hours
	<u>AND</u>		
	A.2	Be in MODE 4.	~~[~~12~~]~~ hours
B. ~~One required group of pressurizer heaters inoperable.~~ Less than 375 kW of pressurizer heater capacity OPERABLE from Bus 1D or Bus 1E.	B.1	Restore required ~~group of~~ pressurizer heaters to OPERABLE status.	72 hours
C. Required Action and associated Completion Time of Condition B not met.	C.1	Be in MODE 3.	6 hours
	<u>AND</u>		
	C.2	Be in MODE 4.	~~[~~12~~]~~ hours

SURVEILLANCE REQUIREMENTS

SURVEILLANCE		FREQUENCY
SR 3.4.9.1	Verify pressurizer water level is < ~~[60]~~62.8%.	12 hours
SR 3.4.9.2	Verify capacity of each required group of pressurizer heaters from each Bus 1D and 1E ≥ ~~[150]~~375 kW.	92 days
~~SR 3.4.9.3~~	~~Verify required pressurizer heaters are capable of being powered from an emergency power supply.~~	~~[18] months~~

3.4 ~~REACTOR~~ PRIMARY COOLANT SYSTEM (~~RCS~~ PCS)

3.4.10 Pressurizer Safety Valves

LCO 3.4.10 ~~[Two]~~ Three pressurizer safety valves shall be OPERABLE with lift settings ~~≥ [2475] psia and ≤ [2525] psia~~ as specified in Table 3.4.10-1.

APPLICABILITY: MODES 1, 2, and 3~~,~~
~~MODE 4~~ with all ~~RCS~~ PCS cold leg temperatures > ~~[285]~~430°F.

~~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 [36] 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~~3 with all ~~RCS~~ PCS cold leg temperatures ≤ ~~[285]~~430°F.	6 hours ~~[~~12~~]~~ hours

SURVEILLANCE REQUIREMENTS

SURVEILLANCE		FREQUENCY
SR 3.4.10.1	Verify each pressurizer safety valve ~~is OPERABLE~~ lift setpoint per Table 3.4.10-1 in accordance with the Inservice Testing Program. Following testing, lift settings shall be within ± 1%.	In accordance with the Inservice Testing Program

TABLE 3.4.10-1

PRESSURIZER SAFETY VALUE LIFT SETTINGS

VALUE NUMBER	LIFT SETTING (psia ± 3%)
RV-1039	2580
RV-1040	2540
RV-1041	2500

3.4 ~~REACTOR~~ PRIMARY COOLANT SYSTEM (~~RCS~~ PCS)

3.4.11 Pressurizer Power Operated Relief Valves (PORVs)

LCO 3.4.11 Each PORV and associated block valve shall be OPERABLE.

APPLICABILITY: MODES 1, 2, and 3 with all PCS cold leg temperatures > 430°F.

ACTIONS

-------------------------------------NOTES-------------------------------------

1. Separate Condition entry is allowed for each PORV.

2. LCO 3.0.4 is not applicable.

CONDITION	REQUIRED ACTION	COMPLETION TIME
~~A. One or more PORVs inoperable and capable of being manually cycled.~~	~~A.1 Close and maintain power to associated block valve.~~	~~1 hour~~
~~B~~A. One PORV inoperable ~~and~~ (not capable of being manually cycled).	~~B~~A.1 Close associated block valve. AND ~~B~~A.2 Remove power from associated block valve. AND ~~B~~A.3 Restore PORV to OPERABLE status.	1 hour 1 hour 72 hours
~~C~~B. One block valve inoperable.	~~C~~B.1 Place associated PORV in ~~manual control~~ the "CLOSE" position. AND ~~C~~B.2 Restore block valve to OPERABLE status.	1 hour 72 hours

(continued)

ACTIONS (continued)

CONDITION	REQUIRED ACTION	COMPLETION TIME
~~D~~C. Required Action and associated Completion Time of Condition A~~,~~ or B~~, or C~~ not met.	~~D~~C.1 Be in MODE 3.	6 hours
	AND	
	~~D~~C.2 ~~Be in MODE 4~~ Reduce T_{ave} to < 430°F.	~~[~~12~~]~~ hours
~~E~~D. Two PORVs inoperable ~~and~~ (not capable of being manually cycled).	~~E~~D.1 Close associated block valves.	1 hour
	AND	
	~~E~~D.2 Remove power from associated block valves.	1 hour
	AND	
	~~E~~D.3 ~~Be in MODE 3~~ Restore one PORV to OPERABLE.	~~6~~2 hours
	~~AND~~	~~[12] hours~~
	~~E.4 Be in MODE 4.~~	
~~F~~E. More than one block valve inoperable.	~~F~~E.1 Place associated PORVs in ~~manual control~~ the "CLOSE" position.	1 hour
	AND	
	~~F~~E.2 Restore at least one block valve to OPERABLE status.	2 hours
~~G~~F. Required Action and associated Completion Time of Condition ~~F~~ D or E not met.	~~G~~F.1 Be in MODE 3.	6 hours
	AND	
	~~G~~F.2 ~~Be in MODE 4~~ Reduce T_{ave} to < 430°F.	~~[~~12~~]~~ hours

SURVEILLANCE REQUIREMENTS

SURVEILLANCE		FREQUENCY
SR 3.4.11.1	--------------------NOTE-------------------- Not required to be performed with block valve closed in accordance with the Required Actions of this LCO. -- Perform a complete cycle of each block valve.	~~[92 days]~~ Once prior to heatup from MODE 5 if not cycled within 92 days.
SR 3.4.11.2	Perform a complete cycle of each PORV with the plant above MODE 5.	~~[~~18~~]~~ months

(continued)

~~SR 3.4.11.3~~	~~Perform a complete cycle of each solenoid air control valve and check valve on the air accumulators in PORV control systems.~~	~~[18] months~~
~~SR 3.4.11.4~~	~~Verify PORVs and block valve(s) are capable of being powered from an emergency power supply.~~	~~[18] months~~

3.4 ~~REACTOR~~ PRIMARY COOLANT SYSTEM (~~RCS~~ PCS)

3.4.12 Low Temperature Overpressure Protection (LTOP) System

LCO 3.4.12 An LTOP System shall be OPERABLE with ~~a maximum of one~~ both High Pressure Safety Injection (HPSI) pumps ~~and one charging pump~~ rendered ~~capable~~ incapable of injecting into the ~~RCS and the Safety Injection Tanks (SITs) isolated, and~~ PCS when PCS temperature is < 300°F:

a. Two OPERABLE Power Operated Relief Valves (PORVs) with lift settings ~~≤ [450] psig; or~~ less than specified in the PTLR; or

b. The ~~RCS~~ PCS depressurized and ~~an RCS~~ a PCS vent ~~of ≥ [1.3] square inches~~ capable of relieving ≥ 167 gpm at a PCS pressure of 315 psia.

APPLICABILITY: MODE ~~4~~3 when any ~~RCS~~ PCS cold leg temperature is ≤~~[285]~~430°F,
MODE ~~5~~4, 5 and
MODE 6 when the reactor vessel head is on.

~~NOTE~~

~~SIT isolation is only required when SIT pressure is greater than or equal to the maximum RCS pressure for the existing RCS cold leg temperature allowed by the P/T limit curves provided in the PTLR.~~

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

Specifications 3.4.12 does not prohibit use of HPSI pumps for emergency addition of makeup to the PCS.

ACTIONS

CONDITION	REQUIRED ACTION		COMPLETION TIME
A. ~~Two~~ One or more HPSI pumps capable of injecting into the ~~RCS~~ PCS when PCS temperature < 300°F.	A.1	Initiate action to verify ~~a maximum of one~~ no HPSI pump is capable of injecting into the ~~RCS~~ PCS.	Immediately

(continued)

ACTIONS (continued)

CONDITION	REQUIRED ACTION	COMPLETION TIME
~~B. Two or more charging pumps capable of injecting into the RCS.~~	~~NOTE~~ ~~Two charging pumps may be capable of injecting into the RCS during pump swap operation for ≤ 15 minutes.~~	
	~~B.1 Initiate action to verify a maximum of one charging pump capable of injecting into the RCS.~~	~~Immediately~~
~~C. A SIT not isolated when SIT pressure is greater than or equal to the maximum RCS pressure for existing cold leg temperature allowed in the PTLR.~~	~~C.1 Isolate affected SIT.~~	~~1 hour~~
~~D. Required Action and associated Completion Time of Condition C not met.~~	~~D.1 Increase RCS cold leg temperature to > [175]°F.~~	~~12 hours~~
	~~OR~~	
	~~D.2 Depressurize affected SIT to less than the maximum RCS pressure for existing cold leg temperature allowed in the PTLR.~~	~~12 hours~~
~~E~~B. One required PORV inoperable ~~in MODE 4~~ with pressurizer level ≤ 57%.	~~E~~B.1 Restore required PORV to OPERABLE status.	7 days

ACTIONS (continued)

CONDITION	REQUIRED ACTION	COMPLETION TIME
~~F~~C. One required PORV inoperable ~~in MODE 5 or 6~~ with pressurizer level > 57%.	~~F~~C.1 Restore required PORV to OPERABLE status.	24 hours
~~G~~D. Two required PORVs inoperable. OR Required Action and associated Completion Time of Condition ~~A, [B,] D, E, or F~~ not met. OR LTOP System inoperable for any reason other than Condition A, ~~[~~B,~~] C, D, E,~~ or ~~F~~C.	~~GD.1 Be in MODE 4 with both SDC inlet valves open.~~ AND D.1 Depressurize ~~RCS~~ PCS and establish ~~RCS~~ PCS vent ~~of ≥ [1.3] square inches~~ capable of relieving > 167 gpm at a PCS pressure of 315 psia.	8 hours 24 hours

SURVEILLANCE REQUIREMENTS

SURVEILLANCE		FREQUENCY
SR 3.4.12.1	Verify ~~a maximum of one~~ both HPSI pumps ~~is capable~~ are incapable of injecting into the ~~RCS~~ PCS when PCS temperature is ≤ 300°F.	12 hours
~~SR 3.4.12.2~~	~~Verify a maximum of one charging pump is capable of injecting into the RCS~~.	~~12 hours~~
~~SR 3.4.12.3~~	~~NOTE~~ ~~Required to be performed when complying with LCO 3.4.12b.~~ ~~Verify each SIT is isolated.~~	~~12 hours~~
SR 3.4.12.~~4~~2	Verify ~~RCS~~ PCS vent ~~≥ [1.3] square inches~~ capable of relieving ≥ 167 gpm at a PCS pressure of 315 psia is open.	12 hours for unlocked open vent valve(s) AND 31 days for locked open vent valve(s) or other vent paths
SR 3.4.12.~~5~~3	Verify PORV block valve is open for each required PORV.	72 hours
SR 3.4.12.~~6~~4	------------------NOTE-------------------- Not required to be performed until ~~[~~12~~]~~ hours after decreasing ~~RCS~~ PCS cold leg temperature to ~~≤ [285]~~≤ 430°F. -- Perform CHANNEL FUNCTIONAL TEST on each required PORV, excluding actuation.	31 days
SR 3.4.12.~~7~~5	Perform CHANNEL CALIBRATION on each required PORV actuation channel.	~~[~~18~~]~~ months

3.4 ~~REACTOR~~ PRIMARY COOLANT SYSTEM (~~RCS~~ PCS)

3.4.13 ~~RCS~~ PCS Operational LEAKAGE

LCO 3.4.13 ~~RCS~~ PCS operational LEAKAGE shall be limited to:

a. No pressure boundary LEAKAGE;

b. 1 gpm unidentified LEAKAGE;

c. 10 gpm identified LEAKAGE;

d. ~~1~~0.3 gpm total primary to secondary LEAKAGE through ~~all~~ any one Steam Generator~~s~~ (SG~~s~~) for any period of steady state operation greater than 24 consecutive hours; and

e. ~~[720] gallons per day~~ 0.6 gpm primary to secondary LEAKAGE through any one SG during periods of startup and major load changes for any period greater than 24 consecutive hours.

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

ACTIONS

CONDITION	REQUIRED ACTION	COMPLETION TIME
A. ~~RCS~~ PCS 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

SURVEILLANCE REQUIREMENTS

SURVEILLANCE		FREQUENCY
SR 3.4.13.1	-------------------NOTE------------------- Not required to be performed in MODE 3 or 4 until 12 hours of steady state operation. --- Perform ~~RCS~~ PCS water inventory balance.	-------NOTE------ Only required to be performed during steady state operation ---------------- 72 hours
SR 3.4.13.2	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~~ PRIMARY COOLANT SYSTEM (~~RCS~~ PCS)

3.4.14 ~~RCS~~ PCS Pressure Isolation Valve (PIV) Leakage

LCO 3.4.14 Leakage from each ~~RCS~~ PCS PIV shall be within limits.

APPLICABILITY: MODES 1, 2, 3, and ~~3,~~4
~~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~~ PCS 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 3.4.14.1 (PIV leakage verification) and be on the ~~RCS~~ PCS pressure boundary [or the high pressure portion of the system]. ----------------------------	(continued)

ACTIONS (continued)

CONDITION	REQUIRED ACTION	COMPLETION TIME
A. (continued)	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
	~~[AND]~~	~~72 hours~~
	~~A.2 Isolate the high pressure portion of the affected system from the low pressure portion by use of a second closed manual, deactivated automatic, or check valve.~~	72 hours
	~~OR~~	
	A.2 Restore ~~RCS~~ PCS PIV to within limits.	
B. Required Action and associated Completion Time for Condition A not met.	B.1 Be in MODE 3.	6 hours
	AND	
	B.2 Be in MODE 5.	36 hours
~~C. Shutdown Cooling (SDC) System auto closure interlock function inoperable.~~	~~C.1 Isolate the affected penetration by use of one closed manual or deactivated automatic valve.~~	~~4 hours~~

SURVEILLANCE REQUIREMENTS

SURVEILLANCE		FREQUENCY
SR 3.4.14.1	-------------------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~~2. ~~RCS~~ PCS 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. 3. Leakage rates less than or equal to 1.0 gpm are considered acceptable. 4. Leakage rates greater than 1.0 gpm but less than or equal to 5.0 gpm are considered acceptable if the latest measured rate has not exceeded the rate determined by the previous test by an amount that reduces the margin between measured leakage rate and the maximum permissible rate of 5.0 gpm by 50% or greater. 5. Leakage rates greater than 1.0 gpm but less than or equal to 5.0 gpm are considered unacceptable if the latest measured rate exceeded the rate determined by the previous test by an amount that reduces the margin between measured leakage rate and the maximum permissible rate of 5.0 gpm by 50% or greater. 6. Leakage rates greater than 5.0 gpm are considered unacceptable. --	In accordance with the Inservice Testing Program or ~~[~~18~~]~~ months AND Prior to entering MODE 2 whenever the ~~unit~~ plant has been in MODE 5 for ~~7 days~~ 72 hours or more, if leakage testing has not been performed in the previous 9 months AND ~~Within 24 hours following valve actuation due to automatic or manual action or flow through the valve~~ Prior to returning the check valve to service after maintenance, repair or replacement work is performed on the valves

SURVEILLANCE REQUIREMENTS (continued)

SURVEILLANCE		FREQUENCY
		(continued)
SR 3.4.14.1 (continued)	Verify leakage from each of the following ~~RCS~~ PCS PIV is ~~equivalent~~ to ≤ ~~0.5 gpm per nominal inch of valve size up to~~ a maximum of 5 gpm at ~~an RCS~~ a PCS pressure ~~≥ [2215] psia and ≤ [2255]~~ of 2060 psia. Valve Name — Valve No Loop 1A SIS Check — ES-3101 Loop 1B SIS Check — ES-3116 Loop 2A SIS Check — ES-3131 Loop 2B SIS Check — ES-3146 Loop 1A LPSI Check — ES-3103 Loop 1B LPSI Check — ES-3118 Loop 2A LPSI Check — ES-3133 Loop 2B LPSI Check — ES-3148 Loop 1A HPSI Check — ES-3104 Loop 1B HPSI Check — ES-3119 Loop 2A HPSI Check — ES-3134 Loop 2B HPSI Check — ES-3149 Loop 1 HLI Check — ES-3408 Loop 1 HLI Check — ES-3410	
SR 3.4.14.2	~~NOTE~~ ~~Not required to be met when the SDC System autoclosure interlock is disabled in accordance with SR 3.4.12.7.~~ ~~Verify SDC System autoclosure interlock prevents the valves from being opened with a simulated or actual RCS pressure signal ≥ [425] psig.~~ Verify all four LPSI check valves are closed.	~~[18] months~~ Prior to entering MODE 2 after use of the LPSI system for SDC.

SURVEILLANCE REQUIREMENTS (continued)

SURVEILLANCE		FREQUENCY
SR 3.4.14.3	~~NOTE~~ ~~Not required to be met when the SDC System autoclosure interlock is disabled in accordance with SR 3.4.12.7.~~ ~~Verify SDC System autoclosure interlock causes the valves to close automatically with a simulated or actual RCS pressure signal ≥ [600] psig.~~ The integrity of the remaining check valve in each high pressure line having a leaking valve shall be determined and recorded and the position of the other closed valve located in that pressure line shall be recorded.	~~[18] months~~ 24 hours

3.4 ~~REACTOR~~ PRIMARY COOLANT SYSTEM (~~RCS~~ PCS)

3.4.15 ~~RCS~~ PCS Leakage Detection Instrumentation

LCO 3.4.15 ~~[Two of] t~~ The following ~~RCS~~ PCS leakage detection instrumentation shall be OPERABLE:

a. One containment sump ~~monitor~~ level indicator; ~~[and]~~

b. One containment atmosphere ~~radioactivity~~ gaseous activity monitor ~~(gaseous or particulate)~~; ~~[~~and

c. One containment air cooler condensate ~~flow rate monitor.]~~ level switch; and

d. One containment humidity monitor.

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

ACTIONS

CONDITION	REQUIRED ACTION	COMPLETION TIME
A. ~~Required containment sump monitor inoperable.~~ With one required leak detection instrument inoperable. ~~[OR~~ ~~Required containment air cooler flow rate monitor inoperable.]~~	------------NOTE------------ LCO 3.0.4 is not applicable. ---------------------------- A.1 ~~Perform SR 3.4.13.1.~~ Restore the required PCS leak detection instrument to OPERABLE. ~~AND~~ ~~A.2 Restore containment sump monitor to OPERABLE status.~~	 ~~Once per 24 hours~~ Prior to entering MODE 3 after entry into MODE 5 ~~30 days~~

(continued)

ACTIONS (continued)

CONDITION	REQUIRED ACTION	COMPLETION TIME
B. ~~Required containment atmosphere radioactivity monitor inoperable.~~ With two or three required leak detection instruments inoperable.	------------NOTE------------ LCO 3.0.4 is not applicable. ----------------------------	
	~~B.1.1 Analyze grab samples of the containment atmosphere.~~	~~Once per 24 hours~~
	~~OR~~	
	~~B.1.2 Perform SR 3.4.13.1.~~	~~Once per 24 hours~~
	~~AND~~	
	~~B.2.1 Restore required containment atmosphere radioactivity monitor to OPERABLE status.~~	~~30 days~~
	~~OR~~	
	~~B.2.2 Verify containment air cooler condensate flow rate monitor is OPERABLE.~~	~~30 days~~
	B.1 Perform SR 3.4.13.1 (PCS water inventory balance).	Once per 24 hours
	AND	
	B.2 Restore three required PCS leak detection instruments to OPERABLE.	30 days
~~C. Required containment air cooler condensate flow rate monitor inoperable.~~	~~C.1 Perform SR 3.4.15.1.~~	~~Once per 8 hours~~
	~~OR~~	
	~~C.2 Perform SR 3.4.13.1.~~	~~Once per 24 hours~~

~~(continued)~~

ACTIONS (continued)

CONDITION	REQUIRED ACTION	COMPLETION TIME
~~D. Required containment atmosphere radioactivity monitor inoperable.~~ ~~AND~~ ~~Required containment air cooler condensate flow rate monitor inoperable.~~	~~D.1 Restore required containment atmosphere radioactivity monitor to OPERABLE status.~~ ~~OR~~ ~~D.2 Restore required containment air cooler condensate flow rate monitor to OPERABLE status.~~	~~30 days~~ ~~30 days~~
~~E~~C. Required Action and associated Completion Time not met.	~~E~~C.1 Be in MODE 3. AND ~~E~~C.2 Be in MODE 5.	6 ~~days~~ hours ~~36 days~~ 36 hours
~~F~~D. All required monitors inoperable.	~~F~~D.1 Enter LCO 3.0.3.	Immediately

SURVEILLANCE REQUIREMENTS

SURVEILLANCE		FREQUENCY
SR 3.4.15.1	Perform CHANNEL CHECK of ~~the~~ each required ~~containment atmosphere radioactivity monitor~~ containment sump level, atmosphere gaseous activity monitor and humidity monitor.	~~[~~12~~]~~ hours
SR 3.4.15.2	Perform CHANNEL FUNCTIONAL TEST of the required containment atmosphere ~~radioactivity~~ humidity monitor.	~~92 days~~ 18 months
SR 3.4.15.3	Perform CHANNEL CALIBRATION of the required containment sump ~~monitor~~ level indicator.	~~[~~18~~]~~ months

SURVEILLANCE REQUIREMENTS (continued)

SURVEILLANCE		FREQUENCY
SR 3.4.15.4	Perform CHANNEL CALIBRATION of the required containment atmosphere ~~radioactivity~~ gaseous activity monitor.	~~[~~18~~]~~ months
SR 3.4.15.5	Perform CHANNEL CALIBRATION of the required containment air cooler condensate ~~flow rate monitor~~ level switch.	~~[~~18~~]~~ months

3.4 ~~REACTOR~~ PRIMARY COOLANT SYSTEM (~~RCS~~ PCS)

3.4.16 ~~RCS~~ PCS Specific Activity

LCO 3.4.16 The specific iodine activity of the ~~reactor~~ primary coolant shall be within limits.

APPLICABILITY: MODES 1 and 2,
MODE 3 with ~~RCS~~ PCS average temperature (~~T_{avg}~~ T_{ave}) $\geq$ 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 3.4.16-1~~ < 40 μCi/gm.	Once per 4 hours
	AND	
	A.2 Restore DOSE EQUIVALENT I-131 to within limit.	48 hours

~~(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 3.4.16-1~~ $\geq$ 40 μCi/gm.	B.1 Be in MODE 3 with ~~T_{avg}~~ T_{ave} < 500°F.	6 hours

ACTIONS (continued)

CONDITION	REQUIRED ACTION		COMPLETION TIME
			(continued)
C. Gross specific activity of the ~~reactor~~ primary coolant not within limit.	C.1	Perform SR 3.4.16.2.	4 hours
	AND		
	C.2	Be in MODE 3 with ~~T_{avg}~~ T_{ave} < 500°F.	6 hours

SURVEILLANCE REQUIREMENTS

SURVEILLANCE		FREQUENCY
SR 3.4.16.1	Verify ~~reactor~~ primary coolant gross specific activity ≤ 100/Ē μCi/gm.	7 days
		~~(continued)~~
SR 3.4.16.2	-------------------NOTE------------------ Only required to be performed in MODE 1. --- Verify ~~reactor~~ primary coolant DOSE EQUIVALENT I-131 specific activity ≤ 1.0 μCi/gm.	14 days AND Between 2 and 6 hours after THERMAL POWER change of ≥ 15% RTP within a 1 hour period

(continued)

SURVEILLANCE REQUIREMENTS (continued)

SURVEILLANCE		FREQUENCY
SR 3.4.16.3	-------------------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 3.4.16-1 (page 1 of 1)~~

~~DELETED~~

3.4 ~~REACTOR~~ PRIMARY COOLANT SYSTEM (~~RCS~~ PCS)

3.4.17 Special Test Exception (STE) ~~RCS~~ PCS Loops

LCO 3.4.17 The requirements of LCO ~~3.4.4, "RCS Loops MODES 1 and 2," and the listed requirements of LCO 3.3.1, "Reactor Protective System (RPS) Instrumentation Operating," for the [(Analog) RC flow low, thermal margin or low pressure, and asymmetric steam generator transient protective trip functions] [(Digital) high log power, high local power density, low departure from nucleate boiling ratio protective trip functions]~~ 3.4.2, "PCS Minimum Temperature for Criticality may be suspended provided:

a. THERMAL POWER ≤ 5% RTP; and

b. The reactor trip setpoints of the OPERABLE power level channels are set ≤ ~~20~~30% RTP.

c. T_{ave} ≥ 500°F.

APPLICABILITY: MODE 2, during ~~startup and~~ PHYSICS TESTS with T_{ave} in one or more Loops < 530°F.

ACTIONS

CONDITION	REQUIRED ACTION	COMPLETION TIME
A. THERMAL POWER not within limit.	A.1 ~~Open~~ Trip reactor ~~trip breakers~~.	Immediately
B. T_{ave} in any one or more loops < 500°F.	B.1 Be in MODE 2 with K_{eff} < 1.0.	30 minutes

SURVEILLANCE REQUIREMENTS

SURVEILLANCE		FREQUENCY
SR 3.4.17.1	Verify THERMAL POWER ≤ 5% RTP.	1 hour
SR 3.4.17.2	Perform a CHANNEL FUNCTIONAL TEST on each logarithmic power level and linear power level neutron flux monitoring channel.	12 hours prior to ~~initiating startup or PHYSICS TESTS~~ critical approach

SURVEILLANCE	FREQUENCY
SR 3.4.17.3 Verify PCS T_{ave} in each loop $\geq$ 500°F.	Once within 30 minutes and every 30 minutes thereafter.

ATTACHMENT 5

CONSUMERS POWER COMPANY
PALISADES PLANT
DOCKET 50-255

STS CONVERSION TECHNICAL SPECIFICATION CHANGE REQUEST

3.4 PRIMARY COOLANT SYSTEM

STS Bases Pages Marked to Show the Differences Between RTS and STS

B 3.4 ~~REACTOR~~ PRIMARY COOLANT SYSTEM (~~RCS~~ PCS)

B 3.4.1 ~~RCS~~ PCS Pressure, Temperature, and Flow Departure from Nucleate Boiling (DNB) Limits

BASES

BACKGROUND

These Bases address requirements for maintaining ~~RCS~~ PCS 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~~ PCS 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~~s~~ for ~~minimum and~~ maximum ~~RCS~~ PCS cold leg temperature~~s~~ ~~are~~ is consistent with operation at the indicated power level and ~~are bounded~~ bounds ~~by~~ those used as the initial temperatures in the analyses.

The LCO limit~~s~~ for minimum ~~and maximum RCS~~ PCS flow rates ~~are~~ is bounded by those used as the initial flow rates in the analyses. The ~~RCS~~ PCS flow rate is not expected to vary during plant operation with all pumps running.

BASES

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~~ Safety Limit (SL 2.1.1). This is the acceptance limit for the ~~RCS~~ PCS 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 struck control ~~Element~~ rod ~~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) (Digital)";~~ LCO 3.1.7, "Regulating Rod Insertion Limits"; LCO 3.2.~~4~~3, "~~AZIMUTHAL~~ QUADRANT POWER TILT ~~(T_q)~~"; and LCO 3.2.~~5~~4, "AXIAL SHAPE INDEX ~~(Analog)~~". The safety analyses are performed over the following range of initial values: ~~RCS~~ PCS pressure ~~1785-2400~~ 1700 - 2300 ~~psig~~ psia, core inlet temperature 500-580°F, and minimum reactor vessel inlet coolant flow rate ~~95-116%~~.

~~The RCS DNB limits satisfy Criterion 2 of the NRC Policy Statement.~~

LCO

This LCO specifies limits on the monitored process variables ~~RCS~~ PCS pressurizer pressure, ~~RCS~~ PCS cold leg temperature, and ~~RCS~~ PCS 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 flow rate are given for the measurement location but have 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.

A DNB analysis was performed in a parametric fashion to determine the core inlet temperature as a function of pressure and flow which the minimum DNBR is equal to the DNB correlation safety limit. This analysis includes the following uncertainties and allowances: 2% of rated power for power measurement; ± 0.06 for ASI measurement; ± 50 psi for pressurizer pressure; ± 7°F for inlet temperature; and 3% measurement and 3% bypass for core flow. In addition, transient biases were included in the determination of the allowable reactor inlet temperature.

The limits of validity of the T_{inlet} equation are:

BASES

$1800 \leq$ pressure ≤ 2200 psia
$100.0 \times 10^6 \leq$ Vessel Flow $\leq 150 \times 10^6$ lb/h
ASI as shown in COLR, Figure 2.1

With measured primary coolant system flow rates > 150 M lbm/hr, limiting the maximum allowed inlet temperature to the T_{inlet} LCO at 150 M lbm/hr increases the margin to DNB for higher PCS flow rates.

APPLICABILITY In MODE 1, the limits on ~~RCS~~ PCS pressurizer pressure, ~~RCS~~ PCS cold leg temperature, and ~~RCS~~ PCS 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.

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, since they represent transients initiated from power levels < 100% RTP, an increased 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

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.

BASES

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 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.

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.

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

Cold leg temperature is a controllable and measurable parameter. If this 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 the parameter can be restored in this time period.

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, 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.

BASES

SURVEILLANCE REQUIREMENTS

SR 3.4.1.1

Since Required Action A.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.

Since Required Action A.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~~ PCS 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 3.4.1.2

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~~ PCS 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 shown by operating practice to be sufficient to regularly assess for 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.~~

BASES

SR 3.4.1.~~4~~3

Measurement of ~~RCS~~ PCS 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~~ PCS 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. Plugging 10 or more steam generatore tubes during a maintenance outage could also increase PCS 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 Surveillance cannot be performed in MODE 2 or below, and will ~~not~~ yield more accurate results if performed ~~below~~ above 90% RTP.

REFERENCE 1. FSAR, Section ~~[15]~~14.1.3

B 3.4 ~~REACTOR COOLANT~~ PRIMARY COOLANT SYSTEM (~~RCS~~ PCS)

B 3.4.2 ~~RCS~~ PCS 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~~ primary coolant moderator temperature coefficient used in core operating and accident analysis is typically defined for the normal operating temperature range (532°F to ~~573~~570°F). The Reactor Protection System receives inputs from the ~~narrow range~~ hot leg temperature detectors, which have a range of ~~520°F to 620°F~~ 50°F to 700°F. The ~~RCS~~ PCS loop average temperature (~~T_{avg}~~ T_{ave}) is controlled using inputs of the same range. Nominal ~~T_{avg}~~ T_{ave} for making the reactor critical is 532°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 520°F limit (Ref. 1)~~ existing transient analysis are bounding of operation at low power with an inlet temperature of 525°F (Ref 1).

~~The RCS minimum temperature for criticality satisfies Criterion 2 of the NRC Policy Statement.~~

LCO

The purpose of the LCO is to prevent criticality outside the normal operating regime (532°F to ~~573~~570°F) and to prevent operation in an unanalyzed condition.

The LCO is only applicable below ~~[~~535~~]~~°F and provides a reasonable distance to the limit of ~~[520]~~525°F. This allows adequate time to trend its approach and take corrective actions prior to exceeding the limit.

BASES

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 $K_{eff} \geq 1.0$. Coupled with the applicability definition for criticality is a temperature limit. Monitoring is required at or below a ~~T_{avg}~~ T_{ave} of ~~[~~535~~]~~°F. ~~The no load temperature of 544°F is maintained by the Steam Dump Control System.~~

ACTIONS

A.1

PCS average temperature is a controlled and measurable parameter. With this parameter not within the LCO limits, action must be taken to restore the parameter. If ~~T_{avg}~~ T_{ave} ~~is~~ stays below ~~[520]~~525°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~~2 with K_{eff} < 1.0 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_{avg}~~ T_{ave} is required to be verified ≥ ~~[520]~~525°F every ~~30 minutes~~ hour. The ~~30 minute~~ specified time period is frequent enough to prevent inadvertent violation of the LCO. While the Surveillance is required whenever the reactor is critical and temperature is below ~~[~~535~~]~~°F, in practice, the Surveillance is most appropriate during the period when the reactor is brought critical.

REFERENCE

1. FSAR, Section ~~[15]~~14.1.3

B 3.4 ~~REACTOR COOLANT~~ PRIMARY COOLANT SYSTEM (~~RCS~~ PCS)

B 3.4.3 ~~RCS~~ PCS Pressure and Temperature (P/T) Limits

BASES

BACKGROUND

All components of the ~~RCS~~ PCS 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~~ PCS heatup and cooldown, within the design assumptions and the stress limits for cyclic operation.

The Pressure and Temperature Limits Report (PTLR) contains P/T limit curves for heatup, cooldown, and In Service Leak and Hydrostatic (ISLH) testing, and data for the maximum rate of change of reactor coolant temperature (Ref. 1).

Each P/T limit curve defines an acceptable region for normal operation. The P/T limit curves include an allowance to account for the fact that pressure is measured in the pressurizer rather than at the vessel beltline and to account for PCP discharge pressure. 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. 2), requires the establishment of P/T limits for material fracture toughness requirements of the RCPB materials. Reference 2 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. 3).

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. 4) and Appendix H of 10 CFR 50 (Ref. 5). The operating P/T limit curves will be adjusted, as necessary, based on the evaluation findings and the recommendations of Reference 3.

BASES

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 2 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 the ISLH testing. However, the criticality limit is not operationally limiting; a more restrictive limit exists in LCO 3.4.2, "~~RCS~~ PCS Minimum Temperature for Criticality."

The consequence of violating the LCO limits is that the ~~RCS~~ PCS has been operated under conditions that can result in brittle failure of the RCPB, possibly leading to a non-isolable 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. 6), 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. Reference 1 establishes the methodology for determining the P/T limits. 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 un-analyzed condition.

~~The RCS P/T limits satisfy Criterion 2 of the NRC Policy Statement.~~

BASES

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~~ PCS, 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

c. The existences, sizes, and orientations of flaws in the vessel material.

APPLICABILITY

The ~~RCS~~ PCS P/T limits Specification provides a definition of acceptable operation for prevention of non-ductile 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 in keeping with the concern for non-ductile failure. The limits do not apply to the pressurizer.

BASES

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~~ PCS Pressure, Temperature, and Flow Departure from Nucleate Boiling (DNB) Limits"; LCO 3.4.2, "~~RCS~~ PCS 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 non-ductile 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.

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~~ PCS 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. 6), 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.

BASES

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~~ PCS remained in an unacceptable P/T region for an extended period of increased stress; or

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~~ PCS 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~~ PCS pressure < ~~[500]~~270 ~~psig~~ 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.

BASES

Besides restoring operation to within limits, an evaluation is required to determine if ~~RCS~~ PCS 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. 6), 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 the PTLR limits is required every 30 minutes when ~~RCS~~ PCS pressure and temperature conditions are undergoing planned changes. This frequency is considered reasonable in view of the control room indication available to monitor ~~RCS~~ PCS 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. Calculation of average hourly cooldown rate must consider changes in reactor vessel inlet temperature caused by initiating shutdown cooling, by starting primary coolant pumps with a temperature difference between the steam generator and PCS, or by stopping primary coolant pumps with shutdown cooling in service.

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.

BASES

This SR is modified by a Note that requires this SR be performed only during ~~RCS~~ PCS 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. ~~NRC approved topical report that defines the methodology for determining the P/T limits~~ EGAD-RSA-26, "Pressure - Temperature and LTOP Limits"

2. 10 CFR 50, Appendix G

3. ASME, Boiler and Pressure Vessel Code, Section III, Appendix G, July 1974 Edition

4. ASTM E 185-82, July 1982

5. 10 CFR 50, Appendix H

6. ASME, Boiler and Pressure Vessel Code, Section XI, Appendix E

B 3.4 ~~REACTOR COOLANT~~ PRIMARY COOLANT SYSTEM (~~RCS~~ PCS)

B 3.4.4 ~~RCS~~ PCS Loops - MODES 1 and 2

BASES

BACKGROUND

The primary function of the ~~RCS~~ PCS 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~~ PCS 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~~ PCS configuration for heat transport uses two ~~RCS~~ PCS loops. Each ~~RCS~~ PCS loop contains a SG and two ~~Reactor Coolant~~ Primary Coolant Pumps (~~RCP~~ PCPs). A~~n~~ ~~RCP~~ PCP 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~~ PCS loops with both ~~RCP~~ PCPs 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~~ PCS 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~~ PCS pressure, ~~RCS~~ PCS temperature, reactor power level, core parameters, and safety system setpoints. The important aspect for this LCO is the ~~reactor~~ primary coolant forced flow rate, which is represented by the number of ~~RCS~~ PCS loops in service.

BASES

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 ~~RCP~~ PCP s 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~~ PCP operation are the four pump coastdown, single pump locked rotor, single pump (broken shaft or coast-down), 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~~106.5% RTP. This is the design overpower condition for four pump operation. The ~~107~~106.5% value is the accident analysis setpoint of the ~~nuclear overpower~~ VHP (~~high flux~~ variable high power) 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 the NRC Policy Statement.~~

LCO

The purpose of this LCO is to require adequate forced flow for core heat removal. Flow is represented by having both ~~RCS~~ PCS loops with both ~~RCP~~ PCP s 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 ~~RCP~~ PCP s providing forced flow for heat transport to ~~an~~ a SG that is OPERABLE in accordance with the Steam Generator Tube Surveillance Program. SG, and hence ~~RCS~~ PCS 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 MODE 3 if any SG level is ≤ ~~[25]~~25.9% as sensed by the RPS. The minimum water level to declare the SG OPERABLE in MODES 1 and 2 is ~~[25]~~25.9%.

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~~ PCS loops are required to be OPERABLE and in operation in these MODES to prevent DNB and core damage.

BASES

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~~ PCS Loops - MODE 3";
LCO 3.4.6, "~~RCS~~ PCS Loops - MODE 4";
LCO 3.4.7, "~~RCS~~ PCS Loops - MODE 5, Loops Filled";
LCO 3.4.8, "~~RCS~~ PCS 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 ~~RCP~~ PCP s 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.

Tripping the reactor from C-06 panel opening the 42-01 and 42-02 breakers prevents control rod withdrawal with less than four PCP operating. This additional action was added in response to NRC request that positive means be provided to prevent rod bank withdrawal in MODE 3 with less than four PCPs operating (T.S. Amendment 118.) LCO 3.3.1 (Reactor Protective System (RPS) Instrumentation - Operating) requires all RPS trip functions to be OPERABLE when more than one Control Rod is capable of being withdrawn. Since the Low PCS flow trip will be OPERABLE, compliance with the LCO 3.3.1 requirements prevents a rod bank withdraw in MODE 3 with less than four PCPs operating.

BASES

SURVEILLANCE REQUIREMENTS

SR 3.4.4.1

This SR requires verification every 12 hours of the required number of loops in operation. Verification includes ~~flow rate,~~ temperature~~, or~~ and primary coolant 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.

REFERENCE

1. FSAR, Section ~~[ ]~~14.1.3

B 3.4 ~~REACTOR COOLANT~~ PRIMARY COOLANT SYSTEM (~~RCS~~ PCS)

B 3.4.5 ~~RCS~~ PCS Loops - MODE 3

BASES

BACKGROUND

The primary function of the ~~reactor~~ primary 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~~ primary coolant is to act as a carrier for soluble neutron poison, boric acid.

In MODE 3, ~~Reactor Coolant~~ Primary Coolant Pumps (~~RCP~~ PCPs) 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~~ PCS loop with one ~~RCP~~ PCP is sufficient to remove core decay heat. However, ~~[two]~~ ~~RCS~~ PCS loops are required to be OPERABLE to provide redundant paths for decay heat removal. Only one ~~RCP~~ PCP needs to be OPERABLE to declare the associated ~~RCS~~ PCS loop OPERABLE.

~~Reactor~~ Primary 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~~ PCS 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~~ PCS 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 the NRC Policy Statement.~~

BASES

LCO

The purpose of this LCO is to require ~~{two}~~ ~~RCS~~ PCS 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~~ 84% 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~~ PCP meets the LCO requirement for one loop in operation.

The first Note permits a limited period of operation without ~~RCP~~ PCPs. All ~~RCP~~ PCPs may be deenergized 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~~ PCS cannot be ensured. 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.

Note 2 requires that one of the following conditions be satisfied before forced circulation (starting the first PCP) may be started:

a. PCS cold leg temperature (T_c) is > 430.

b. S/G secondary temperature is ≤ T_c.

c. S/G secondary temperature is < 100°F above T_c, and shutdown cooling is isolated from the PCS, and PCS heatup/cooldown rate is ≤ 10°F/hour.

d. S/G secondary temperature is < 100°F above T_c, and shutdown cooling is isolated from the PCS, and pressurizer level is ≤ 57%.

Satisfying any of the above conditions will preclude a large pressure surge in the PCS when the PCP is started. Energy additions from the steam generators could occur if a primary coolant pump was started when the steam generator secondary temperature is significantly above the PCS temperature. The maximum pressurizer level at which credit is taken for having a bubble (57%, which provides about 700 cubic feet of steam space) is based on engineering judgement and verified by LTOP analysis. This level provides the same steam volume to dampen pressure transients as would be available at full power. Additional discussion on Pressure - Temperature and LTOP limits is contained in the PTLR.

BASES

In MODES 3, 4, and 5, it is sometimes necessary to stop all ~~RCP~~ PCPs or Shutdown Cooling (SDC) pump forced circulation (e.g., to change operation from one SDC train to the other, to perform surveillance or startup testing, to perform the transition to and from SDC System cooling, or to avoid operation below the ~~RCP~~ PCP 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 loop consists of at least one ~~RCP~~ PCP providing forced flow for heat transport and an SG that is OPERABLE in accordance with the Steam Generator Tube Surveillance Program. ~~An~~ A ~~RCP~~ PCP 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~~ PCS loop in operation is adequate for transport and heat removal. A second ~~RCS~~ PCS loop is required to be OPERABLE but not in operation for redundant heat removal capability.

Operation in other MODES is covered by:

LCO 3.4.4, "~~RCS~~ PCS Loops - MODES 1 and 2";
LCO 3.4.6, "~~RCS~~ PCS Loops - MODE 4";
LCO 3.4.7, "~~RCS~~ PCS Loops - MODE 5, Loops Filled";
LCO 3.4.8, "~~RCS~~ PCS 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~~ PCS loop is inoperable, redundancy for forced flow heat removal is lost. The Required Action is restoration of the required ~~RCS~~ PCS 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.

BASES

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 de-pressurization from the existing plant conditions in an orderly manner and without challenging plant systems.

C.1 and C.2

If no ~~RCS~~ PCS loop is in operation, except as provided in Note 1 in the LCO section, all operations involving a reduction of ~~RCS~~ PCS boron concentration must be immediately suspended. This is necessary because boron dilution requires forced circulation for proper homogenization. Action to restore one ~~RCS~~ PCS loop to OPERABLE status and operation shall be initiated immediately and continued until one ~~RCS~~ PCS 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~~ PCS loops are in operation. Verification includes ~~flow rate,~~ temperature~~,~~ and 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]~~ 84%. 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.

BASES

SR 3.4.5.3

Verification that the required number of ~~RCP~~ PCP s are OPERABLE ensures that the single failure criterion is met and that an additional ~~RCS~~ PCS 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 ~~RCP~~ PCP s. 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~~ PRIMARY COOLANT SYSTEM (~~RCS~~ PCS)

B 3.4.6 ~~RCS~~ PCS Loops - MODE 4

BASES

BACKGROUND

In MODE 4, the primary function of the ~~reactor~~ primary 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~~ primary coolant is to act as a carrier for soluble neutron poison, boric acid.

In MODE 4, either ~~Reactor Coolant~~ Primary Coolant Pumps (~~RCP~~ PCPs) or SDC trains can be used for coolant circulation. The intent of this LCO is to provide forced flow from at least one ~~RCP~~ PCP or one SDC train for decay heat removal and transport. The flow provided by one ~~RCP~~ PCP 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.

The purposes of the SDC System in MODE 4 are to remove decay heat and sensible heat from the Primary Coolant System (PCS), as required by GDC 34, to provide mixing of borated coolant, to provide sufficient coolant circulation to minimize the effects of a boron dilution accident, and to prevent boron stratification (Ref. 1). Heat is removed from the PCS by circulating primary coolant through the shutdown heat exchangers, where the heat is transferred to the Component Cooling Water System via the shutdown heat exchangers. The coolant is then returned to the PCS cold legs. Operation of the SDC System for normal cooldown or decay heat removal is manually accomplished from the control room. The heat removal rate is adjusted by controlling the flow of primary coolant through the shutdown heat exchangers and bypassing the heat exchangers. Mixing of the primary coolant is maintained by this continuous circulation of primary coolant through the SDC System.

BASES

When primary coolant boron concentration is being changed, the process must be uniform throughout the primary coolant system volume to prevent stratification of primary coolant at lower boron concentration which could result in a reactivity insertion. Sufficient mixing of the primary coolant is assured if one shutdown cooling pump or one primary coolant pump is in operation. The shutdown cooling pump will circulate the primary system volume in less than 60 minutes when operated at rated capacity. By imposing a minimum shutdown cooling pump flow rate of 2810 gpm, sufficient time is provided for the operator to terminate the boron dilution under asymmetric flow conditions. The pressurizer volume is relatively inactive, therefore it will tend to have a boron concentration higher than the rest of the primary coolant system during a dilution operation. Administrative procedures will provide for use of pressurizer sprays to maintain a nominal spread between the boron concentration in the pressurizer and the primary system during the addition of boron.

This LCO allows the Shutdown Cooling (SDC) system to be OPERABLE. When both of the SDC system inlet valves are open, the pressure relief valves in the SDC system provide the required over pressure protection. Inadvertent starting of a HPSI pump would exceed the relief capacity of the SDC system relief valves. The HPSI pump operating restrictions Surveillance Requirement (SR 3.4.12.1) verifies that both HPSI pumps are incapable of injecting into the PCS when the PCS temperature is less than 300°F. Since the SDC system is not placed into service until the PCS pressure is less than 270 psia and PCS temperature is less than 300°F, the HPSI Surveillance Requirement (SR 3.4.12.1) provides the required HPSI pump operating restrictions when the SDC system sees PCS pressure conditions.

APPLICABLE SAFETY ANALYSES

In MODE 4, ~~RCS~~ PCS circulation is considered in the determination of the time available for mitigation of the accidental boron dilution event. The ~~RCS~~ PCS loops and SDC trains provide this circulation.

~~RCS~~ PCS Loops MODE 4 have been identified in the NRC Policy Statement as important contributors to risk reduction.

BASES

LCO

The purpose of this LCO is to require that at least two loops or trains, ~~RCS~~ PCS 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~~ PCS 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.

Note 1 permits all ~~RCP~~ PCPs and SDC pumps to be de-energized ≤ 1 hour per 8 hour period. This means that natural circulation has been established using the SGs. The Note prohibits boron dilution when forced flow is stopped because an even concentration distribution cannot be ensured. 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~~ PCS without the ~~RCP~~ PCPs 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~~ PCS temperature and pressure diminish. Without cooling by forced flow, higher heat loads will cause the ~~reactor~~ primary 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 ~~RCP~~ PCPs 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 ~~either~~ one of the following ~~two~~ conditions be satisfied before forced circulation (starting the first PCP) ~~an RCP~~ may be started ~~with any RCS cold leg temperature ≤ 285°F~~:

~~a. Pressurizer water level is < 60%; or~~

~~b. Secondary side water temperature in each SG is < 100°F above each of the RCS cold leg temperatures.~~

a. S/G secondary temperature is ≤ T_c.

BASES

b. S/G secondary temperature is < 100°F above T_c, and shutdown cooling is isolated from the PCS, and PCS heatup/cooldown rate is ≤ 10°F/hour.

c. S/G secondary temperature is < 100°F above T_c, and shutdown cooling is isolated from the PCS, and pressurizer level is ≤ 57%.

Satisfying ~~either~~ any of the above conditions will preclude a large pressure surge in the ~~RCS~~ PCS when the ~~RCP~~ PCP is started. Energy additions from the steam generators could occur if a primary coolant pump was started when the steam generator secondary temperature is significantly above the PCS temperature. The maximum pressurizer level at which credit is taken for having a bubble (57%, which provides about 700 cubic feet of steam space) is based on engineering judgement and verified by LTOP analysis. This level provides the same steam volume to dampen pressure transients as would be available at full power. Additions discussion on Pressure - Temperature and LTOP limits is contained in the PRLR.

Note 3 limitation on operating P-50A and P-50B together with T_c below 300°F allows the pressure temperature limits in LCO 3.4.3 and LCO 3.4.12 to be higher than they would be without this limit.

An OPERABLE ~~RCS~~ PCS loop consists of at least one OPERABLE ~~RCP~~ PCP 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.

Similarly, for the SDC System, an OPERABLE SDC train is composed of the OPERABLE SDC pump(s) capable of providing forced flow to the SDC heat exchanger(s). ~~RCP~~ PCPs and SDC pumps are OPERABLE if they are capable of being powered and are able to provide flow 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~~ PCS loops and SGs or the SDC System.

Operation in other MODES is covered by:

LCO 3.4.4, "~~RCS~~ PCS Loops - MODES 1 and 2";
LCO 3.4.5, "~~RCS~~ PCS Loops - MODE 3";
LCO 3.4.7, "~~RCS~~ PCS Loops - MODE 5, Loops Filled";
LCO 3.4.8, "~~RCS~~ PCS 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~~ PCS loop or SDC train is OPERABLE and in operation, redundancy for heat removal is lost. Action must be initiated immediately to restore a second loop or train to OPERABLE status. The immediate Completion Time reflects the importance of maintaining the availability of two paths for decay heat removal.

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 (≤ 200°F) rather than MODE 4 (200°F to 300°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~~ PCS loops or SDC trains are OPERABLE or in operation, except during conditions permitted by Note 1 in the LCO section, all operations involving reduction of ~~RCS~~ PCS boron concentration must be suspended and action to restore one ~~RCS~~ PCS 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.

D.1 and D.2

When the SDC flow rate is throttled to less than 2810 gpm, all of the assumptions of the dilution accident analysis are no longer met. Actions must be initiated immediately to suspend all activities which could lead to a reduction of PCS boron concentration.

D.3.1

With SDC flow less than 2810 gpm, but at least 1000 gpm, the dilution accident analysis shows satisfactory results if the assumed dilution flow is less than the capacity of a single charging pump. Action is therefore required to assure that SDC flow through the core is at least 1000 gpm, and that two charging pumps are electrically disabled. By disabling two charging pumps, the potential source of unborated PCS make-up from charging pumps or primary make-up pumps is limited to 53 gpm.

D.3.2

Plant conditions exist when it is desired to have charging pumps available for immediate make up, but when it is also desired to reduce SDC flow for testing or maintenance activities. Action D.3.2 provides an allowance for these conditions to exist if periodic verifications assure that no charging pump is operating. If during conditions when SDC flow is less than 2810 gpm, a dilution does occur, SHUTDOWN MARGIN must be verified by performance of SR 3.1.2.1. Action required to take PCS boron samples shall be initiated within 15 minutes after the dilution and every 15 minutes thereafter until a stable PCS boron concentration exists or a flow of 2810 gpm has been re-established.

E.1

With one of two SDC suction valve interlock channels inoperable, the required action is to place the circuit breaker for the associated valve operator in the "OPEN" position within 1 hour. The breaker may be "Racked In" only during operation of the associated valve when the PCS pressure is less than the SDC System design pressure.

BASES

SURVEILLANCE REQUIREMENTS

SR 3.4.6.1

This SR requires verification every 12 hours that one required loop or train is in operation. 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~~ PCS loop status. In addition, control room indication and alarms will normally indicate loop status.

SR 3.4.6.2

This SR requires verification every 12 hours of secondary side water level in the required SG(s) ≥ ~~[25]~~ 84%. 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~~ PCS 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.

SR 3.4.6.4

The SDC suction interlock allows closed isolation valves (MO-3015 and MO-3016) to be opened when the PCS pressure is less than 270 psia. The frequency of 18 months is based on a typical fuel cycle and industry accepted practice.

REFERENCE ~~None~~ 1. FSAR 14.3

B 3.4 ~~REACTOR COOLANT~~ PRIMARY COOLANT SYSTEM (~~RCS~~ PCS)

B 3.4.7 ~~RCS~~ PCS Loops - MODE 5, Loops Filled

BASES

BACKGROUND

In MODE 5 with the ~~RCS~~ PCS loops filled (loops filled means the PCS loops are intact, not blocked by dams, and totally filled with coolant), the primary function of the ~~reactor coolant is the removal of~~ PCS is to remove the decay heat and transfer this heat either to the Steam Generator (SG) secondary side coolant or the component 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~~ PCS 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 purposes of the SDC System in MODE 5 are to remove decay heat and sensible heat from the Primary Coolant System (PCS), as required by GDC 34, to provide mixing of borated coolant, to provide sufficient coolant circulation to minimize the effects of a boron dilution accident, and to prevent boron stratification (Ref. 1). Heat is removed from the PCS by circulating primary coolant through the shutdown heat exchangers, where the heat is transferred to the Component Cooling Water System via the shutdown heat exchangers. The coolant is then returned to the PCS cold legs. Operation of the SDC System for normal cooldown or decay heat removal is manually accomplished from the control room. The heat removal rate is adjusted by controlling the flow of primary coolant through the shutdown heat exchangers and bypassing the heat exchangers. Mixing of the primary coolant is maintained by this continuous circulation of primary coolant through the SDC System.

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.

BASES

This LCO allows the Shutdown Cooling (SDC) system to be OPERABLE. When both of the SDC system inlet valves are open, the pressure relief valves in the SDC system provide the required over pressure protection. Inadvertent starting of a HPSI pump would exceed the relief capacity of the SDC system relief valves. The HPSI pump operating restrictions Surveillance Requirement (SR 3.4.12.1) verifies that both HPSI pumps are incapable of injecting into the PCS when the PCS temperature is less than 300°F. Since the SDC system is not placed into service until the PCS pressure is less than 270 psia and PCS temperature is less than 300°F, the HPSI Surveillance Requirement (SR 3.4.12.1) provides the required HPSI pump operating restrictions when the SDC system sees PCS pressure conditions.

APPLICABLE SAFETY ANALYSES

In MODE 5, ~~RCS~~ PCS circulation is considered in the determination of the time available for mitigation of the accidental boron dilution event. The SDC trains provide this circulation. ~~RCS~~ PCS Loops - MODE 5 (Loops Filled) have been identified in the NRC Policy Statement 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~~]~~%. 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~~]~~%. 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.

BASES

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. 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~~ PCS loop flow path is to be maintained with subcooled liquid.

In MODE 5, it is sometimes necessary to stop all ~~RCP~~ PCP 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~~ PCP 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 ~~either~~ one of the following ~~two~~ conditions be satisfied before ~~an RCP~~ forced circulation (starting the first PCP) may be started ~~with any RCS cold leg temperature ≤ 285°F~~:

~~a. Pressurizer water level must be < 60%; or~~

~~b. Secondary side water temperature in each SG must be < 100°F above each of the RCS cold leg temperatures.~~

a. S/G secondary temperature is ≤ T_c.

b. S/G secondary temperature is < 100°F above T_c, and shutdown cooling is isolated from the PCS, and PCS heatup/cooldown rate is ≤ 10°F/hour.

c. S/G secondary temperature is < 100°F above T_c, and shutdown cooling is isolated from the PCS, and pressurizer level is ≤ 57%.

BASES

Satisfying ~~either~~ any of the above conditions will preclude a low temperature overpressure event due to a thermal transient when the ~~RCP~~ PCP is started. Energy additions from the steam generators could occur if a primary coolant pump was started when the steam generator secondary temperature is significantly above the PCS temperature. The maximum pressurizer level at which credit is taken for having a bubble (57%, which provides about 700 cubic feet of steam/air space) is based on engineering judgement and verified by LTOP analysis. This level provides the same volume to dampen pressure transients as would be available at full power. Additions discussion on Pressure - Temperature and LTOP limits is contained in the PRLR.

Note 4 limitation on operating P-50A and P-50B together with T_c below 300°F allows the pressure temperature limits in LCO 13.4.3 and LCO 13.4.12 to be higher than they would be without this limit.

Note ~~4~~5 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~~ PCP is in operation. This Note provides for the transition to MODE 4 where a~~n~~ ~~RCP~~ PCP is permitted to be in operation and replaces the ~~RCS~~ PCS circulation function provided by the SDC trains.

An OPERABLE SDC train is composed of an OPERABLE SDC pump and an OPERABLE SDC heat exchanger, along with the appropriate flow and temperature instrumentation for control and indication. Closing the SDC heat exchanger control valves diverting all SDC flow through the bypass line does not make the SDC train inoperable.

SDC pumps are OPERABLE if they are capable of being powered and are able to provide flow if required. An OPERABLE SG can perform as a heat sink when it has an adequate water level and is OPERABLE in accordance with the SG Tube Surveillance Program.

BASES

APPLICABILITY

In MODE 5 with ~~RCS~~ PCS 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~~ PCS Loops - MODES 1 and 2";
LCO 3.4.5, "~~RCS~~ PCS Loops - MODE 3";
LCO 3.4.6, "~~RCS~~ PCS Loops - MODE 4";
LCO 3.4.8, "~~RCS~~ PCS 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 and A.2

If the required SDC train is inoperable and any SGs have secondary side water levels < ~~[~~25~~]~~%, 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.

B.1 and B.2

If no SDC train is in operation, except as permitted in Note 1, all operations involving the reduction of ~~RCS~~ PCS 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.

C.1 and C.2

When the SDC flow rate is throttled to less than 2810 gpm, all of the assumptions of the dilution accident analysis are no longer met. Actions must be initiated immediately to suspend all activities which could lead to a reduction of PCS boron concentration.

BASES

C.3.1

With SDC flow less than 2810 gpm, but at least 1000 gpm, the dilution accident analysis shows satisfactory results if the assumed dilution flow is less than the capacity of a single charging pump. Action is therefore required to assure that SDC flow through the core is at least 1000 gpm, and that two charging pumps are electrically disabled. By disabling two charging pumps, the potential source of unborated PCS make-up from charging pumps or primary make-up pumps is limited to 53 gpm.

C.3.2

Plant conditions exist when it is desired to have charging pumps available for immediate make up, but when it is also desired to reduce SDC flow for testing or maintenance activities. Action C.3.2 provides an allowance for these conditions to exist if periodic verifications assure that no charging pump is operating. If during conditions when SDC flow is less than 2810 gpm, a dilution does occur, SHUTDOWN MARGIN must be verified by performance of SR 3.1.2.1. Action required to take PCS boron samples shall be initiated within 15 minutes after the dilution and every 15 minutes thereafter until a stable PCS boron concentration exists or a flow of 2810 gpm has been re-established.

SURVEILLANCE REQUIREMENTS

SR 3.4.7.1

This SR requires verification every 12 hours that one SDC train is in operation. 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 swap-over to the standby SDC train should the operating train be lost.

BASES

SR 3.4.7.2

Verifying the SGs are OPERABLE by ensuring their secondary side water levels are ≥ ~~[~~25~~]~~% 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., one or both SGs have < ~~[~~25~~]~~% 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.

REFERENCES ~~None~~ FSAR 14.3

B 3.4 ~~REACTOR COOLANT~~ PRIMARY COOLANT SYSTEM (~~RCS~~ PCS)

B 3.4.8 ~~RCS~~ PCS Loops - MODE 5, Loops Not Filled

BASES

BACKGROUND

In MODE 5 with the ~~RCS~~ PCS loops not filled, the primary function of the ~~reactor~~ primary 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~~ primary 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.

The purposes of the SDC System in MODE 5 are to remove decay heat and sensible heat from the Primary Coolant System (PCS), as required by GDC 34, to provide mixing of borated coolant, to provide sufficient coolant circulation to minimize the effects of a boron dilution accident, and to prevent boron stratification (Ref. 1). Heat is removed from the PCS by circulating primary coolant through the shutdown heat exchangers, where the heat is transferred to the Component Cooling Water System via the shutdown heat exchangers. The coolant is then returned to the PCS cold legs. Operation of the SDC System for normal cooldown or decay heat removal is manually accomplished from the control room. The heat removal rate is adjusted by controlling the flow of primary coolant through the shutdown heat exchangers and bypassing the heat exchangers. Mixing of the primary coolant is maintained by this continuous circulation of primary coolant through the SDC System.

BASES

This LCO allows the Shutdown Cooling (SDC) system to be OPERABLE. When both of the SDC system inlet valves are open, the pressure relief valves in the SDC system provide the required over pressure protection. Inadvertent starting of a HPSI pump would exceed the relief capacity of the SDC system relief valves. The HPSI pump operating restrictions Surveillance Requirement (SR 3.4.12.1) verifies that both HPSI pumps are incapable of injecting into the PCS when the PCS temperature is less than 300°F. Since the SDC system is not placed into service until the PCS pressure is less than 270 psia and PCS temperature is less than 300°F, the HPSI Surveillance Requirement (SR 3.4.12.1) provides the required HPSI pump operating restrictions when the SDC system sees PCS pressure conditions.

APPLICABLE SAFETY ANALYSES

In MODE 5, ~~RCS~~ PCS circulation is considered in determining the time available for mitigation of the accidental boron dilution event. ~~The~~ In MODE 5, Loops not filled, the SDC trains provide this circulation. The flow provided by one SDC train is adequate for decay heat removal and for boron mixing.

~~RCS~~ PCS loops - MODE 5 (loops not filled) have been identified in the NRC Policy Statement 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.

Note 1 permits the SDC pumps to be de-energized for ~~≤ 15 minutes when switching from one train to another~~ 1 hour. 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.

BASES

An OPERABLE SDC train is composed of an OPERABLE SDC pump capable of providing forced flow to an OPERABLE SDC heat exchanger, along with the appropriate flow and temperature instrumentation for control~~,~~ ~~protection~~ and indication. Closing the SDC heat exchanger control valves diverting all SDC flow through the bypass line doen not make the SDC train inoperable. SDC pumps are OPERABLE if they are capable of being powered and are able to provide flow 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~~ PCS Loops - MODES 1 and 2";
LCO 3.4.5, "~~RCS~~ PCS Loops - MODE 3";
LCO 3.4.6, "~~RCS~~ PCS Loops - MODE 4";
LCO 3.4.7, "~~RCS~~ PCS 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 the required 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.

B.1 and B.2

If no SDC train is OPERABLE or in operation, except as provided in Note 1, all operations involving the reduction of ~~RCS~~ PCS 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.