ENCLOSURE 1

Response to Request for Additional Information

ISSUE #	DOC # or JFD #	CTS/STS REF.	DESCRIPTION OF ISSUE	PVNGS RESPONSES
3.3.1-1	L.4	CTS Table 4.3-1, Note 2	CTS table 4.3-1, Note 2, requires adjusting Linear power levels, CPC delta T power, and CPC nuclear power signals when above 15% RTP. ITS SR 3.3.1.4, Note 1, does not require testing until 12 hours after THERMAL POWER ≥ 20% RTP. There is inadequate justification for changing the CTS requirement from 15% RTP to 20% RTP. COMMENTS: Provide additional discussion and justification for changing the CTS testing requirement from 15% to 20%.	DOC L.4 has been revised to provide additional justification for changing the CTS testing requirement.
3.3.1-2 OOS	L.5	CTS Table 4.3-1 Notes 3, 7, and 8	CTS Table 4.3-1 Notes 3, 7, and 8 require performing testing above specific power levels. There is no specific time allowed after reaching the power level to perform the testing. ITS SRs 3.3.1.2, 3.3.1.5, and 3.3.1.6 allow 12 hours after reaching the power level to perform testing. This is an extension of the CTS STI. COMMENTS: Provide additional DOC justification to support the STI extension.	The testing required by Table Notes (7) and (8) is required by plant procedures within 12 hours of exceeding the power level specified in the Note. The ITS is consistent with the current operating practice. The testing required by Note (3) is performed within 12 hours of reaching 15% power. This is based on the time required for plant stabilization for the performance of the testing. This testing ensures the three excore linear subchannel gains are consistent with the shape annealing matrix elements calculated by SR 3.3.1.11. The shape annealing matrix elements are used to improve the accuracy of the Axial Shape Index calculation in the Core Protection Calculations (CPC).

ISSUE #	DOC # or JFD #	CTS/STS REF.	DESCRIPTION OF ISSUE	PVNGS RESPONSES
3.3.1-2 OOS (Cont'd)				The CPC uses the three excore linear subchannels to determine the axial flux shape. The three neutron flux detectors are far enough from the core to be exposed to flux from all heights in the core, although it is desired that they read only their particular level. The CPCs adjust for this flux overlap by using the predetermined shape annealing matrix elements in the CPC software. The excore linear subchannel gains are verified during the monthly test (SR 3.3.1.6) as well as during the quarterly calibration (SR 3.3.1.8). The quarterly calibration is performed within 92 days of Mode 2 entry. The probability of unacceptable drift in more than one excore channel coincident with an event that causes excessive local power peaks at low power during this 12 hour period is low.
3.3.1-3	L.4	CTS Table 4.3-1, Note 2	CTS table 4.3-1, Note 2, requires adjusting Linear power levels, CPC delta T power, and CPC nuclear power signals when above 15% RTP. ITS SR 3.3.1.4, Note 1, does not require testing until 12 hours after THERMAL POWER ≥ 20% RTP. This is an extension to the CTS STI from immediately to after 12 hours. COMMENT: Provide additional DOC discussion to support the CTS Surveillance Test Intervals.	The current plant operating practice is to perform this testing within 12 hours of reaching the power level specified in Note (2). The ITS requirement is consistent with current operating practice and is needed for plant stabilization, data taking and flow verification. See also the response to issue 3.3.1-1.

ISSUE #	DOC # or JFD #	CTS/STS REF.	DESCRIPTION OF ISSUE	PVNGS RESPONSES
3.3.1-4	JFD 1 LA.10	ITS Actions	CTS Table 3.3-1, Action 2, requires a special Plant Review Board review of the desirability of maintaining an inoperable channel bypassed, in accordance with CTS 6.5.1.6.g. A similar review and audit requirement is contained in ITS Action Notes LCO 3.3.1. Furthermore, the staff concluded that all review and audit programmatic requirements can be relocated to owner-controlled documents because sufficient control exists within the framework of current regulations. Therefore, a note should be added to ITS LCO 3.3.1 that retains CTS requirements for prior review and approval of placing channels in bypass. COMMENT: Provide additional discussion and justification, identifying the licensee controlled documents this CTS requirement is moved to.	TSTF-76 was submitted for this generic change. It is the understanding of PVNGS that the staff has agreed with the proposed changes of TSTF-76 to relocate the Note to a Licensee controlled document. The Note has been relocated to the PVNGS QA Program Description. The DOC has been revised accordingly.

ISSUE #	DOC # or JFD #	CTS/STS Ref.	DESCRIPTION OF ISSUE	PVNGS RESPONSES
3.3.1-5	JFD 10	ITS Table 3.3-1. RC Flow -Low	This JFD states in part that separate RC Flow - Low functions for each SG are needed because otherwise bypassing both RC low parameters in a single channel would not be allowed. However, JFD 5 states that PVNGS does not have a bypass function for RC Flow-Low. Provide additional information to explain the meaning of the DOCs.] COMMENT: Provide additional information	The bypass function referred to in JFD 5 is an operational bypass function that allows all four RC Flow - Low channels to be bypassed when thermal power is less than 1E-4% RTP. The PVNGS design does not use this type of operational bypass, the PVNGS RC Flow Trips are active any time the RTCBs are closed. The bypass referred to in JFD 10 is a maintenance or trip channel bypass. All of the Plant Protection System functions have a trip channel bypass that is interlocked to prevent simultaneously bypassing the same function in more than one channel. This ensures that the single failure criteria is met with a channel in maintenance bypass. This bypass is used during testing of a single channel or to meet the requirements of Actions A.1, B.1, C.2.1, or D.2.

ISSUE #	DOC # or JFD #	CTS/STS Ref.	DESCRIPTION OF ISSUE	PVNGS RESPONSES
3.3.1-6	JFD 12 LA.9	ITS SR 3.3.1.4 CTS Table 4.3-1 Note (2)	Proposed SR additions make the TS limits ambiguous. Clarify the proposed SR. State in the justification that the changes are consistent with the current licensing basis. COMMENT: Provide additional information.	The NUREG provides a single value for the allowable difference between the power level as determined by the calorimetric, and the power level indicated on the CPC and Nuclear Instrumentation channels. This SR requires the adjustment of the NI's and CPC's to the calorimetric power daily above 20% power. The calorimetric heat balance is less accurate at low power levels. If this SR is performed at 20% power, with the CPC's and NI's reading 2% less than the calorimetric power, the 2% tolerance could be exceeded as the plant power level is increased to 100% power. To ensure the accuracy is within the tolerances assumed in the safety analysis the CPC's and NI's must be adjusted to be no less than 0.5% below calorimetric power at lower power levels to ensure the absolute difference remains less than 2% at 100% power. This SR is consistent with the current licensing basis in CTS Table 4.3-1, Note (2).
3.3.1-7	None	ITS Table 3.3.1-1	The Allowable Value for Variable Overpower includes a decreasing rate > 5% per minute RTP. This change is not discussed in the JFDs. COMMENT: Provide a JFD.	The Variable Overpower (VOPT) decreasing rate limit is discussed in JFD 4. This limit is required because the PVNGS design uses a variable, rate limited setpoint for this function. The NUREG is based on a high linear power level trip used by the other Combustion Engineering digital plants. The decreasing rate limit of 5% is specified in the CTS Table 2.2-1, Note (8). The CTS markup has been revised to clarify the source of the value.

PVNGS ITS 3.3.1 REACTOR PROTECTIVE SYSTEM INSTRUMENTATION - OPERATING

ISSUE #	DOC # or JFD #	CTS/STS Ref.	DESCRIPTION OF ISSUE	PVNGS RESPONSES
3.3.1-8	JFD 13	ITS Table 3.3.1-1	Logarithmic Power Level - High discussion requires a plant specific justification for deviation form the STS. COMMENT: Provide a plant specific discussion giving a design basis or operational limitation justification for proposed changes.	This change is not considered plant specific. TSTF-132 was submitted to incorporate this change in NUREG-1432.

ISSUE #	DOC # or JFD #	CTS/STS Ref.	DESCRIPTION OF ISSUE	PVNGS RESPONSES
3.3.1-9 OOS	JFD 14 LA.3	ITS Table 3.3.1-1 footnote (c) CTS Table 3.3.1 Note (b)	Proposed deletion of Pressurizer Pressure Low function footnote requires a design basis discussion for deviation from the NUREG. This is a change to the CTS and a change to the NUREG. COMMENT: Provide additional discussion based on PVNGS design.	CTS Table 3.3-1 Item 1.A.2 requires the Pressurizer Pressure - Low instrumentation to be operable in Modes 1 and 2 and note (b) states that the trip may be bypassed when Pressurizer Pressure is below 400 PSIA. CTS Table 2.2-1 Note (2) allows the setpoint to be reduced in Modes 3 and 4 and provides specific requirements for the setpoint in these lower modes. These two CTS notes are combined into NUREG Table 3.3.1-1 note (C). Since the Pressurizer Pressure cannot be less than 400 PSIA in Mode 1 or 2 and the setpoints cannot be reduced in Modes 1 or 2, these notes are not applicable in any mode that requires the operability of the Pressurizer Pressure - Low function. The notes are applicable only in Modes 3 and 4. The Reactor Trip Breakers are open in these modes therefore the Pressurizer Pressure-Low Reactor Trip does not serve a safety function in these modes. The Reactor Protection System and Engineered Safety Features Actuation System share a common measurement channel, variable setpoint card, bistable comparator, and operational bypass. The note was relocated to the ESFAS LCO 3.3.5 since it is required to be operable in Mode 3. The PVNGS design requires the RPS and ESFAS to always have the same setpoint value and bypass status so the setpoint will continue to be controlled to the same requirements by the ESFAS LCO. Revised CTS Markup and DOCs LA.3, A.13

ISSUE #	DOC # or JFD #	CTS/STS Ref.	DESCRIPTION OF ISSUE	PVNGS RESPONSES
3.3.1-10	None	Reactor Coolant Flow - Low Ramp AV	The CTS units psi/sec are changed to psid/sec without a presentation of a DOC. COMMENT: Provide a DOC for the proposed change.	Added DOC A.14
3.3.1-11	LA.X LA.2 LA.4 LA.6 LA.7 LA.8 LA.11 LA.12	DOC boilerplate; generic to all 3.3 LA.X DOCs CTS Table 4.3-1 Note (6)	The DOC states that the relocated portion of the CTS requirement is "not required to determine the operability of the system ...." Explain the meaning of this justification. There is insufficient detailed safety analysis to support the proposed changes. COMMENT: Provide justification for each proposed change.	Section 50.36 of Title 10 of the Code of Federal Regulations established the regulatory requirements related to the content of the Technical Specifications. The rule requires that the TS include items in specific categories, including Safety Limits, Limiting Conditions for Operations, and Surveillance Requirements; however the rule does not specify the particular requirements to be included in a plant's TS. The NRC developed criteria, as described in the "Final Policy Statement on Technical Specification Improvements for Nuclear Power Reactors" (58FR39132), to determine which of the design conditions and associated Surveillances need to be located in the Technical Specifications. The fundamental purpose of the Technical Specifications, as described in the Commission's final policy statement, is to impose those conditions or limitations on reactor operation necessary to obviate the possibility of an abnormal situation or event giving rise to an immediate threat to the public health and safety by identifying those features that are of controlling importance to safety and establishing on them certain conditions of operation which cannot be changed without prior Commission approval.

ISSUE #	DOC # or JFD #	CTS/STS Ref.	DESCRIPTION OF ISSUE	PVNGS RESPONSES
3.3.1-11 (Cont'd)				These changes are acceptable because they will not affect the safe operation of the plant and do not impact the PVNGS safety analysis. These changes involve the relocation of descriptive details and information not needed to convey the requirements of the LCOs, Applicability, Actions, or Surveillance Requirements, from the CTS to a licensee controlled document (i.e. ITS Bases, TRM, UFSAR), which is not otherwise required to be in the Technical Specifications under 50.36. These changes are also not needed to obviate the possibility that an abnormal situation or event will give rise to an immediate threat to the public health and safety. The descriptive details that are relocated to a licensee controlled document are based on NUREG 1432, which has been reviewed by the NRC staff. The Technical Specification requirements that remain are consistent with current licensing practices, operating experience, and plant accident and transient analyses, and provide reasonable assurance that public health and safety will be protected. Specifically: LA.2 identifies information on the number of channels required to trip the reactor. LA.4 identifies a list of channel process measurement circuits that affect multiple functional units. LA.6 is descriptive information included in the definition of Channel Functional Test.

ISSUE #	DOC # or JFD #	CTS/STS Ref.	DESCRIPTION OF ISSUE	PVNGS RESPONSES
3.3.1-11 (Cont'd)				LA.7 is information on measurement of RCS total flowrate. LA.8 is a description of the uncertainty of the flow rate. LA.11 is a statement identifying that an RPS function is declared inoperable if its setpoint is less conservative than the allowable value. LA.12 relocates CTS Table 2.2-1 which contains the RPS instrumentation trip setpoints. Relocation of the above information does not delete requirements. The relocation moves descriptive information and details from the CTS to a Licensee Controlled Document. The relocation of this information and detail does not impact the requirements for determination of OPERABILITY for systems, structures and components required by the LCO's of ITS Section 3.3.
3.3.1-12	A.13	Table 2.2-1, Note (2) & (3)	Requirements are deleted from the CTS without an appropriate less restrictive discussion of safety questions that may result from operating the plant without the operational limits. COMMENT: Provide an L-DOC.	Since the Notes are not applicable in Modes 1 or 2, the Table 2.2-1 Note (3) is located in ITS 3.3.2 (RPS Instrumentation- Shutdown) Table 3.3.2-1 Note (b). Table 2.2-1 Note (2) is Located in ITS 3.3.5 (ESFAS Instrumentation) Table 3.3.5-1 Note (a). Refer to issue 3.3.1-9.

ISSUE #	DOC # or JFD #	CTS/STS Ref.	DESCRIPTION OF ISSUE	PVNGS RESPONSES
3.3.1-13	A.3	CTS SR 4.3.1.2	The DOC states that the CTS requirement to demonstrate the logic for the bypasses is operable is equivalent based on the ITS definition for a CFT. Stating that the requirements are equivalent doesn't make them so. Explain why the proposed changes are equivalent. COMMENT: Provide additional information to support the proposed change	The PVNGS procedures perform a CHANNEL FUNCTIONAL TEST of the bypass function to meet this SR, since a CHANNEL FUNCTIONAL TEST verifies the proper operation of bypass logic as well verifying the setpoint is within the allowable value. Current PVNGS practice is to consider CTS SR 4.3.2.1 a CHANNEL FUNCTIONAL TEST, making this change administrative in nature.
3.3.1-14	L.3	ITS SR 3.3.1.7	Note 2 to ITS SR 3.3.1.7 is inconsistent with the proposed ITS. NUREG Note (b) to Table 3.3.1-1, which modifies the Log Power Monitor applicability by requiring the RTCBs to be closed is proposed to be deleted, thus the DOC is incorrect since the trip function is required to be operable in Mode 2 regardless of breaker position. COMMENT: Provide a revised DOC.	Revised DOC L.3.
3.3.1-15	L.8	CTS Action 2 ITS 3.3.1 Condition C	The L.8 DOC is confusing. Statements about how the bypass removal function affects channel operability are unclear. Provide a rewritten DOC that states the proposed change and explain why there is not a significant safety question in the operation of the plant with the proposed ITS. COMMENT: Provide a revised DOC.	Revised DOC L.8.

ISSUE #	DOC # or JFD #	CTS/STS Ref.	DESCRIPTION OF ISSUE	PVNGS RESPONSES
3.3.1-16	L.6	CTS Action 2, ITS Action C	The generalized discussion in L.6 does not explain why there is not a significant safety question in the operation of the plant with the proposed ITS. COMMENT: Provide a revised DOC.	Revised DOC L.6.
3.3.1-17	A.11	ITS Action G	The ITS requirement to enter Action E to shut down the plant and the CTS requirement to enter LCO 3.0.3 are stated to be equivalent with no resulting (technical) changes. Are these requirement equivalent in all respects including reporting requirements? Explain. COMMENT: Provide additional explanation why the proposed change is administrative.	10 CFR 50.73(a)(2)(i)(B) requires Licensees to report: "any operation or condition prohibited by the plant's Technical Specifications." An entry into LCO 3.0.3 as required by the CTS requires an LER. 10 CFR 50.72(b)(1)(i)(A) requires Licensees to report: "The initiation of any nuclear plant shutdown required by the plant's Technical Specifications." 10 CFR 50.73(a)(2)(i)(A) requires Licensees to submit an LER on: "The completion of any nuclear plant shutdown required by the Plant's Technical Specifications." If the ITS Action to place the Unit in Mode 3 is started a 1 hour report is required, and if the shutdown is completed an LER is required. The only difference in the reporting requirements is that any entry into 3.0.3 must be reported, but if the ITS Action is exited prior to the initiation of a shutdown a report is not required.
3.3.1-18	None	CTS Note 4	Daily channel calibrations for Local Power Density and DNBR are deleted without justification COMMENT: Provide DOC discussion for each proposed change.	The requirements for the daily calorimetric calibrations are CTS Table 4.3-1 Note 2. The ITS SR 3.3.1.4 performs this testing. The CTS markup has been revised to clarify the changes.

ISSUE #	DOC # or JFD #	CTS/STS Ref.	DESCRIPTION OF ISSUE	PVNGS RESPONSES
3.3.1-19	None	CTS Note 8 ITS SR 3.3.1.5	SR 3.3.1.5 is added to DNBR-low without safety analysis justification. COMMENT: Provide DOC discussion for each proposed change.	Added DOC A.15
3.3.1-20	None	CTS Table Notes 4, 5 and 6	CTS daily and refueling channel calibrations for the CPC System and CPC refueling channel functional tests are deleted without discussion. COMMENT: Provide DOC discussion for each proposed change.	Added DOC A.15
3.3.1-21	A.10	CTS Note (9)	CTS applies Note (9) to only the CPCs quarterly CFT whereas the ITS applies this SR to all RPS functions without a justification. COMMENT: Provide DOC discussion for each proposed change.	The CTS Table 4.3-1 Note (9) is ITS SR 3.3.1.7 Note (1). Although SR 3.3.1.7 applies to all RPS functions, the text of the note limits the applicability to the CPC.
3.3.1-22	M.2	CTS Table 4.3-1 Note (2)	DOC M.2 is used to justify changes that includes a lower limit for performing ITS SR 3.3.1.4 without providing discussion of the change. COMMENT: Provide DOC discussion for each proposed change.	Revised markup of CTS Table 4.3-1 Note (2). Revised DOC M.2 The CTS Table 4.3.1 Note (2) changes are discussed in 4 DOCs. DOC A.8 discusses the change in wording to delete the words CHANNEL FUNCTIONAL TEST not included. DOC L.4 discusses the change of performing this test at 20% RTP vs. the CTS value of 15% RTP. DOC LA.9 discusses the relocation of the details for performing the test. DOC M.2 discusses the change in acceptance criteria from greater than 2% difference to greater than or equal to 2%. This change will provide an enhancement to plant safety by requiring a more accurate calibration of the CPC and Excore Neutron power readings.

ISSUE #	DOC # or JFD #	CTS/STS Ref.	DESCRIPTION OF ISSUE	PVNGS RESPONSES
3.3.1-23	JFD	ITS	~~B 3.3-12: Explain the deletion of the Mode 3,4,5 discussion.~~ Insert 1 to the Bases for Applicable Safety Analysis: What is the relationship between the insert limiting values and the TS limits? Insert 1 to Bases for Action Statement: Clarify the meaning of the first sentence.	The description of issue was revised at the request of NRC staff in telephone conversation on 7/24/97 to remove the comment related to the Mode 3, 4, and 5 discussion. The limiting values specified in Insert 1 have no relationship with the TS setpoints and allowable values. The CPCs use various measurement channel inputs to calculate the Departure from Nucleate Boiling Ratio (DNBR), and Local Power Density (LPD). In some cases the DNBR and LPD calculations are only valid within a range of input values or calculated parameter values. These are the limiting values in Insert 1. The PVNGS design uses some measurement channels for several safety functions. For example the Pressurizer Pressure measurement channels provide an input to the RPS Pressurizer Pressure - High trip function, as well as providing an input to the CPC calculation for DNBR and LPD. CTS Table 3.3-1 Actions 2 and 3 (ITS Actions A.1, B.1, C.2.1, and D.2) require the channel placed in trip or bypassed condition. This insert ensures that the operator is aware that a single measurement channel failure results in several inoperable functions and the Required Actions specified must be completed for all of the inoperable functions.

ISSUE #	DOC # or JFD #	CTS/STS REF..	DESCRIPTION OF ISSUE	PVNGS RESPONSE
3.3.2-1	L.5	CTS Table 3.3-1, Action 2	The L5 DOC is confusing. Statements about how the bypass removal function affects channel operability are unclear. Provide a rewritten DOC that states the proposed change and explain why there is not a significant safety question in the operation of the plant with the proposed ITS. COMMENT: Provide a revised justification for this less restrictive change.	Revised DOC L.5
3.3.2-2	JFD 2	STS 3.3.2, Actions NOTE	CTS 3.3.1, Action 2, requires a special Plant Review Board review of the desirability of maintaining an inoperable channel bypassed, in accordance with CTS 6.5.1.6.g. A similar review and audit requirement is contained in ITS LCO NOTES to LCO 3.3.2. Furthermore, the staff concluded that all review and audit programmatic requirements can be relocated to owner-controlled documents because sufficient control exists within the framework of current regulations. Therefore, a note should be added to ITS LCO 3.3.2 that retains CTS requirements for prior review and approval of placing channels in bypass. COMMENT: Revise the ITS to adopt the STS.	Refer to the response to issue 3.3.1-4. DOC LA.4 was revised accordingly.
3.3.2-3	L.2	CTS Table 3.3-1 STS 3.3.2, Condition C	The generalized discussion in L2 does not explain why there is not a significant safety question in the operation of the plant with the proposed ITS. COMMENT: Provide justification for this less restrictive change.	Revised DOC L.2

ISSUE #	DOC # or JFD #	CTS/STS REF..	DESCRIPTION OF ISSUE	PVNGS RESPONSE
3.3.2-4	M.1	CTS Table 3.3-1, Action 10	CTS Table 3.3-1, Functional Unit C.2, requires the Core Protection Calculators (CPCs) to be operable in Modes 3, 4, and 5, unless, per Action 10, the Logarithmic Power Level - High function is operable and the Trip Setpoint is lowered to $\leq 10^{-4}$% of Rated Thermal Power (RTP). ITS 3.3.2 removes the requirement for operable CPCs in Modes 3, 4, and 5, and instead requires the allowable value of the Logarithmic Power Level - High function normally set at $\leq$ 0.011% RTP in Modes 3, 4, and 5 to be lowered to $\leq 10^{-4}$ % RTP. The proposed format is to change the function applicability by establishing a new ITS setpoint $\leq 10^{-4}$% RTP if 4 RCP are running. Provide justification that states the safety basis for replacing <u>CPC operability</u> requirements with a more restrictive allowable value? Also justify replacing CTS trip setpoint limits its ITS allowable value limits. Is this consistent with the approved setpoint methodology? M.1 for CTS Table 3.3-1 (Function1.B.2.a Modes 3* 4*, 5*) markup is used to change the Log Power applicability. Where is this in the ITS? COMMENT: Revise M.1 or submittal as necessary	Description of issue was revised per telephone conversation with NRC Staff on 7/24/97. Revised DOC M.1 The PVNGS Safety Analysis does not allow power operation with less than 4 Reactor Coolant Pumps (RCPs) running. For a subcritical withdrawal event with less than 4 RCP's running a reactor trip must be generated at $\leq 10^{-4}$% RTP to prevent overshoot into the power range. The PVNGS safety analysis allows the use of either the CPCs or the Excore Logarithmic power level - High channels with the trip setpoint lowered to $\leq 10^{-4}$% RTP to meet this requirement. The ITS Table 3.3.2-1 Note (c) requires the setpoint to be reduced to $\leq 10^{-4}$% RTP. The safety analysis assumes a trip at 4×10^{-4}% RTP. Specifying a setpoint instead of an allowable value for other than normal operating conditions is consistent with the current setpoint methodology. The changes made to the Log Power applicability by DOC M.1 are shown in ITS Table 3.3.2-1 Note (c)

ISSUE #	DOC # or JFD #	CTS/STS REF..	DESCRIPTION OF ISSUE	PVNGS RESPONSE
3.3.2-5	M.1	CTS Table 3.3-1, Action 10	CTS Table 3.3-1, Functional Unit C.2, requires the Core Protection Calculators (CPCs) to be operable in Modes 3, 4, and 5, unless, per Action 10, the Logarithmic Power Level - High function is operable and the Trip Setpoint is lowered to $\leq 10^{-4}$% of Rated Thermal Power (RTP). ITS 3.3.2 removes the requirement for operable CPCs in Modes 3, 4, and 5, and instead requires the allowable value of the Logarithmic Power Level - High function normally set at $\leq$ 0.011% RTP in Modes 3, 4, and 5 to be lowered to $\leq 10^{-4}$ % RTP. The proposed format is to change the function applicability by establishing a new ITS setpoint $\leq 10^{-4}$% RTP if 4 RCP are running. Provide justification that states the safety basis for replacing <u>CPC operability</u> requirements with a more restrictive allowable value? Also justify replacing CTS trip setpoint limits its ITS allowable value limits. Is this consistent with the approved setpoint methodology? M.1 for CTS Table 3.3-1 (Function1.B.2.a Modes 3* 4*, 5*) markup is used to change the Log Power applicability. Where is this in the ITS? COMMENT: Revise M.1 or submittal as necessary.	Refer to the response to issue 3.3.2-4.

ISSUE #	DOC # or JFD #	CTS/STS REF.	DESCRIPTION OF ISSUE	PVNGS RESPONSE
3.3.2-6	L.7	CTS Table 3.3-1 and Table 4.3-1, Item 1.A.5	CTS Table 3.3-1 and Table 4.3-1, Item 1.A.5, requires the OPERABILITY of the low steam generator pressure reactor trip functions in Modes 3 and 4. ITS Table 3.3.2-1 requires this instrumentation in Mode 3, but not in Mode 4. The justification states that in Mode 4, the steam generator temperature is lower and the resultant energy release and cooldown following a MSLB is less than is required in Mode 3. The licensee has not provided sufficient analysis justification to show that there is not a significant safety question in the operation of the plant such that the current licensing basis can be changed, i.e., that the lesser steam generator temperature and resultant energy release and cooldown following a MSLB is bounded by the safety analysis without the Steam Generator Pressure - Low trip in Mode 4 as required in CTS Table 3.3-1 and Table 4.3-1, Item 1.A.5. COMMENT: Provide additional description and justification for this less restrictive change.	Revised DOC L.7

ISSUE #	DOC # or JFD #	CTS/STS REF.	DESCRIPTION OF ISSUE	PVNGS RESPONSE
3.3.2-7	LA.4 JFD 2	CTS Table 3.3-1, Action 2	CTS Table 3.3-1, Action 2, requires a special Plant Review Board review of the desirability of maintaining an inoperable channel bypassed, in accordance with CTS 6.5.1.6.g. A similar review and audit requirement is contained in Note 2 to LCO 3.3.1. Furthermore, the staff concluded that all review and audit programmatic requirements can be relocated to owner-controlled documents because sufficient control exists within the framework of current regulations. Therefore, a note should be added to ITS LCO 3.3.2 that maintains CTS 3.3.1 requirements for prior review and approval of placing channels in bypass. COMMENT: Provide a revised ITS.	Refer to the response to issue 3.3.1-4

ISSUE #	DOC # or JFD #	CTS/STS REF.	DESCRIPTION OF ISSUE	PVNGS RESPONSE
3.3.2-8	None	CTS Table 3.3-1, Actions 2 and 3, CTS 3.0.3	ITS 3.3.2, Condition E, requires opening all RTCBs within 1 hour of failure to meet the required Actions and completion times (1 hour) for Conditions A, B, C, and D. This is in contrast with CTS Table 3.3-1, Actions 2 and 3, which require immediate entry into CTS 3.0.3 if the 1 hour completion time is not met. CTS 3.0.3 allows 1 hour to begin a shutdown, to Mode 3 in an additional 6 hours and to Mode 5 in an additional 30 hours. The ITS opening of all RTCBs is not equivalent, rather it is less restrictive, than a requirement to enter a lower power with a reduction in the reactor Mode, because there are no requirements to reduce RCS temperature. Additionally, the time to remove the reactor from the APPLICABILITY is changed, from the CTS 37 hours to the ITS 1 hour, which is more restrictive. These changes are not justified. COMMENT: Provide DOC justification for opening all RTCBs instead of reducing the reactor Mode as in the CTS.	Added DOC M.2 Revised the CTS and NUREG markup This change is more restrictive since the Action completion time is reduced. The CTS does not require a reduction in the RCS temperature since LCO 3.0.3 requires the unit to be placed in a Mode in which the LCO does not apply. In this case the Applicable Modes are 3, 4, and 5 with the RTCBs closed and the CEAs capable of withdrawal. As soon as the RTCBs are opened the plant in no longer in a Mode in which this LCO applies and LCO 3.0.3 is exited.

ISSUE #	DOC # or JFD #	CTS/STS REF..	DESCRIPTION OF ISSUE	PVNGS RESPONSE
3.3.2-9	None	ITS Table 3.3.2-1	The ITS adds Table 3.3.2-1 and associated notes to the STS. Note b to that table allows lowering the steam generator pressure - low setpoints as the steam pressure is reduced. There is no discussion or justification for adding Note b of ITS Table 3.3.2-1 to the STS. COMMENT: Provide justification for the STS deviation based on current licensing basis, system design, and operational constraints	The CTS Table 2.2-1 has been added to ITS 3.3.2 to show the source of the allowable values and the Table Notes. The ITS setpoint allowable values are the same values as the CTS allowable values. The CTS Table 2.2-1 Note (3) is required to fully describe the allowable value because the setpoint is variable, depending on plant conditions. The justification for the addition of the Steam Generator Pressure - Low function to ITS 3.3.2 is described in JFD 1. Added DOC A.9
3.3.2-10	None	ITS Table 3.3.2-1	The ITS adds Table 3.3.2-1 to the STS. This table has an Allowable Values column, but no discussion of where these Allowable Values come from, or the acceptability of the allowable values. COMMENT: Provide justification for the STS deviation based on current licensing basis, system design, and operational constraints, justifying any change from CTS setpoints to ITS Allowable Values.	The CTS Table 2.2-1 has been added to ITS 3.3.2 to show the source of the allowable values. The ITS setpoint allowable values are the same values as the CTS allowable values.

ISSUE #	DOC # or JFD #	CTS/STS REF.	DESCRIPTION OF ISSUE	PVNGS RESPONSE
3.3.2-11	None	ITS Table 3.3.2-1	The ITS adds Table 3.3.2-1 and associated notes to the STS. Note d to that table allows bypassing the Logarithmic Power Level - High trip when the THERMAL POWER is > 1E-4% RTP, and requires automatic removal of the bypass when THERMAL POWER is ≤ 1E-4% RTP. There is no discussion or justification for adding Note d of ITS Table 3.3.2-1 to the STS. COMMENT: Provide justification for the STS deviation based on current licensing basis, system design, and operational constraints.	The addition of Table 3.3.2-1, Note (d) is part of the reformatting of the ITS specification 3.3.2 described in JFD 1. The NUREG Note is included in the LCO applicability section of the specification. Due to the format change described in JFD 1, the information in the LCO applicability section, including the Note, is relocated to Table 3.3.2-1. The content of the note is not changed.

ISSUE #	DOC # or JFD #	CTS/STS REF..	DESCRIPTION OF ISSUE	PVNGS RESPONSE
3.3.2-12	LA.2 LA.3	See item 3.3.1-11	Insufficient safety basis justification. COMMENT: Provide additional justification	Section 50.36 of Title 10 of the Code of Federal Regulations established the regulatory requirements related to the content of the Technical Specifications. The rule requires that the TS include items in specific categories, including Safety Limits, Limiting Conditions for Operations, and Surveillance Requirements; however the rule does not specify the particular requirements to be included in a plant's TS. The NRC developed criteria, as described in the "Final Policy Statement on Technical Specification Improvements for Nuclear Power Reactors" (58FR39132), to determine which of the design conditions and associated Surveillances need to be located in the Technical Specifications. The fundamental purpose of the Technical Specifications, as described in the Commission's final policy statement, is to impose those conditions or limitations on reactor operation necessary to obviate the possibility of an abnormal situation or event giving rise to an immediate threat to the public health and safety by identifying those features that are of controlling importance to safety and establishing on them certain conditions of operation which cannot be changed without prior Commission approval.

ISSUE #	DOC # or JFD #	CTS/STS REF.	DESCRIPTION OF ISSUE	PVNGS RESPONSE
3.3.2-12 (Cont'd)				These changes are acceptable because they will not affect the safe operation of the plant and do not impact the PVNGS safety analysis. These changes involve the relocation of descriptive details and information not needed to convey the requirements of the LCOs, Applicability, Actions, or Surveillance Requirements, from the CTS to a licensee controlled document (i.e. ITS Bases, TRM, UFSAR), which is not otherwise required to be in the Technical Specifications under 50.36. These changes are also not needed to obviate the possibility that an abnormal situation or event will give rise to an immediate threat to the public health and safety. The descriptive details that are relocated to a licensee controlled document are based on NUREG 1432, which has been reviewed by the NRC staff. The Technical Specification requirements that remain are consistent with current licensing practices, operating experience, and plant accident and transient analyses, and provide reasonable assurance that public health and safety will be protected. Specifically: LA.2 includes a list of channel process measurement circuits that affect multiple functional units.

ISSUE #	DOC # or JFD #	CTS/STS REF..	DESCRIPTION OF ISSUE	PVNGS RESPONSE
3.3.2-12 (Cont'd)				LA.3 is a discussion of an RPS channel being placed in bypass and a second channel of the same function being placed in trip. Relocation of the above information does not delete requirements. The relocation moves descriptive information and details from the CTS to a Licensee Controlled Document. The relocation of this information and detail does not impact the requirements for determination of OPERABILITY for systems, structures and components required by the LCO's of ITS Section 3.3.
3.3.2-13	L.6	ITS Action D CTS Action 3	L.6 is applied to changes in CTS Action 3 that discuss "two automatic bypass removal functions inoperable" but the justification discusses logarithmic power setpoints. Provide corrected DOC and CTS/ITS markup for submittal changes. COMMENT: Provide a revised submittal	The justification is provided in DOC L.5. The NUREG markup has been revised to reference the correct DOC.
3.3.2-14	Bases Insert #5	ITS B 3.3-42	The addition of Bases background discussion that states "a CEA is considered capable of withdrawal when power is applied to the CEDM" is generic to the NUREG and requires a staff approved TSTF. The proposed Bases clarification is an operability discussion and therefore belongs in the Bases LCO section. COMMENT: Provide an appropriate TSTF change.	Revised Bases to relocate the discussion to the LCO section of the Bases. Detail was added to clarify what PVNGS considers "CEA capable of withdrawal". This is considered plant specific guidance and a TSTF was not submitted.

PVNGS ITS 3.3.2 REACTOR PROTECTION SYSTEM (RPS) INSTRUMENTATION - SHUTDOWN

ISSUE #	DOC # or JFD #	CTS/STS REF..	DESCRIPTION OF ISSUE	PVNGS RESPONSE
3.3.2-15	Bases insert 2	ITS Bases B 3.3-43	Bases insert 2 does not discuss the applicable safety analysis basis for the addition. COMMENT: Provide a revised Bases.	This section was copied from the RPS Instrumentation - Operating, LCO 3.3.1 Bases, Applicable Safety Analysis section (pg. B3.3-16 and B3.3-17), for consistency between the LCO 3.3.1 and 3.3.2 discussion of the Logarithmic Power Level - High trip Function.
3.3.2-16	L.1	CTS Table 3.3-1	Functional Unit 1.B.2.a (Modes 3*, 4*, 5*) Action 9 is changed to require Actions 2, 3 and 10 in the CTS markup COMMENT: Revise L.1 discussion to include justification for ITS allowance to startup with inoperable channels.	Revised DOC L.1

ISSUE #	DOC # or JFD #	CTS/STS REF.	DESCRIPTION OF ISSUE	PVNGS RESPONSE
3.3.3-1	None	CTS 3.1.3.6.a	CTS 3.1.3.6.a requires. With one or more CEAC's Inoperable.... . ITS 3.3.3 Action A requires with one CEAC inoperable. There is no discussion or justification for the change to the CTS requirement. COMMENT: Provide additional discussion and justification for the change to the CTS requirement of Inoperable CEAC's.	Comment withdrawn at NRC staff request during telephone conversation on 7/24/97.
3.3.3-2	JFD5 JFD7	ITS Applicability Note	A new note is proposed to allow bypass of the CEACs during testing pursuant to special test exception LCO 3.1.10. Provide a revised LCO 3.1.10 that lists this proposed TS exception with existing exceptions in the LCO. COMMENT: Cross references have been deleted from STS. Revise ITS LCO 3.3.3 to eliminate cross references to Special Test Exceptions.	Revised ITS 3.3.3, and ITS 3.3.3 Bases Removed JFD 5.
3.3.3-3	JFD6	ITS RA B.1	Proposed changes include moving part of ITS Action B1 requirements "Disable the Reactor Cut Back System" to a new Action B6. The completion time is unchanged. The intent of the STS format is to organize required Actions by placing the most important Actions first in the list. The proposed alternate format is generic and requires a staff approved industry TSTF Traveler. COMMENT: Provide an industry traveler for staff review.	LCO 3.3.3 in NUREG-1432, Required Action B.1 provides two unrelated Required Actions for verification that the DNBR is within limits and disabling the reactor power cutback system. The proposed change makes these separate actions separated by an <u>AND</u> logical connector. This does not change the intent or application of the Required Action, it only provides additional clarification for users. This change was not considered generic because it was considered below the threshold needed for processing a generic change.

ISSUE #	DOC # or JFD #	CTS/STS REF.	DESCRIPTION OF ISSUE	PVNGS RESPONSE
3.3.3-4	JFD1	ITS Action B.2	Proposed changes include deletion of the Action to perform SR 3.1.5.4 because it is not applicable since performance of a functional test of each RSPT requires the reactor to be in shutdown. The proposed alternate format is generic and requires a staff approved industry TSTF Traveler. COMMENT: Provide an industry traveler for staff review.	TSTF 75 has been submitted for this JFD.
3.3.3-5	LA.2	CTS SR 4.3.1.5	The DOC applies to a CTS requirement to verify the CPC is operable. DOC LA2 states that this SR becomes two SRs in the ITS. LCO 3.3.3 includes only the CEAC portion of the SR. The CPC portion is included in the LCO 3.3.1. DOC LA2 states that "when the autorestart count on the CPC is checked, the codes 30 and 33 are not included in the count." Revise the justification to address only changes made to the CEAC. COMMENT: Provide a revised DOC that addresses changes to the CEACs.	Revised DOC LA.2.
3.3.3-6	L.1	CTS SR 4.3.1.6	DOC L1 states that the "other CEAC channel has not been exposed to the high temperature and therefore a FUNCTIONAL TEST is not needed for the other channel." Provide additional facts to support this conclusion. COMMENT: Provide a revised L.1 DOC.	Revised DOC L.1

ISSUE #	DOC # or JFD #	CTS/STS REF.	DESCRIPTION OF ISSUE	PVNGS RESPONSE
3.3.3-7	DOC A.6	ITS Action E	The ITS requirement to enter Action E to shut down the plant and the CTS requirement to enter LCO 3.0.3 are stated to be equivalent with no resulting (technical) changes. Are these requirement equivalent in all respects including reporting requirements? Explain. COMMENT: Provide additional facts to support the proposed change as being administrative.	Refer to the Response to issue 3.3.1-17
3.3.3-8	DOC A.4	CTS Action 6.b.2.a) & 6.b.2.c)	There is not sufficient presentation of facts in the DOC to conclude that adopting the STS action requirements with the addition of "fully withdrawn and maintained fully withdrawn" is a purely administrative change. The changes made to CTS 6.b.2.c) are noted by use of DOC A4 but the DOC contains no analysis of the changes. Provide additional facts to support the proposed changes to the CTS. COMMENT: Provide additional facts to support the proposed change as being administrative.	The changes to CTS Action 6.b.2.a and 6.b.2.c described in DOC A.4 consist of including the requirements of Specifications 3.1.3.5, 3.1.3.6.b, and 3.1.3.7.b for two CEACs inoperable, into the text of ITS 3.3.3 to make the Actions easier to use. CTS 3.1.3.5 requires all shutdown CEAs to be fully withdrawn in Mode 1, CTS 3.1.3.6.b requires all CEAs to be fully withdrawn except regulating group #5 may be inserted to no more than 127.5", and CTS 3.1.3.7.b requires all part length CEAs to be fully withdrawn.
3.3.3-9	DOC A.1	CTS Action 6.b.2.a)	DOC A1 is for editorial rewording changes. In the markup of CTS Action 6 additions and <u>deletions</u> are justified with the A1 DOC. Provide appropriate discussion for each proposed change. COMMENT: Provide discussion for proposed changes.	There are no requirements deleted by this change. The CTS specification 4.1.3.1.2 is replaced with the ITS Specification SR 3.1.5.3. The cross reference to the CTS specification 3.3.1.6.b is removed since the requirements of the specification 3.3.1.6.b are repeated in both CTS Action 6.b.2.a and ITS Action B.2. These changes are editorial in nature.

ISSUE #	DOC # or JFD #	CTS/STS REF.	DESCRIPTION OF ISSUE	PVNGS RESPONSE
3.3.3-10	DOC L.4	Action 6.2.c)	DOC L4 addresses deletion of requirements that allow use of the CEDMCS in the manual group or manual individual Modes but does not provide a safety analysis discussion! COMMENT: Provide safety analysis discussion for changes proposed by L.4.	Revised DOC L.4
3.3.3-11	JFD8	ITS Bases	Changes to B2 appear to alter the intent of the LCO. Provide additional explanation to support the change as descriptive. COMMENT: Provide additional justification	The Bases have been modified to include the plant specific value for the fully withdrawn position (≥ 144.75"). and the plant specific terminology for the "full out" CEA reed switches (Upper Electrical Limit or UEL). These changes do not affect the intent of the LCO.
3.3.3-12	LA.1	CTS SR 4.3.1.4	New Issue	Detailed test instructions for the CEA Amplifier isolation test needs to be relocated to the ITS Bases
3.3.3-13	LA.2	CTS SR 4.3.1.5	New Issue	Detailed information for the use of the auto-restart periodic test restart and the normal system load restart cods in the auto-restart total needs to be relocated to the ITS Bases.

ISSUE #	DOC # or JFD #	CTS/STS REF.	DESCRIPTION OF ISSUE	PVNGS RESPONSE
3.3.4-1	M.1	CTS Table 3.3-1 Action 1 ITS Matrix Logic	CTS Table 3.3-1, Action 1, requires entering Mode 3 in 6 hours AND/OR opening the RTCBs if conditions are not met. ITS 3.3.4, ACTION E requires entering Mode 3 AND opening the RTCBs under the same conditions. There is no discussion or justification for the change to CTS requirements. Provide additional justification stating why the proposed more restrictive ITS requirement for ITS Matrix Logic does not present a safety concern. In addition, the M1 DOC of Table 3.3-1 does not discuss Action A. The CTS Action 1 becomes Actions A and E in the ITS. The DOCs need to discuss all CTS changes contained in the markups. COMMENT: Provide discussion and justification for removing the option for opening the RTCBs in the ITS ACTION E.	Revised DOC M.1

ISSUE #	DOC # or JFD #	CTS/STS REF.	DESCRIPTION OF ISSUE	PVNGS RESPONSE
3.3.4-2	LA.3	CTS Table 4.3-1 Note 10	CTS Table 4.3-1, Note 10, requires a CFT at least once per 18 months and following maintenance or adjustment of the RTCB.... . ITS SR 3.3.4.2 removes the portion of thel requirement, "following maintenance or adjustment of the RTCBs".... this information is moved to unspecified plant procedures. COMMENT: Provide discussion which specifies why there is no safety question in the operation of the plant if the post maintenance testing requirements now contained the CTS are relocated to plant procedures.	Section 50.36 of Title 10 of the Code of Federal Regulations established the regulatory requirements related to the content of the Technical Specifications. The rule requires that the TS include items in specific categories, including Safety Limits, Limiting Conditions for Operations, and Surveillance Requirements; however the rule does not specify the particular requirements to be included in a plant's TS. The NRC developed criteria, as described in the "Final Policy Statement on Technical Specification Improvements for Nuclear Power Reactors" (58FR39132), to determine which of the design conditions and associated Surveillances need to be located in the Technical Specifications. The fundamental purpose of the Technical Specifications, as described in the Commission's final policy statement, is to impose those conditions or limitations on reactor operation necessary to obviate the possibility of an abnormal situation or event giving rise to an immediate threat to the public health and safety by identifying those features that are of controlling importance to safety and establishing on them certain conditions of operation which cannot be changed without prior Commission approval.

ISSUE #	DOC # or JFD #	CTS/STS REF.	DESCRIPTION OF ISSUE	PVNGS RESPONSE
3.3.4-2 (Cont'd)				These changes are acceptable because they will not affect the safe operation of the plant and do not impact the PVNGS safety analysis. These changes involve the relocation of descriptive details and information not needed to convey the requirements of the LCOs, Applicability, Actions, or Surveillance Requirements, from the CTS to a licensee controlled document (i.e. ITS Bases, TRM, UFSAR), which is not otherwise required to be in the Technical Specifications under 50.36. This change is also not needed to obviate the possibility that an abnormal situation or event will give rise to an immediate threat to the public health and safety. The descriptive details that are relocated to a licensee controlled document are based on NUREG 1432, which has been reviewed by the NRC staff. The Technical Specification requirements that remain are consistent with current licensing practices, operating experience, and plant accident and transient analyses, and provide reasonable assurance that public health and safety will be protected. Specifically: LA.3 relocates the phrase "and following maintenance or adjustment of the reactor trip breakers."

ISSUE #	DOC # or JFD #	CTS/STS REF.	DESCRIPTION OF ISSUE	PVNGS RESPONSE
3.3.4-2 (Cont'd)				Relocation of the above information does not delete requirements. The relocation moves descriptive information and details from the CTS to a Licensee Controlled Document. The relocation of this information and detail does not impact the requirements for determination of OPERABILITY for systems, structures and components required by the LCO's of ITS Section 3.3.
3.3.4-3	L.1	CTS 3.3.1, Action 9	CTS 3.3.1, Action 9, requires restoring an inoperable channel within 48 hours or opening the RTCBs within the next hour. ITS 3.3.4, ACTION A, under the same conditions extends the time for opening the RTCBs to 6 hours. The DOC presentation of the safety significance of the proposed extension is confusing. COMMENT: Provide discussion on the safety significance of the proposed change.	Revised DOC L.1
3.3.4-4	None	CTS 3.3.1, Action 8	CTS 3.3.1, Action 8, allows 48 hours to restore an inoperable channel before action is required. ITS 3.3.4, Action C, under the same conditions, allows no restoration time before action is required. There is no discussion or justification for the change to CTS requirements. COMMENT: Provide discussion and justification for the change to CTS restoration time requirements.	Comment withdrawn at NRC staff request during Telephone conversation on 7/24/97.

ISSUE #	DOC # or JFD #	CTS/STS REF.	DESCRIPTION OF ISSUE	PVNGS RESPONSE
3.3.4-5 OOS & Generic to submittal	L.4 JFD 4	CTS Table 3.3-1, Action 5	CTS Table 3.3-1, Action 5, requires placing an Inoperable RTCB in the tripped position within 1 hour or be in Mode 3 within 6 hours. ITS 3.3.4, ACTION B proposed to add an option to open the redundant RTCB in the affected trip leg within 1 hour AND open the affected (inoperable) RTCB within 48 hours. This extends the CTS AOT from 1 hour to 48 hours in the ITS. This is a change to the CTS and to the STS and requires an approved TSTF. Explain the meaning of "failure evidence" as used in the L-DOC. CTS Action 5 allows startup or power operations to continue if the inoperable channel is tripped. Does this provide an allowance to startup with inoperable channels.? COMMENT: This extension of the CTS Allowed Outage Time is also a change to the STS. Provide a plant specific design or operational hardship justification for not adopting the STS. Explain the how the plant implements the operational allowances provided by CTS Action 5.	Revised JFD4 and DOC L.4 as discussed with NRC Staff in telephone conversation on 7/24/97.
3.3.4-6	JFD 6 JFD 1	Condition A Required Action C.1	Changes proposed to incorporate the NUREG note into the Condition. Changes proposed to NUREG Required Action. COMMENT: Change requires an industry and NRC approved TSTF.	TSTF 170 has been submitted for JFD 1. TSTF 83 has been approved for JFD 6. Revised JFD 1 based on discussions with NRC Staff in telephone conversation on 7/24/97.

ISSUE #	DOC # or JFD #	CTS/STS REF.	DESCRIPTION OF ISSUE	PVNGS RESPONSE
3.3.4-7	JFD 2	ITS SRs	Certain parts of the justification are unclear. The application of LTR CEN-327 in the NUREG is stated to be inconsistent with the PVNGS licensing basis and adoption of the LTR. Explain this discussion in more detail. Relate the discussion to the staffs SER on the Licensing Topical Report. COMMENT: Clarify the discussion points in JFD 2.	Revised JFD 2
3.3.4-8	A.2	CTS/ITS Applicability	The DOC states that the ITS prevents the interpretation that closing some, but not all RTCBs, or some, but not all CEAs capable of withdrawal does not meet the Mode applicability. Does the CTS maintain the some but not all positions by procedure? Or are there some other instruction to the operators? COMMENT: Provide additional discussion to support the A.2 DOC.	The PVNGS procedures use the same wording as the Technical Specifications. There are no additional instructions or procedures. The wording differences described in DOC A.2 are a clarification of the requirement that does not conflict with the current PVNGS operating practice.
3.3.4-9	L.3	ITS Condition D	The statement of acceptability of the ITS for PVNGS is unclear. COMMENT: Provide additional discussion to support the L.3 conclusions.	Revised DOC L.3 as discussed with NRC Staff in telephone conversation dated 7/24/97.
3.3.4-10	L.2	CTS Table 3.3-1 Actions 5 & 8	The proposed change justifies an allowance to close open circuit breakers for one hour in order to perform required surveillance testing. The discussion does not address the safety analysis basis for the proposed change. COMMENT: Provide discussion for the proposed change that addresses safety questions in the operation of the plant.	Revised DOC L.2

ISSUE #	DOC # or JFD #	CTS/STS REF.	DESCRIPTION OF ISSUE	PVNGS RESPONSE
3.3.4-11	A.4	ITS Action E	The ITS requirement to enter Action E to shut down the plant and the CTS requirement to enter LCO 3.0.3 are stated to be equivalent with no resulting (technical) changes. Are these requirement equivalent in all respects including reporting requirements? Explain. COMMENT: Provide additional explanation why the proposed change is administrative.	Refer to the Response to issue 3.3.1-17
3.3.4-12	JFD 8	ITS Bases	Proposed changes include addition of operability statements to the Background discussion. Statements regarding operability belong in the LCO section of the ITS. JFD 8 does not provide a safety analysis basis for the proposed change to the STS. The staff considers these proposed changes to be generic. COMMENT: Provide a markup of the LCO section, a revised bases and industry approved TSTF change	Revised ITS 3.3.4 Bases.

ISSUE #	DOC# or JFD#	CTS/STS REF.	DESCRIPTION OF ISSUE	PVNGS RESPONSE
3.3.5-1	A.1	CTS 4.3.2.2	CTS 4.3.2.2 requires demonstrating the operability of "total bypass function" every 18 months. ITS 3.3.5.3 requires calibration of the bypass removal channels every 18 months and ITS SR 3.3.5.5 requires a CHANNEL FUNCTIONAL TEST of each automatic bypass removal channel within 92 days prior to each reactor startup. There is no indication that the total bypass function is tested in ITS 3.3.5 as required by CTS 4.3.2.2. This less restrictive change is not justified. COMMENT: Provide discussion and justification for this less restrictive change.	ITS SR 3.3.5.3 requires a CHANNEL CALIBRATION each 18 months. A CHANNEL CALIBRATION calibrates the entire channel, including the sensor, and includes the CHANNEL FUNCTIONAL TEST of the bypass function. Since the entire channel is tested by the combination of the CHANNEL CALIBRATION and the CHANNEL FUNCTIONAL TEST, the total bypass function is demonstrated OPERABLE by this testing as required in CTS 4.3.2.2, and there is no change in the testing requirements.
3.3.5-2	LA.8 JFD 1	CTS Table 3.3-3, Action 13	CTS Table 3.3-3, Action 13, requires a special Plant Review Board review of the desirability of maintaining an inoperable channel bypassed, in accordance with CTS 6.5.1.6.g. A similar review and audit requirement is contained in Note 2 to STS LCO 3.3.5. Furthermore, the staff concluded that all review and audit programmatic requirements can be relocated to owner-controlled documents because sufficient control exists within the framework of current regulations. Therefore, a note should be added to ITS LCO 3.3.5 that maintains CTS requirements for prior review and approval of placing channels in bypass. COMMENT: Revise the ITS to adopt the STS.	Refer to the response to issue 3.3.1-4

ISSUE #	DOC# or JFD#	CTS/STS REF.	DESCRIPTION OF ISSUE	PVNGS RESPONSE
3.3.5-4 (Generic)	L.2	STS 3.3.5, Condition C	The L2 DOC is confusing. Statements about how the bypass removal function affects channel operability are unclear. Provide a rewritten DOC that states the proposed change and explain why there is not a significant safety question in the operation of the plant with the proposed ITS. COMMENT: Provide a revised DOC.	Revised DOC L.2
3.3.5-5 (OOS)	A.1	CTS Table 3.3-4, IV.A	CTS Table 3.3-4, Function IV.A (Main Steam Line Isolation), Steam Generator pressure - low, has an allowable value of ≥ 911 psia. ITS Table 3.3.5-1, Functions 4.a and 4.b (Steam Generator 1 and 2, respectively, pressure - low), have allowable values of ≥ 890 psia. This more restrictive change from ≥ 911 psia to ≥ 890 psia is not noted nor justified. COMMENT: This change to the CTS Allowable Value requires staff review.	During the ITS preparation Technical Specification Amendments 105 (Unit 1), 97 (Unit 2), and 77 (Unit 3) changed the MSIS setpoint from 919 psia to 890 psia. The correct value was used in the ITS, however the CTS page 3/4 3-25 used in the package did not have the Amendments included. A new CTS markup page is provided.

ISSUE #	DOC# or JFD#	CTS/STS REF.	DESCRIPTION OF ISSUE	PVNGS RESPONSE
3.3.5-6	JFD 2 L.5	STS SR 3.3.5.2 and SR 3.3.5.5	STS SR 3.3.5.2 requires a CFT of each ESFAS channel including each automatic bypass removal channel every 92 days when in MODE 1, 2, or 3. Further, STS SR 3.3.5.5 requires a CFT of each automatid ESFAS bypass removal channel once within 92 days prior to power ascension from MODE 4. ITS 3.3.5.2 does not propose to require a CFT of each automatic ESFAS bypass removal channel every 92 days when in MODE 1, 2, or 3. Specifically, this applies only to the pressurizer pressure - low bypass. The justification is based on the similarity to the automatic RPS bypass removal channels which do not require CHANNEL FUNCTIONAL TESTING in MODE 1, 2, or 3. Testing bypass removal function is applicable to both the RPS and the ESFAS if the automatic bypass removal functions have the potential to render safety systems inoperable during specified Modes of applicability. COMMENT: Provide justification for the STS deviation based on current licensing basis, system design, and operational constraints, showing why the CFT of the automatic bypass removal channels is not possible every 92 days while in MODE 1, 2, or 3.	Justification for this change was included in TSTF-74. This TSTF was approved 3/17/97.

ISSUE #	DOC# or JFD#	CTS/STS REF.	DESCRIPTION OF ISSUE	PVNGS RESPONSE
3.3.5-7	None	CTS Table 3.3-3 Notes (a) & (b) ITS Table 3.3.5-1 Notes (a) & (b)	Changes are made to the CTS table notes which are not documented in a CTS/ITS discussion of change. COMMENT: Provide a revised markup and a DOC for each change to CTS Table 3.3-3 Notation (a)	Revised the CTS markup and added DOC A.8.

ISSUE #	DOC# or JFD#	CTS/STS REF.	DESCRIPTION OF ISSUE	PVNGS RESPONSE
3.3.5-8	LA.2 LA.4 LA.5 LA.7 LA.X (generic)	DOC boilerplate in most Sections	The DOC states that the relocated portion of the CTS requirement is "not required to determine the operability of the system ...." Explain the meaning of this justification. There is insufficient detailed safety analysis to support the proposed changes. COMMENT: Provide justification for each proposed change.	Section 50.36 of Title 10 of the Code of Federal Regulations established the regulatory requirements related to the content of the Technical Specifications. The rule requires that the TS include items in specific categories, including Safety Limits, Limiting Conditions for Operations, and Surveillance Requirements; however the rule does not specify the particular requirements to be included in a plant's TS. The NRC developed criteria, as described in the "Final Policy Statement on Technical Specification Improvements for Nuclear Power Reactors" (58FR39132), to determine which of the design conditions and associated Surveillances need to be located in the Technical Specifications. The fundamental purpose of the Technical Specifications, as described in the Commission's final policy statement, is to impose those conditions or limitations on reactor operation necessary to obviate the possibility of an abnormal situation or event giving rise to an immediate threat to the public health and safety by identifying those features that are of controlling importance to safety and establishing on them certain conditions of operation which cannot be changed without prior Commission approval.

ISSUE #	DOC# or JFD#	CTS/STS REF.	DESCRIPTION OF ISSUE	PVNGS RESPONSE
3.3.5-8 (Cont'd)				These changes are acceptable because they will not affect the safe operation of the plant and do not impact the PVNGS safety analysis. These changes involve the relocation of descriptive details and information not needed to convey the requirements of the LCOs, Applicability, Actions, or Surveillance Requirements, from the CTS to a licensee controlled document (i.e. ITS Bases, TRM, UFSAR), which is not otherwise required to be in the Technical Specifications under 50.36. These changes are also not needed to obviate the possibility that an abnormal situation or event will give rise to an immediate threat to the public health and safety. The descriptive details that are relocated to a licensee controlled document are based on NUREG 1432, which has been reviewed by the NRC staff. The Technical Specification requirements that remain are consistent with current licensing practices, operating experience, and plant accident and transient analyses, and provide reasonable assurance that public health and safety will be protected. Specifically: LA.2 is a statement regarding ESFAS instrumentation channel trip setpoint being less conservative than the allowable values.

ISSUE #	DOC# or JFD#	CTS/STS REF.	DESCRIPTION OF ISSUE	PVNGS RESPONSE
3.3.5-8 (Cont'd)				LA.4 includes a list of channel process measurement circuits that affect multiple functional units. LA.5 is a discussion of an ESFAS channel being placed in bypass and a second channel of the same function being placed in trip. LA.7 is a statement describing the percent level specified in the table for Steam Generator Level Setpoint. Relocation of the above information does not delete requirements. The relocation moves descriptive information and details from the CTS to a Licensee Controlled Document. The relocation of this information and detail does not impact the requirements for determination of OPERABILITY for systems, structures and components required by the LCO's of ITS Section 3.3.
3.3.5-9	L.1	Table 3.3-3 Action 13	The changes made to CTS Action 13 in the ITS is not presented by DOC L1 in a meaningful discussion that addresses each change individually and provides a safety analysis justification for each change. COMMENT: Provide justification for each proposed change.	Revised DOC L.1

ISSUE #	DOC# or JFD#	CTS/STS REF.	DESCRIPTION OF ISSUE	PVNGS RESPONSE
3.3.5-10	none	Table 3.3-3 Note *	Note * modifies both Actions 13 and 14 in the CTS, the ITS proposes to delete Note *. Changes are proposed to the CTS table note which are not documented in a CTS/ITS discussion of change. COMMENT: Provide justification for each proposed change.	Revised CTS markup Added DOC A.9
3.3.5-11	LA.7	Table 3.3-4 Notes (2) & (4)	Each of the notes proposed to be relocated establish a reference for the TS allowable value limits without which the TS numbers have no meaning. Explain why the details are "not required to determine operability." COMMENT: Provide justification for each proposed change.	Refer to the response to issue 3.3.5-8
3.3.5-12	A.7	ITS Action E	The ITS requirement to enter Action E to shut down the plant and the CTS requirement to enter LCO 3.0.3 are stated to be equivalent with no resulting (technical) changes. Are these requirements equivalent in all respects including reporting requirements? Explain. COMMENT: Provide additional explanation why the proposed change is administrative.	Refer to the response to issue 3.3.1-17

ISSUE #	DOC# or JFD#	CTS/STS REF.	DESCRIPTION OF ISSUE	PVNGS RESPONSE
3.3.5-13	JFD 10	ITS B 3.3.5	New Issue	The ITS 3.3.5 Bases includes information for actions required with an inoperable process measurement channel, to trip or bypass associated functional units. Additional information is added to provide instructions for a inoperable Steam Generator Pressure Difference - High Channel, since this provides an input to the AFAS logic circuits. With an inoperable Steam Generator Pressure Difference channel inoperable the SG rupture detection circuit is not available to prevent providing feedwater to a ruptured SG. This information is added to the Insert 1.

ISSUE #	DOC # or JFD #	CTS/STS REF	DESCRIPTION OF ISSUE	PVNGS RESPONSE
3.3.6-1	L.1	Addition of Action C	CTS is changed to include an action for the condition of two actuation logic or two manual channels inoperable and which affect the same trip leg. The L1 DOC does not give a safety analysis of the one hour time limit to open a trip breaker vice the CTS requirement to enter LCO 3.0.3. COMMENT: Provide a revised DOC L.1.	Revised DOC L.1
3.3.6-2	L.5	CTS Table 3.3-3 Action 16	CTS Table 3.3-3, Action 16 requires if one less that the total number of channels is Inoperable, be in Mode 3 within 6 hours and Mode 4 within the following 6 hours. ITS 3.3.6 Action D allows a restoration period of 48 hours before the Mode changes are required. This is an extension of the CTS AOT. DOC L5 discusses changes made to CTS Action 18. The L5 discussions are not relevant to Action 18. COMMENT: The extension of CTS Allowed Outage Time to 48 hours requires staff approval. Correct the L.5 DOC to include justifications consistent with the proposed CTS markup.	Revised DOC L.5

ISSUE #	DOC # or JFD #	CTS/STS REF	DESCRIPTION OF ISSUE	PVNGS RESPONSE
3.3.6-3	LA.3	CTS Table 4.3-2 Note 3	CTS Table 4.3-2 Note 3 includes a list of Actuation Devices that are not tested at power and a list of Actuation Devices that are partially tested at power. ITS 3.3.6 does not include this information. The DOC states that the ITS refer to the UFSAR for this information. ITS 3.3.6 does not refer to the UFSAR for the information. For the list of relays that are now included in the FSAR, provide a FSAR reference to the list in the Bases for SR 3.3.6.2. There is inadequate justification for removing the detailed information from the CTS. COMMENT: Provide additional justification for removing the detailed list of Actuation Devices from the CTS including where in the ITS the reference to the UFSAR is located.	The ITS 3.3.6 Bases for SR 3.3.6.2 state these lists are located in reference 1. The Bases reference 1 is the UFSAR. The justification for relocating the component lists to the UFSAR is described in the response to issue 3.3.1-11
3.3.6-4	L.3	CTS Table 3.3-3 Action 12	The CTS Action 12 changes justified in the ITS by DOC L3 needs to discuss each change individually and provide a safety analysis basis for each change. COMMENT: Provide additional justification for changing the Mode requirements in the CTS.	Revised DOC L.3 and L.2

ISSUE #	DOC # or JFD #	CTS/STS REF	DESCRIPTION OF ISSUE	PVNGS RESPONSE
3.3.6-5	L.4	CTS Table 3.3-3 Action 17	CTS Table 3.3-3 Action 17 requires restoration of an Inoperable Matrix Logic Channel within 48 hours or entry into Mode 3 in 6 hours and Mode 5 in the next 30 hours. ITS 3.3.6 Action E for the same conditions requires entry into Mode 3 within 6 hours and Mode 4 within 12 hours. The CTS Action 17 changes justified in the ITS by DOC L4 needs to address each change and provide an adequate safety analysis justification for each change. COMMENT: Provide additional justification for changing the Mode requirements in the CTS.	Revised DOC L.4
3.3.6-6	JFD 11	Bases p. B3.3-10	Proposed changes include addition of operability statements to the Background discussion. Statements regarding operability belong in the LCO section of the ITS. JFD 11 does not provide a safety analysis basis for the proposed change to the STS. The staff considers these proposed changes to be generic. COMMENT: Provide a markup of the LCO section, a revised bases and industry approved TSTF change.	The ITS 3.3.6 Bases and the LCO sections have been revised. ITS 3.3.5 Bases were revised to remain consistent with ITS 3.3.6. The additions to the LCO section is detail for the LCO requirements, explanation of the relationship between LCO 3.3.5 and 3.3.6, a description of the LCO 3.3.6 Condition A common power source failure, and descriptive detail of the ESFAS Logic operation. This information is copied from LCO 3.3.4 RPS Logic Bases with the necessary changes to describe the ESFAS Logic. The equipment and requirements for the ESFAS and RPS are the same with the exception that the RPS Initiation Logic opens the RTCBs and the ESFAS opens contacts in the Actuation Logic. The changes have been made for consistency between the RPS and ESFAS Logic Bases.

ISSUE #	DOC # or JFD #	CTS/STS REF	DESCRIPTION OF ISSUE	PVNGS RESPONSE
3.3.6-7	JFD 9	ITS Action A	Changes proposed to incorporate the NUREG note into the Condition COMMENT: Change requires an industry and NRC approved TSTF.	TSTF 83 has been submitted for this change.
3.3.6-8	JFD 6 L.7	ITS Table 3.3.6-1	Proposed note (a) states that if the valves isolated by MSIS are closed then the actuation function is not required. COMMENT: Change requires an industry and NRC approved TSTF.	The ITS adds a Note for the Main Steam Isolation Signal (MSIS) Function that states the MSIS Function is not required to be operable when all of the associated valves isolated by the MSIS function are closed. NUREG-1432 has a similar note in Table 3.3.5-1 Note (d) that states the ESFAS measurement channels do not have to be operable if the associated valves isolated by the MSIS Function are closed. The Note was added to LCO 3.3.6 ESFAS Logic and Manual Trip, to be consistent with LCO 3.3.5. The MSIS function is designed to isolate the steam generators to prevent a cooldown during an excessive steam flow, or if the level in the steam generator is high enough for moisture carry over. When all of the valves isolated by the MSIS function are closed there is no need for the MSIS function because excessive steam flow or moisture carry over are not possible. The added note is added to provide consistency between LCO 3.3.5 ESFAS Instrumentation and LCO 3.3.6 ESFAS Logic and Manual Trip. The change was not considered generic because it was considered below the threshold needed for processing a generic change.

ISSUE #	DOC # or JFD #	CTS/STS REF	DESCRIPTION OF ISSUE	PVNGS RESPONSE
3.3.6-9	M.1	ITS required matrix channels	DOC M1 discusses the note to Condition A which applies to three matrices inoperable due to inoperable power supplies. COMMENT: Correct the ITS Action A markup to include the note.	Revised DOC M.1
3.3.6-10	M.2		The M2 bubble in the CTS markup includes the MSIS which is not discussed in the DOC. The DOC discussion does not address any safety questions with regard to the proposed addition of requirements. COMMENT: Provide revised submittal pages.	Revised DOC M.2 Revised CTS markup pages

ISSUE #	DOC # or JFD #	CTS/STS REF.	DESCRIPTION OF ISSUE	PVNGS RESPONSE
3.3.7-1	M.4	CTS 3.3.2 Action 19a	CTS 3.3.2, Action 19a requires 8 hours restoration time for a degraded voltage relay. ITS 3.3.7 Action C reduces the restoration time to 1 hour. There is inadequate justification for reducing the restoration period. COMMENT: Provide additional justification for the reduction in restoration time for degraded voltage relays.	Revised DOC M.4.
3.3.7-2	M.2	CTS SR 4.3.2.3	M2 states that the CTS required ESF response time test is the same test as the delay time test in the ITS. While there may be common elements in both tests the statement is not an adequate justification for delay time testing additions to the ITS. COMMENT: Provide a revised justification for proposed CTS changes.	Revised DOC M.2
3.3.7-3	A.3 JFD2 JFD3	CTS 3.3.2	Proposed ITS 3.3.7 deletes CTS requirements for degraded voltage instrumentation. CTS require 4 channels per bus of loss of voltage instruments and 4 channels per bus of degraded voltage instruments. The JFD fails to make the case that representing the design as four channels with inputs from two different functions is consistent with the current licensing basis approved by the staff COMMENT: Revise ITS LCO to include 4 channels of degraded voltage instrumentation.	Revised LCO 3.3.7 as discussed in telephone conversation with the NRC staff on 7/24/97

ISSUE #	DOC # or JFD #	CTS/STS REF.	DESCRIPTION OF ISSUE	PVNGS RESPONSE
3.3.7-4	M.1	CTS Table 3.3-2 and Table 3.3-4	Proposed ITS Mode 4 LOV & Degraded Voltage applicability requirement are less restrictive than CTS requirements because instrument operability in the CTS was at all times in Mode 4, whereas ITS requirements only include those conditions when the associated DG is required to be operable. COMMENT: Provide a L DOC for this proposed change.	CTS Table 3.3-3, Item VIII lists the Applicable Modes for both the Degraded Voltage and Loss of Voltage functions as Mode 1, 2, and 3. The CTS does not require the OPERABILITY of the DV and LOV in Mode 4.
3.3.7-5	A.2	CTS Table 3.3-3, note (e)	The A2 DOC is confusing. The design information provided by CTS note (e) is described most aptly in the Bases. The movement of design information to the Bases is an "LA" change. COMMENT: Provide an "LA" DOC for the proposed CTS change.	Added DOC LA.5 Deleted DOC A.2
3.3.7-6	M.3	ITS 3.3.7	Is it PVNGS practice to enter all applicable CTS conditions that apply at times specified by proposed ITS Actions B and D? If not, revise the M3 DOC to clarify any differences in practices between current and proposed requirements. COMMENT: Provide revised DOC as necessary.	Revised DOC M.3 The ITS Action D differences between the ITS and CTS are discussed in DOC L.3. It is the PVNGS practice to enter all applicable CTS conditions that apply at the times specified in ITS Action B.

PVNGS ITS 3.3.7 DIESEL GENERATOR - LOSS OF VOLTAGE START

ISSUE #	DOC # or JFD #	CTS/STS REF.	DESCRIPTION OF ISSUE	PVNGS RESPONSE
3.3.7-7	L.3	CTS Action 19	The second and fourth sentences of the DOC don't appear to be germane to the justification for the less restrictive change. The DOC needs to discuss why there are no safety questions in the operation of the plant in adopting the less restrictive ITS. COMMENT: Provide a revised DOC for the proposed changes.	Revised DOC L.3
3.3.7-8	M.4	CTS 3.3.2 Action 19.a	The DOC needs to provide a safety basis discussion for adopting the more restrictive changes. COMMENT: Provide a revised DOC justification.	Revised DOC M.4
3.3.7-9	LA.4	CTS figure 3.3-1	The LA.4 DOC needs to justify why the deleted figure is not required to determine operability. If the figure is not required why is the CTS figure relocated? Additional explanation citing specific reasons for this conclusion are needed to support the proposed changes. COMMENT: Provide additional justification.	The only information needed for operability is the calibration information for the relays that is located in SR 3.3.7.3. The figure is a graphical representation of the inverse voltage time characteristics of the relays. See also the response to issue 3.3.1-11.

ISSUE #	DOC # or JFD #	CTS/STS REF.	DESCRIPTION OF ISSUE	PVNGS RESPONSE
3.3.7-10	JFD1	CTS Action 13	Before TS ESF channels can be placed in bypass the CTS require review and audit procedures to be implemented for approval. A similar requirement is in the STS. In addition, the staff concluded that all review and audit programmatic requirements can be relocated to owner-controlled documents because sufficient control exists within the framework of current regulations. Add a note to PVNGS ITS that maintains CTS requirements for prior review and approval of placing channels in bypass. COMMENT: Revised the ITS to include a note for plant review board approval prior to placing a channel in bypass.	Refer to the response to issue 3.3.1-4
3.3.7-11	JFD5	ITS SR 3.3.7.3	Additional discussion is required to prove that the proposed ITS channel calibration allowable values and time delay relay allowable values are consistent with CTS. COMMENT: Provide additional discussion.	ITS SR 3.3.7.3 requires the Degraded voltage time delay ≤ 35 seconds at 3744 V. This value is from UFSAR Table 7.3.1B that lists the response time as ≤35 seconds for a Degraded Voltage of 90%. The nominal voltage is 4.16kV, so the 90% value is 3744V. The response time acceptance criteria was relocated from the Technical Specifications by Amendments 88 (Unit 1), 75 (Unit 2), and 59 (Unit 3), based on the guidance in GL 93-08 "Relocation of Technical Specification Tables of Instrument Response Time Limits". ITS SR 3.3.7.3 requires the Loss of Voltage time delay ≤ 11.4 seconds at 2929.5V. This value is from CTS Table 3.3-1.

PVNGS ITS 3.3.7 DIESEL GENERATOR - LOSS OF VOLTAGE START

ISSUE #	DOC # or JFD #	CTS/STS REF.	DESCRIPTION OF ISSUE	PVNGS RESPONSE
3.3.7-12	JFD2 M2	ITS LCO CTS delay relay times	Proposed ITS deletes CTS requirements for 4 channels of degraded voltage relays. The CTS markup includes degraded voltage time delay settings. FSAR page 8.3-42 | Revision 7 (1995) states that each 4.16kV bus has 4 induction disc undervoltage relays with built in time delays and 4 solid state undervoltage relays with built in time delay. The solid state relay time delays are shown in the CTS markup as the degraded voltage TS functions. COMMENT: Revise the ITS LCO to include both loss of voltage and degraded voltage relays.	Revised LCO 3.3.7

ISSUE #	DOC # or JFD #	CTS/STS REF	DESCRIPTION OF ISSUE	PVNGS RESPONSE
3.3.8-1	M.3	CTS 4.9.9	CTS requires verification that containment purge isolation occurs on manual initiation and on CPIAS. ITS SR 3.9.3.2 is identified as encompassing the testing requirements of ITS 3.3.8. ITS SR 3.9.3.2 does not verify Containment Purge Valve Isolation on a manual initiation. COMMENT: Provide corrected discussion and justification for the change.	Revised DOC M.3.
3.3.8-2	M.4	CTS 3.3.3.1	CTS Surveillance Requirement 3.3.3.1 requires restoration of an out of tolerance radiation monitoring channel setpoint within 4 hours or declare the channel inoperable. ITS does not specify time to restore the set point to the proper values. Additional safety basis justification for this change to CTS requirements is needed. COMMENT: Provide additional discussion and justification for changing restore times in the CTS requirements.	Revised DOC M.4
3.3.8-3	M.5	CTS 3.3.3.1 Action c	CTS 3.3.3.1, Action c, allows an exemption from CTS 3.0.3 and 3.0.4. ITS 3.3.8 does not retain this allowance. Provide additional safety analysis justification for the change to CTS requirements. COMMENT: Provide additional discussion and justification for applying ITS 3.0.3 and 3.0.4 to this requirement.	Revised DOC M.5

ISSUE #	DOC # or JFD #	CTS/STS REF	DESCRIPTION OF ISSUE	PVNGS RESPONSE
3.3.8-4	L.2	CTS 4.3.3.1	CTS SR 4.3.3.1 requires a CHANNEL FUNCTIONAL TEST of the radiation monitors prior to a release with ### note and weekly with ## note. There is inadequate safety analysis justification for this extension of the CTS STI. The CTS ### and ## notes are not analyzed as part of the DOCs. COMMENT: This extension of the CTS DOCs require additional justification.	The CTS Note ## is discussed in DOC L.3 Added DOC L.4 to discuss CTS Note ### The CPIAS radiation monitors have approximately 0.40 failures per year, and 0.1 failures per quarter, that are detectable by the Channel Functional Test. This is consistent with other similar radiation monitors that are tested quarterly or each 18 months during the calibration. Most failures of these radiation monitors result in alarms that alert the operator to a failure. The deletion of the Channel Functional Test does not have a significant effect on the reliability of the radiation monitors, and the probability of a random failure in more than one redundant channels during a Quarterly interval is low
3.3.8-5	M.6	None	ITS 3.3.8, Action A, specifies the REQUIRED Actions for CPIAS Manual Trip, Actuation Logic, or radiation monitor in MODES 1, 2, 3, and 4. There are no CTS requirements for the same conditions. Provide additional safety analysis justification for the change to the CTS requirements. COMMENT: Provide additional discussion and justification for the change to CTS requirements for CPIAS Manual Trip and Actuation Logic or radiation monitor in MODES 1-4.	Revised DOC M.6

ISSUE #	DOC # or JFD #	CTS/STS REF	DESCRIPTION OF ISSUE	PVNGS RESPONSE
3.3.8-6	LA.2	CTS Table 3.3-6	Provide additional safety analysis justification for moving CTS requirements to plant procedures. COMMENT: Provide additional justification for proposed changes.	Section 50.36 of Title 10 of the Code of Federal Regulations established the regulatory requirements related to the content of the Technical Specifications. The rule requires that the TS include items in specific categories, including Safety Limits, Limiting Conditions for Operations, and Surveillance Requirements; however the rule does not specify the particular requirements to be included in a plant's TS. The NRC developed criteria, as described in the "Final Policy Statement on Technical Specification Improvements for Nuclear Power Reactors" (58FR39132), to determine which of the design conditions and associated Surveillances need to be located in the Technical Specifications. The fundamental purpose of the Technical Specifications, as described in the Commission's final policy statement, is to impose those conditions or limitations on reactor operation necessary to obviate the possibility of an abnormal situation or event giving rise to an immediate threat to the public health and safety by identifying those features that are of controlling importance to safety and establishing on them certain conditions of operation which cannot be changed without prior Commission approval.

[illegible]

ISSUE #	DOC # or JFD #	CTS/STS REF	DESCRIPTION OF ISSUE	PVNGS RESPONSE
3.3.8-6 (Cont'd)				These changes are acceptable because they will not affect the safe operation of the plant and do not impact the PVNGS safety analysis. These changes involve the relocation of descriptive details and information not needed to convey the requirements of the LCOs, Applicability, Actions, or Surveillance Requirements, from the CTS to a licensee controlled document (i.e. ITS Bases, TRM, UFSAR), which is not otherwise required to be in the Technical Specifications under 50.36. This change is not needed to obviate the possibility that an abnormal situation or event will give rise to an immediate threat to the public health and safety. The descriptive details that are relocated to a licensee controlled document are based on NUREG 1432, which has been reviewed by the NRC staff. The Technical Specification requirements that remain are consistent with current licensing practices, operating experience, and plant accident and transient analyses, and provide reasonable assurance that public health and safety will be protected. Specifically: LA.2 lists the measurement range for each radiation monitor.

ISSUE #	DOC # or JFD #	CTS/STS REF	DESCRIPTION OF ISSUE	PVNGS RESPONSE
3.3.8-6 (Cont'd)				Relocation of the above information does not delete requirements. The relocation moves descriptive information and details from the CTS to a Licensee Controlled Document. The relocation of this information and detail does not impact the requirements for determination of OPERABILITY for systems, structures and components required by the LCO's of ITS Section 3.3.
3.3.8-7	L.3	CTS Table 3.3-6	CTS Applicability is during purge operations. The ITS proposes to adopt STS Applicabilities. The DOC discussion does not clearly identify what is less restrictive about the proposed ITS. COMMENT: Provide a clear statement of the less restrictive nature of the proposed ITS.	The CTS Applicability requires the CPIAS radiation monitors in Modes 5 and 6. The ITS applicability does not require the CPIAS radiation monitors in Modes 5 and 6, unless CORE ALTERATIONS, or movement of Irradiated fuel assemblies is in progress.
3.3.8-8	L.1	CTS Table 3.3-6 Action 26	The underlying justification for alternate actions to closing the purge valves is to exit the Mode of applicability, which is always an option for complying with LCOs. COMMENT: Provide clarification of the proposed DOC.	Revised DOC L.1
3.3.8-9	A.2	CTS Table 3.3-6 Action 26	Explain the administrative nature of the addition of manual and logic element to the CTS limits in adopting the ITS. COMMENT: Provide clarification of the proposed DOC.	The addition of CPIAS Actuation Logic and Manual Trip to the LCO is discussed in DOC M.6. The change discussed in DOC A.2 is the format change of the Action from listing the required number of Operable channels, to specifying the required channels inoperable.

DIR

ISSUE #	DOC # or JFD #	CTS/STS REF	DESCRIPTION OF ISSUE	PVNGS RESPONSE
3.3.8-10	A.5	CTS Table 4.3-3 Function 1.c, CH. CK.	DOC A.5 discusses the equivalence of current channel check requirements as compared to proposed ITS testing. ITS SR 3.0.4 ensures surveillance testing is met prior to entering the LCO. Therefore, proposed ITS changes are less restrictive than CTS SR 4.3.3.1 since there is no ITS mechanism to ensure testing is performed just prior to release and if purge is in service for greater than 12 hours. COMMENT: Provide revised discussion of change justification.	The CTS requires a CHANNEL CHECK at the frequency P#. CTS Table 1.1 defines P as "Completed prior to each release" . CTS Table 4.3-3 Note # states: "If purge is in service for greater than 12 hours, perform once per 12 hours." ITS SR 3.3.8.1 requires a CHANNEL CHECK at a frequency of 12 hours. The ITS LCO 3.3.8 Applicability is Modes 1, 2, 3, 4, during Core Alterations, or during Movement of irradiated fuel assemblies within containment, when the penetration is not isolated by at least one closed automatic valve. ITS SR 3.0.4 ensures that SR 3.3.8.1 is met prior to entering the LCO applicability (purging in Modes 1, 2, 3, 4, during Core Alterations, or Movement of irradiated fuel). This is equivalent to the frequency "P" in the CTS. As long as purge continues in these conditions the SR 3.3.8.1 must be performed each 12 hours. This is equivalent to the # Note in the CTS. There is no difference in the CTS and ITS surveillance intervals, and this change is administrative in nature.
3.3.8-11	M.1	ITS Action C	Provide additional DOC discussion to identify what is more restrictive about the proposed ITS. COMMENT: Provide revised DOC justifications.	Deleted DOC M.1 DOC M.6 discusses the addition of the CPIAS Actuation Logic and Manual Trip to the ITS. DOC M.1 was redundant.
3.3.8-12	M.2	ITS Action B	M.2 is not consistent with the NUREG as stated. Revise the condition to adopt the STS. COMMENT: Provide revised ITS and DOCS.	Revised DOC M.2.

ISSUE #	DOC # or JFD #	CTS/STS REF	DESCRIPTION OF ISSUE	PVNGS RESPONSE
3.3.8-13	JFD5 JFD6	ITS	Deviations from the STS are limited to those necessary based on design, or operational constraints. Proposed ITS actions result in the same actions that would be taken if the STS were adopted. COMMENT: Provide operational constraint or design justification for each proposed deviation from STS.	These actions are based on the current licensing basis. The actions ensure that the containment purge valves are fully closed if the CPIAS is not Operable, preventing a radiation release in the event of a radiation accident inside containment. In addition the containment purge valve receive a close signal on a CIAS, independent of the CPIAS actuation.
3.3.8-14	Bases	ITS	The Bases state that setpoints in accordance with the Allowable Values will ensure the safety limits are not violated.... yet the Safety Analysis Bases state these functions are not assumed in mitigating containment radiation releases and Criterion 3 applies. How are these positions consistent with one another. COMMENT: Provide additional explanation.	The ITS 3.3.8 and 3.3.9 Bases are revised to remove the references to the Safety Limits. The setpoints in LCOs 3.3.8 and 3.3.9 are not required to ensure the Safety Limits in section 2.0 are violated. The setpoints ensure that the consequences of accidents are acceptable.

ISSUE #	DOC # or JFD #	CTS/STS REF..	DESCRIPTION OF ISSUE	PVNGS RESPONSE
3.3.9-1	M.1	CTS 3.3.3.1, Action a	CTS 3.3.3.1, Action a, requires that with a radiation monitoring channel alarm/trip setpoint exceeding the value shown in Table 3.3-6, adjust the setpoint to within the limit within 4 hours or declare the channel inoperable. This statement is not entirely included in ITS 3.3.9. ITS 3.3.9, Required Action A.1, requires the setpoints within the allowable value or declaring the channel inoperable. ITS 3.3.9 does not allow 4 hours to restore the setpoint to the proper value. The removal of this CTS restoration time constitutes a more restrictive change. The discussion of the change is inadequate in that it does not include a safety analysis justification for changing the AOT. COMMENT: Provide additional discussion and justification for the more restrictive change.	Revised DOC M.1
3.3.9-2	M.3	STS SR 3.3.9.3 CTS 4.3.2.1	ITS SR 3.3.9.3 requires a CHANNEL FUNCTIONAL TEST of the CREFAS Actuation Logic. This channel test is not a requirement in the CTS. The discussion of the change is inadequate in that it does not include a safety analysis justification for adding the SR. COMMENT: Provide additional discussion and justification for the more restrictive change.	Revised DOC M.3

5

ISSUE #	DOC # or JFD #	CTS/STS REF..	DESCRIPTION OF ISSUE	PVNGS RESPONSE
3.3.9-3	M.4	STS SR 3.3.9.5 CTS 4.3.2.1	ITS SR 3.3.9.5 requires a CHANNEL FUNCTIONAL TEST of the CREFAS manual trip Function. There is no requirement for this test in the CTS. The discussion of the change is inadequate in that it does not include a safety analysis justification for adding the SR. COMMENT: Provide additional discussion and justification for the more restrictive change.	Revised DOC M.4
3.3.9-4	M.5	CTS Tables 3.3-6 and 4.3-3 Item 2B CTS Table 3.3-3 IX	CTS Tables 3.3-6 and 4.3-3 Item 2B requires the radiation monitors for the CREFAS to be Operable in all Modes, and CTS Table 3.3-3 Item IX, CREFAS requires the CREFAS automatic actuation logic operable in all Modes. ITS 3.3.9 Applicability requires the CREFAS to be operable in Modes 1, 2, 3, 4, 5, and 6, during movement of irradiated fuel assemblies. This change reduces the requirement of <u>all MODES</u> to MODES 1 through 5, and 6 if fuel movement is in progress. This is a less restrictive change which is not analyzed. COMMENT: Provide additional discussion and justification for the less restrictive change.	The CTS requires the CREFAS to Operable in Modes 1, 2, 3, 4, 5, and 6. The ITS requires the CREFAS to be Operable in Modes 1, 2, 3, 4, 5, 6, and during the movement of irradiated fuel assemblies. The ITS is more restrictive because it requires the Operability of the CREFAS during the movement of irradiated fuel assemblies when the plant is not in Modes 1 - 6. Revised DOC M.5 to clarify the change. Revised Action C for consistency with LCO Applicability.

PVNGS ITS 3.3.9 CONTROL ROOM ESSENTIAL FILTRATION ACTUATION SIGNAL

ISSUE #	DOC # or JFD #	CTS/STS REF.	DESCRIPTION OF ISSUE	PVNGS RESPONSE
3.3.9-5	M.7 M.6	CTS Table 3.3-3 Action 18	CTS Table 3.3-3 Action 18 states in part that operation may continue for up to 6 hours with an inoperable channel provided at least 1 train of essential ventilation is ih operation, otherwise action is to be taken to shutdown the plant. ITS 3.3.9 Required Actions A and B state that the essential ventilation must be placed in operation in one hour otherwise shutdown the plant. CTS 3.3-6 Action 26 requires the same Action as ITS 3.3.9 Required Action A.1, but not Action B.1 and B.2 but it appears to apply to the same equipment. ITS 3.3.9 requirements try to unify these actions. However, the 6 hour AOT for putting CREFAS into operation is not analyzed by the DOC for Action 26. Both M6 and M7 DOCs require additional justification of the safety enhancements that will result from adding the proposed more restrictive actions. COMMENT: Provide additional discussion and justification for the more restrictive change.	Revised DOC M.6 Revised DOC M.7

ISSUE #	DOC # or JFD #	CTS/STS REF..	DESCRIPTION OF ISSUE	PVNGS RESPONSE
3.3.9-6	LA.3 LA.4 LA.5	CTS 3.3.2	The DOC states that the relocated portion of the CTS requirement is "not required to determine the operability of the system ...." Explain the meaning of this justification. There is insufficient detailed safety analysis to support the proposed changes. COMMENT: Provide an appropriate safety basis discussion.	Section 50.36 of Title 10 of the Code of Federal Regulations established the regulatory requirements related to the content of the Technical Specifications. The rule requires that the TS include items in specific categories, including Safety Limits, Limiting Conditions for Operations, and Surveillance Requirements; however the rule does not specify the particular requirements to be included in a plant's TS. The NRC developed criteria, as described in the "Final Policy Statement on Technical Specification Improvements for Nuclear Power Reactors" (58FR39132), to determine which of the design conditions and associated Surveillances need to be located in the Technical Specifications. The fundamental purpose of the Technical Specifications, as described in the Commission's final policy statement, is to impose those conditions or limitations on reactor operation necessary to obviate the possibility of an abnormal situation or event giving rise to an immediate threat to the public health and safety by identifying those features that are of controlling importance to safety and establishing on them certain conditions of operation which cannot be changed without prior Commission approval.

ISSUE #	DOC # or JFD #	CTS/STS REF..	DESCRIPTION OF ISSUE	PVNGS RESPONSE
3.3.9-6 (Cont'd)				These changes are acceptable because they will not affect the safe operation of the plant and do not impact the PVNGS safety analysis. These changes involve the relocation of descriptive details and information not needed to convey the requirements of the LCOs, Applicability, Actions, or Surveillance Requirements, from the CTS to a licensee controlled document (i.e. ITS Bases, TRM, UFSAR), which is not otherwise required to be in the Technical Specifications under 50.36. These changes are also not needed to obviate the possibility that an abnormal situation or event will give rise to an immediate threat to the public health and safety. The descriptive details that are relocated to a licensee controlled document are based on NUREG 1432, which has been reviewed by the NRC staff. The Technical Specification requirements that remain are consistent with current licensing practices, operating experience, and plant accident and transient analyses, and provide reasonable assurance that public health and safety will be protected. Specifically: LA.3 is a statement that the trip setpoints are consistent with the values in Table 3.3-4.

ISSUE #	DOC # or JFD #	CTS/STS REF..	DESCRIPTION OF ISSUE	PVNGS RESPONSE
3.3.9-6 (Cont'd)				LA.4 is a statement regarding ESFAS instrumentation trip setpoints. LA.5 lists details regarding the number of ESFAS channels requried. Relocation of the above information does not delete requirements. The relocation moves descriptive information and details from the CTS to a Licensee Controlled Document. The relocation of this information and detail does not impact the requirements for determination of OPERABILITY for systems, structures and components required by the LCO's of ITS Section 3.3.

ISSUE #	DOC # or JFD #	CTS/STS REF..	DESCRIPTION OF ISSUE	PVNGS RESPONSE
3.3.9-7	LA.6	CTS 3.3.2, CTS Table 3.3-4	ITS SR 3.3.9.2 proposes to retain the trip setpoint and relocate the allowable value. In the CTS this is an ESFAS function. Explain why ESFAS function allowable valued are retained in ITS 3.3.2 while the trip setpoint is relocated and the opposite is proposed for this LCO? The Bases for ITS 3.3.9 (retype) specifies Allowable Value as the controlling limit. The DOC states that instrument values for these limits is the same because the instrumentation is digital and is not subject to the setpoint drift present in analog instrumentation. COMMENT: Provide additional justification.	The ESFAS setpoints are based on the analytical limits in the safety analysis. To allow for calibration tolerances, instrumentation uncertainties, and instrument drift, the allowable values are specified to ensure the setpoints are maintained conservative to the analytical limits under all conditions. The difference between the trip setpoint and the allowable value is the instrument drift, tolerances, and instrumentation uncertainties expected between Channel Functional Tests. For the CREFAS radiation monitors the setpoint is a digital value stored in memory. Since there is no drift, calibration tolerance, or instrumentation uncertainties associated with this setpoint, the setpoint is the same as the allowable value. The use of the setpoint for the calibration information, instead of the allowable value is consistent with the CTS Specification 3.3.3.1 and the other radiation monitors in that specification.

ISSUE #	DOC # or JFD #	CTS/STS REF..	DESCRIPTION OF ISSUE	PVNGS RESPONSE
3.3.9-8	JFD 7 M.5 M.6	STS 3.3.9 Applicability	ITS 3.3.9 Applicability proposes: "MODES 1, 2, 3, 4, 5, and 6, During movement of irradiated fuel assemblies." STS 3.3.9 Applicability included CORE ALTERATIONS that is deleted in the ITS. JFD7 states that CORE ALTERATIONS can only occur in MODE 6. ITS 3.3.9 Applicability as it is presented would permit CREFAS to be inoperable during CORE ALTERATIONS but not during movement of irradiated fuel. This appear to be an inconsistent practice. There is also inconsistency with commitments to maintain CORE ALTERATIONS as discussed in DOC M6 and JFD7. The CTS 3.3.3.1 proposed insert for Action 26 requires suspension of CORE ALTERATIONS if CREFAS cannot be placed in operation. This is inconsistent with proposed Applicability for ITS 3.3.9. COMMENT: Provide justification for the STS deviation and provide a consistent CTS to ITS markup with corresponding JFDs.	ITS does not permit the CREFAS to be inoperable during CORE ALTERATIONS as stated in the description of this issue. ITS 3.3.9 requires the CREFAS to be Operable in Modes 1,2,3,4,5,6 and during the movement of irradiated fuel assemblies. Since the CREFAS must be Operable during Mode 6 and CORE ALTERATION can only occur in Mode 6, the CREFAS must be Operable during CORE ALTERATIONS. The Mode Applicability of "during CORE ALTERATIONS" is not needed to define the Mode Applicability requirements of this LCO. Revised DOC M.5. Revised DOC M.6 CTS Action 26 requires the suspension of CORE ALTERATIONS. This is consistent with ITS Action C.2.3.

ISSUE #	DOC # or JFD #	CTS/STS REF..	DESCRIPTION OF ISSUE	PVNGS RESPONSE
3.3.9-9	Bases	ITS B3.3-148	The Bases Background discussion states that two CREFAS trains are actuated on a one-out-of-two channel logic, yet the proposed ITS require only one operable channel. Provide the safety analysis assumptions for PVNGS actuations for CREFAS. Are both trains credited, are both channels credited? COMMENT: Provide additional justification.	The CREFAS consists of two channels of radiation monitors, and Actuation Logic. When a radiation monitor trips, the Actuation Logic cross channel trip feature actuates both trains of CREFS equipment. The safety analysis assumes that control room habitability is maintained. This requires a single channel of CREFAS. The Safety Injection Actuation Signal (SIAS) also actuates the CREFS during a LOCA, independent of the CREFAS. The CTS LCO 3.3.3.1, Table 3.3-6, requires one channel of radiation monitors. CTS LCO 3.3.2, Table 3.3-3 requires one channel of Actuation Logic. This is consistent with LCO 3.3.9 of the CE STS (NUREG-1432).
3.3.9-10	JFD4	CTS 3.3.3.1 Action 26	The JFD replaced CTS language, "place in essential filtration mode" with "place in operations" without sufficient discussion for the change. COMMENT: Provide additional justification	"Place in operations" is the mode required by the safety analysis. This response was discussed with the NRC staff in telecon 8/15/97.
3.3.9-11	M6 M7	CTS 3.3.3.1 CTS 3.3.2	Explain how the CTS 3.3.3.1 action statements for monitors and the CTS 3..3.2 ESFAS action statements for actuation instrumentation both address the CREFAS function in ITS 3.3.9. Note that the STS retained only actuation instrumentation with the exception of the PAM LCO. COMMENT: Provide appropriate discussion.	The ITS Bases, LCO section states a channel consists of Actuation Logic, Manual Trip, and a gaseous radiation monitor.

ISSUE #	DOC # or JFD #	CTS/STS REF..	DESCRIPTION OF ISSUE	PVNGS RESPONSE
3.3.9-12	A.4	CTS 3.3-3	The DOC adds functions not specified but related to instrument loops. Provide an safety analysis of the equivalence of the CTS and ITS wording. COMMENT: Provide additional justification.	The CTS section 3.3.3.1 is applicable to the radiation monitors, 3.3.2 is applicable to the Actuation Logic. ITS 3.3.9 includes these functions and adds the manual trip function. DOC A.4 discusses the change is wording that specifies the actuation logic. DOC M.6 discusses the addition of the manual trip function and the radiation monitors.
3.3.9-13	JFD 1	Action A.1, C.1	New Issue	ITS Actions A.1 and C.1 require the operator to place one train of CREFAS in operation. The CREFAS is the Control Room Essential Filtration Actuation System. The operator will place the Control Room Essential Filtration System (CREFS) in operation. The terminology is corrected in the ITS Actions and the Bases.
3.3.9-14	Bases	ITS Bases SR 3.3.9.5	New Issue	The ITS Bases for SR 3.3.9.5 states that the 18 months frequency is based on operating experience and the need to perform the testing during an outage. The PVNGS design is testable at power so the bases is corrected to state the frequency is based on operating experience. The testing frequency is same as the CTS testing frequency.
3.3.9-15	JFD	None	New Issue	The heading for the NUREG Exceptions for this Specification uses the correct specification number, but tit uses the title for ITS 3.3.8. The title of the specification is corrected.

ISSUE #	DOC # or JFD #	CTS/STS REF..	DESCRIPTION OF ISSUE	PVNGS RESPONSE
3.3.9-16	LA.4	CTS 3.3.2 Action A	New Issue	Requirement to make the radiation monitors inoperable with the trip setpoint less conservative than the allowable value needs to be relocated to the ITS Bases

ITEM #	DOC # or JFD #	CTS/STS REF.	DESCRIPTION OF ISSUE	PVNGS RESPONSE
3.3.10-1	LA.3	CTS 3.3.3.1	CTS 3.3.3.1 states that the Radiation Monitors shown in Table 3.3-6 shall be operable with their alarm/trip setpoints within the specified limits. CTS 3.3.3.1, Table 3.3-6 also lists the Alarm/Trip setpoint and the measurement range for each Radiation monitor. The justification states that this detail and the part of this LCO requiring the alarm/trip setpoints is not required to determine the operability of the system and therefore is moved to the Bases. The requirements are not found in the Bases for ITS 3.3.10. COMMENT: Provide location of calibration requirements.	The setpoints, ranges, and allowable values are relocated to the UFSAR.
3.3.10-2 OOS	L.5, L.6	CTS SR 4.6.4.1	CTS SR 4.6.4.1, requires a CHANNEL CHECK and a CHANNEL CALIBRATION of the Containment Hydrogen Monitor once per 12 hours and once per 92 days on a STAGGERED TEST BASIS respectively. ITS SR 3.3.10.1, requires this CHANNEL CHECK once per 31 days for each channel that is normally energized. ITS SR 3.3.10.2, requires a CHANNEL CALIBRATION of the Containment Hydrogen monitors every 18 months. Provide operational data to support the stated conclusions regarding the reliability of these instrument channels. COMMENT: This change to CTS Surveillance Test Interval requires additional justification.	The containment hydrogen monitors have experienced two failures in the last two years. There are six containment hydrogen monitors installed at PVNGS, two monitors per unit. This is a rate of one failure for each 6 years of service. This demonstrates that failure of more than one channel, in a given surveillance interval is a rare event.

ITEM #	DOC # or JFD #	CTS/STS REF.	DESCRIPTION OF ISSUE	PVNGS RESPONSE
3.3.10-3	L.7	CTS 3.3.3.1, SR 4.3.3.1	CTS 3.3.3.1, requires the Containment Area Radiation Monitors to be operable in MODE 4. CTS 3.3.3.1, Action a, requires adjustment of a alarm/trip setpoint that exceeds the allowed value within 4 hours. These requirements are not included in ITS 3.3.10 but instead are included as part of the post accident monitoring instrument requirements. Information from accident monitoring instrumentation is used as an accident management tool. Provide additional L.7 discussion that explains why the radiation monitors moved to PAM instrumentation do not require the alarm or trip setpoint for operability. COMMENT: Provide discussion and justification for the less restrictive change.	The Containment Area radiation monitors are used to monitor for the potential of significant radiation releases from containment and to provide release assessment for use by operators in determining the need to invoke site emergency plans. These functions require an indication of Containment radiation levels over the range specified in Reg Guide 1.97. An alarm is not required to accomplish these functions.
3.3.10-4	L.8	SR 4.3.3.1	CTS Surveillance Requirement 4.3.3.1 requires a CHANNEL FUNCTIONAL TEST (CFT) for the Radiation Monitors. The CFT is deleted in the ITS but the Channel Calibration is retained. The staff notes that the Channel Calibration encompasses the CFT. Provide justification for deleting the more frequent CTS CFT requirement while retaining the Channel Calibration. COMMENT: Provide discussion and justification for the less restrictive change	The Containment Area radiation monitors have approximately one failure every three years that is detected by the Quarterly Channel Functional Test. This is a higher failure rate than a set of identical radiation monitors that are only tested each 18 months during the calibration. Most failures of these radiation monitors result in alarms that alert the operator to a failure. The deletion of the Channel Functional Test does not have a significant effect on the reliability of the radiation monitors.

ITEM #	DOC # or JFD #	CTS/STS REF.	DESCRIPTION OF ISSUE	PVNGS RESPONSE
3.3.10-5	L.9		CTS 3.3.3.1, requires the Containment Area Radiation Monitors Operable in MODE 4. Additional justification is needed to support the safety basis for the proposed change. COMMENT: Provide safety basis discussion.	The Containment Area Radiation monitors are used for the diagnosis and preplanned actions required to mitigate Design Basis Accidents (DBAs). These accidents are assumed to occur in Modes 1, 2, and 3. The safety analysis does not assume the operability of the Containment radiation monitors in Mode 4.
3.3.10-6	L.13	ITS SR 3.3.10.2	Provide a reference to proposed ITS calorimetric testing that includes the PAM function 16 detectors. COMMENT: Provide stated reference.	Revised DOC L.13
3.3.10-7	L.3	CTS Table 3.3.10, function 15, Rx. Level	ITS action statements are less restrictive but the justification does not state why the proposed changes do not adversely affect safe operation of the plant. COMMENT: Provide additional justification.	Operation with a single inoperable channel does not adversely affect safe operation because the remaining channel is available, the passive nature of the instrumentation (no critical automatic action is assumed to occur from these channels) and the low probability of an accident during the 30 day interval. Operation for 7 days with two inoperable channels does not affect safe operation because of the relatively low probability of an event requiring PAM instrumentation operation during the 7 day period, and the availability of alternate means to obtain the required information.

ITEM #	DOC # or JFD #	CTS/STS REF.	DESCRIPTION OF ISSUE	PVNGS RESPONSE
3.3.10-8	L.11	CTS 3.3.3.6. CTS Table 4.3.3	CTS Table 4.3.3, requires a CHANNEL CHECK of the Containment Area Radiation Monitor once per 12 hours. ITS SR 3.3.10.1, requires this CHANNEL CHECK once per 31 days for each channel that is normally energized. The DOC states that a CHANNEL CHECK once per 31 days is required for the PAM instruments in CTS 3.3.3.6 as well as the ITS 3.3.10. This is based on experience that shows that failure of more than one channel of a given function in a 31 day period is a rare event. Clarify the DOC discussion related to experience for establishing the surveillance interval. It can't show that both 12 hours and 31 days are the correct test intervals. COMMENT: Provide additional justification.	The frequency of the CHANNEL CHECK is based on the reliability and function of the instrumentation. Experience with these radiation monitors at the current 12 hour frequency, and experience with other similar radiation monitors that are tested at less frequent intervals, shows that failure of more than one channel in a given 31 day period is a rare event.
3.3.10-9	L.12 L.4	CTS 3.3.3.1 Action C CTS 3.6.4.1	ITS action statements are less restrictive but the justification does not state why the proposed changes do not adversely affect safe operation of the plant. COMMENT: Provide additional justification.	Revised DOC L.12 Revised DOC L.4

ITEM #	DOC # or JFD #	CTS/STS REF.	DESCRIPTION OF ISSUE	PVNGS RESPONSE
3.3.10-10	M3	CTS 3.6.4.1	The more restrictive justification does not state why the proposed changes is an enhancement to safe operation of the plant. The safety analysis basis is unclear. Does the PVNGS safety analysis take credit for the functions in the proposed mode? COMMENT: Revise the M3 DOC.	The containment hydrogen monitors are used to determine when the hydrogen recombiners are required to be placed in service to maintain the post LOCA hydrogen concentration below its flammability limit of 4% v/o. In modes 3 and 4 the hydrogen produced would be less than calculated for a DBA LOCA, and the ITS LCO 3.6.7 does not require the Operability of the hydrogen recombiners. The ITS requires the Operability of the hydrogen monitors in Mode 3. This is an enhancement to safe operation because it allows the operator to monitor the containment hydrogen concentration following a LOCA in Mode 3. The safety analysis assumes the containment hydrogen monitor is available to alert the operator of the need to activate the hydrogen recombiners. Since the hydrogen monitor is not required to be operable in Mode 3 it is not assumed that the hydrogen monitor is available.

ITEM #	DOC # or JFD #	CTS/STS REF.	DESCRIPTION OF ISSUE	PVNGS RESPONSE
3.3.10-11	LA2	CTS 3.6.4.1	Removal of details that establish criteria for performing SRs <u>is</u> required for operability. In this case, it is a necessary requirement for performing a channel calibration. COMMENT: Revise the LA2 DOC.	LA.2 relocates information related to the sample gas concentration used in the CHANNEL CALIBRATION of the hydrogen monitors. This information does not need to be specified in the SR and may be relocated to the ITS BASES. Adequate controls exist for the BASES within the provisions of 10CFR50.59 and the TS BASES control program. DOC LA.2 has been revised accordingly. Relocation of the above information does not delete requirements. The relocation moves descriptive information and details from the CTS to a Licensee Controlled Document. The relocation of this information and detail does not impact the requirements for determination of OPERABILITY for systems, structures and components required by the LCO's of ITS Section 3.3.
3.3.10-12	All DOCs and All Bases .	ITS B3.3.10 Insert 2	Search and replace all uses of "insure(s)" with "ensure(s)" COMMENT: Revise the submittal	Revised B 3.3.4-14, B 3.3.5-11, B 3.3.5-16, B 3.3.5-18, B 3.3.12-3 Revised DOCs 3.3.12 M.2, 3.3.5 JFD 8, 3.3.8 L.2, 3.3.11 JFD 2, and 3.3.11 M.1

ITEM #	DOC # or JFD #	CTS/STS REF.	DESCRIPTION OF ISSUE	PVNGS RESPONSE
3.3.10-13	Bases	ITS B3.3.10 B3.3-175	Radial symmetry Bases text is deleted, yet other retained Bases state the need for radial distribution. COMMENT: Revise the deleted text to support proposed Bases.	Revised ITS 3.3.10 Bases. The retained text states that the radial symmetry was considered and any two thermocouple pairings per quadrant meet the requirements. The deleted text describe a condition in which specific pairings are required to meet the radial symmetry. This text is not applicable to PVNGS and is removed.
3.3.10-14	Bases	ITS B3.3.10 B3.3-180	~~Bases text additions for channel calibration of the containment isolation valves alter the TS definition of channel calibration and therefor is not permitted~~. Bases text references to the FSAR regarding radiation monitor channel calibration techniques need to be verified to meet the intent of the TS channel calibration definition. COMMENT: Revise the Bases discussions and verify Bases additions do not alter the TS definitions.	The description of issue was revised at the request of the NRC staff in telecon on 8/15/97, to remove the comment related to the Containment Isolation Valve position indication. The radiation monitors use ion chamber as sensors. These ion chambers were exposed to an NITS (NBS) traceable radiation field by the manufacturer during the primary calibration. As part of this calibration, the background keep-alive source response was measured. During the CHANNEL CALIBRATION the response of the keep-alive source is verified to be consistent with that measured during the primary calibration. This provides traceability and in situ calibration response checks as required in NUREG-0737. The methodology of this test of the sensor meets the Technical Specification CHANNEL CALIBRATION definition.

ITEM #	DOC # or JFD #	CTS/STS REF.	DESCRIPTION OF ISSUE	PVNGS RESPONSE
3.3.10-15	JFD 6	ITS Action	New Issue	ITS 3.3.10 requires action in accordance with Specification 5.6.8. This is the incorrect reference. The correct reference for the PAM Report is 5.6.6. Revised DOC L.1, L.4, L.10
3.3.10-16	M.1		New Issue	Review of DOCs determined that additional justification needed for this DOC
3.3.10-17	LA.2	CTS 4.6.4.1	New Issue	Details of Containment Hydrogen Monitor calibration need to be relocated to the ITS Bases.

ITEM #	DOC # or JFD #	CTS/STS REF.	DESCRIPTION OF ISSUE	PVNGS RESPONSE
3.3.11-1	JFD 1 JFD 2	ITS	Provide a design difference justification for not adopting the STS format to include the disconnect and control circuit switches in the Table 3.3.11. COMMENT: Provide additional justification	Justification is provided in Amendment 85 to the Unit 1 TS, Amendment 73 to the Unit 2 TS, and Amendment 57 to the Unit 3 TS. The response to this issue was discussed with the NRC Staff in telephone conversation on 7/24/97.
3.3.11-2	L.3	CTS SR 4.3.3.5.b	CTS Surveillance Requirement 4.3.3.5.b requires operating each remote shutdown system disconnect switch, power and control circuit including the actuated components. ITS SR 3.3.11.2 requires verifying each required control circuit and transfer switch is capable of performing the intended function. This change is less restrictive because the ITS wording allows the use of continuity checks to perform the SR. The CTS requires testing the actuated components. The use of a continuity check verifies that the disconnect switches are open when required to meet the requirements of 10 CFR 50 Appendix R. The change from a specific functional type test in the CTS to a optional continuity test in the ITS is not justified. COMMENT: Provide discussion and justification for the change to test methods.	The testing of the disconnect switches by the use of a continuity check verifies the contacts on the disconnect switches are open, when the switch is placed in the local position. This demonstrates that the control room functions have been isolated from the local (remote shutdown panel or local panel) circuits and cannot affect the ability to operate the device locally. This verifies that the circuits perform the required function to meet the requirements of 10 CFR 50 Appendix R. Revised the ITS Bases to conform to the wording in NUREG-1432.

ITEM #	DOC # or JFD #	CTS/STS REF.	DESCRIPTION OF ISSUE	PVNGS RESPONSE
3.3.11-3	JFD 1	STS Table 3.3.12-1	STS Table 3.3.12-1 Identifies functions of control parameters. JFD1 justifies deleting these control parameters in ITS Table 3.3.11-1 and the associated Bases because they are not CTS requirements. Justification for their removal from the STS is based in part on NRC Generic Letter 91-08 Removal of Component Lists from Technical Specifications. Although component lists are not required for Technical Specifications, some identification of control functions is needed to determine adequacy of controls. The proposed additions to LCO 3.3.11 are captured by the concept of operability in the STS, which is further clarified by ITS SR 3.3.11.2. The proposed ITS changes to the LCO are not required. COMMENT: Revise ITS and CTS markup to adopt the STS LCO and Table format.	Justification is provided in Amendment 85 to the Unit 1 TS, Amendment 73 to the Unit 2 TS, and Amendment 57 to the Unit 3 TS. The response to this issue was discussed with the NRC Staff in telephone conversation on 7/24/97.
3.3.11-4	Bases	3.3.11 B3.3-184 insert 1	Change the insert to clarify that the disconnect and control switches are required for the Table 3.3.11-1 Functions. COMMENT: Revise the Bases	The disconnect and Control switches are listed in licensee controlled documents and are not included in Table 3.3.11-1. Refer to the response to issue 3.3.11-2 for additional information.

ITEM #	DOC # or JFD #	CTS/STS REF.	DESCRIPTION OF ISSUE	PVNGS RESPONSE
3.3.12-1	M.1	CTS 3.1.2.7 Action c	M1 deletes CTS 3.1.2.7 Action c: "The provisions of Specification 3.0.3 are not applicable". ITS does not have this exception, rather LCO 3.0.3 applies and requires the unit be placed in a Mode or condition outside the applicability of the LCO. M1 does not discuss the safety significance of these changes. COMMENT: Provide safety basis discussion and justification for the more restrictive ITS requirements.	LCO 3.0.3 applies to ITS LCO 3.3.12. This ensures that the plant will be placed in a mode or condition in which the LCO does not apply if the LCO is not met except as specified in the Required Actions and associated Completion Times. This minimizes the probability of a boron dilution event without the Operability of the BDAS channels to alert the operator.
3.3.12-2	L.1	CTS 3.1.2.7 Action b.2	Correct the inaccurate DOC statements regarding CTS requirements and ITS Action requirements. Provide a discussion that explains the safety basis for eliminating CTS Action b.2 limits. Include discussion about changes to frequencies for monitoring boron concentrations. Why is the COLR limit, "at least a 15 minute warning to criticality," acceptable? Also, explain the deletion of the requirements to suspend CORE ALTERATIONS. COMMENT: Revise the DOC. Provide discussion and justification for the less restrictive change.	Revised DOC L.1
3.3.12-3	L.2	CTS 3.1.2.7 Applicability	Mode 6 neutron monitoring requirements are moved to ITS 3.9.2. This reorganization of CTS requirements does not constitute a less restrictive change. COMMENT: Revise the submittal DOC.	Revised CTS markup and DOC L.2.

ITEM #	DOC # or JFD #	CTS/STS REF.	DESCRIPTION OF ISSUE	PVNGS RESPONSE
3.3.12-4	A.1 JFD 4	CTS 3.1.2.7 , Action b.1 STS 3.3.13 Action B	CTS 3.1.2.7, Action b.1 requires the RCS Boron Concentration to be monitored by redundant methods immediately if two startup channel high neutron flux alarms are inoperable. If monitoring methods cannot be accomplished immediately then core alterations or positive reactivity changes are to be suspended immediately. DOC A.1 is used to justify the CTS to ITS changes to this action requirement. The staff cannot make a determination that the proposed use of an alternate to STS format and requirements as provided in ITS Action B.1 and B.2 provides equivalent actions to CTS b.1. In addition, JFD4 does not provide an justification for deviation from STS requirements. COMMENT: Provide revised DOCs and appropriate discussion for deviation from the STS based on current licensing basis.	The CTS markup has been revised. Revised JFD 4 Revised DOC A.4, A.3

ITEM #	DOC # or JFD #	CTS/STS REF.	DESCRIPTION OF ISSUE	PVNGS RESPONSE
3.3.12-5	L.3 JFD 1 JFD 2	CTS Table 3.3-1 and CTS Table 4.3-1 Item 1.B.2 STS 3.3.13	L.3 states that the ITS does not require Logarithmic Power channels to be operable and that this is consistent with the STS. However, my copy of the STS specify log power monitor channels for LCO 3.3.13. Reconcile how the CTS requirements for log power channels, items B.2.a and B.2.b in Table 3.3-1 and LCO 3.1.2.7 requirements for startup high neutron flux alarms are met with the proposed ITS 3.3.12 requirements for an operable BDAS. Note that the CTS Table 3.3-1 markup retains the Logarithmic Power Mode 3, 4, 5 with the trip breakers closed requirements without a like requirement in LCO 3.3.12. In fact, these Logarithmic Power channels are still needed if the RTCB are closed. Note also that L.3 does not discuss the CTS markup deletions of the log power monitors for Modes 3, 4, 5 [without any table notation regarding breaker position]. Furthermore, L.3 states that ITS 3.3.12 requires two startup channels and the BDAS alarms. This statement is not factual. ITS 3.3.12 requires an alarm system to be operable and does not specify that the alarm system is required to be actuated by startup channels. COMMENT: Provide discussion and justification for the less restrictive change. Provide justification for the STS deviation based on current licensing basis, system design, or operational constraints. Revise the LCO to provide appropriate remedial	Revised DOC L.3 Revised JFD 1 Revised JFD 2.

ITEM #	DOC # or JFD #	CTS/STS REF.	DESCRIPTION OF ISSUE	PVNGS RESPONSE
3.3.12-6	JFD 3 M.3 JFD4 M.1	ITS 3.3.12 Action A Action B	The proposed format of Actions A and B do not provide an appropriate remedial action to not meeting the requirements to perform periodic boron concentration measurements. The ITS format proposes to use the OR logical connector as compared to the STS that uses an AND logical connector. With the OR once the option is chosen then the alternate action is not permitted. To establish an alternate remedial course a new Action should be proposed for the condition "Required Actions or associated completion time of Action A not met." This would provide an action to place the plant in a safe condition consistent with the requirements of STS. COMMENT: Provide a revised ITS LCO to provide appropriate remedial actions.	The ITS sections 1.2 and 1.3 were reviewed and there is no restriction preventing the user from alternating between the OR options. Both of the OR options have an immediate completion time and provide the necessary Required Actions to prevent an inadvertent boron dilution event.
3.3.12-7	JFD 6	ITS SR 3.3.12.2	Specified frequency is 31 days of cumulated operation during shutdown. Without an agreed to meaning of "cumulated operation during shutdown" the staff prefers a specified interval. Provide a justification based on system design or operational limitations for not adopting the specified STS frequency. COMMENT: Provide justification for the STS deviation based on current licensing basis, system design, or operational constraints.	ITS SR 3.3.12.2 and the associated Bases have been revised to adopt the STS Frequency. Added DOC L.4. Revised JFD 6.

ITEM #	DOC # or JFD #	CTS/STS REF.	DESCRIPTION OF ISSUE	PVNGS RESPONSE
3.3.12-8	Bases	ITS B3.3-191	The Safety Analysis Bases do not discuss the 15 minute lead time to a dilution event. Is this an assumption of the licensing basis? If not, then explain the Background Bases discussion of this assumed response time. Delete the proposed addition "This SR is an extension of SR 3.9.22....." it is an unnecessary reference. COMMENT: Provide additional justification and make appropriate changes.	The reference to SR 3.9.2.2 has been removed from the Bases. The 15 minute time is discussed in the SADB Boron Dilution Event section 3.4.6. It is also listed in the UFSAR section 15.4.6, and the Standard Review Plan (NUREG 0800) section 15.4.6.II.5
3.3.12-9	LA.2		LA.2 relocates redundant analysis methods but it also relocates CTS applicability requirements "when entering Mode 3, 4, or 5 or at the time both alarms are determined to be inoperable" which are not associated with analysis methods and which are not otherwise included in the ITS. Provide a DOC analysis of these CTS changes. COMMENT: Revise the submittal to address these CTS changes.	The CTS markup pages and the associated DOCs have been revised.
3.3.12-10	M.2, M.3		New Issue	Review of DOCs determined that additional justification was needed for this DOC.

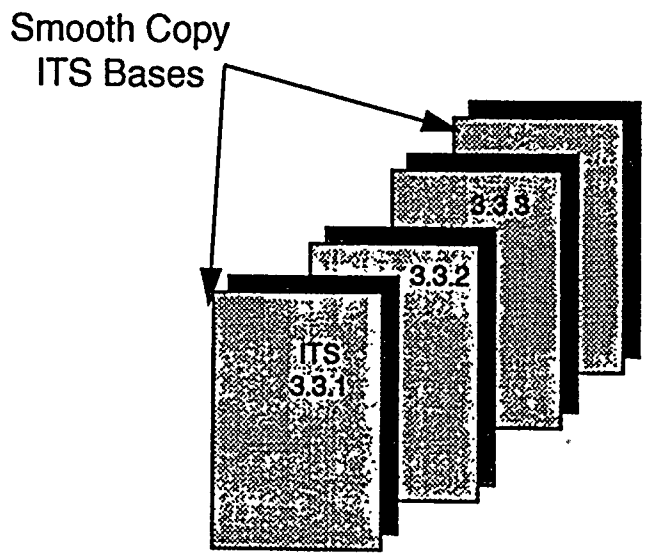
ENCLOSURE 2

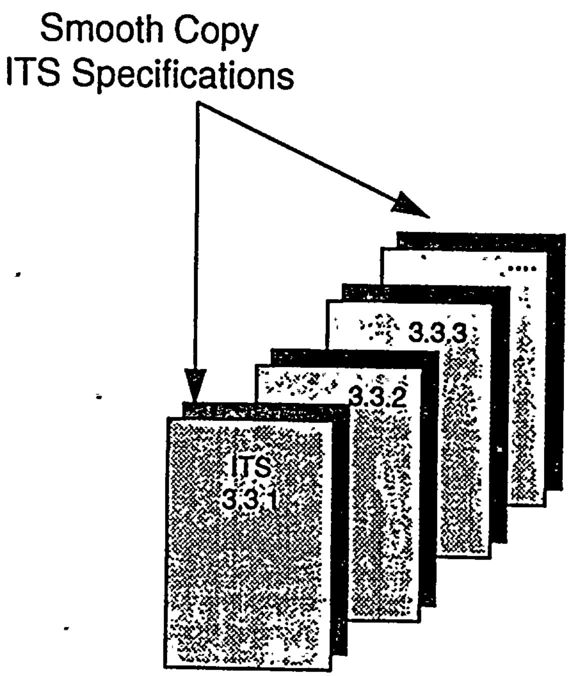
ITS Section 3.3, "Instrumentation"

2.

PVNGS ITS
SECTION 3.3 - INSTRUMENTATION

ITS REVIEW PACKAGE CONTENTS
Volume 6

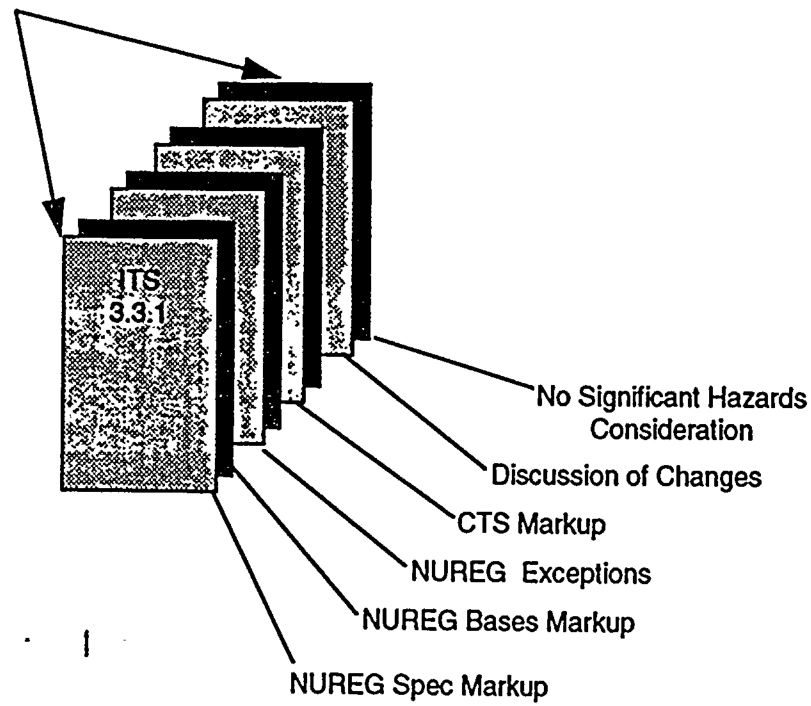




Additional sections of CJD's (Collection of Justification Documentation) are added as necessary to complete the specific ITS Section/Chapter.

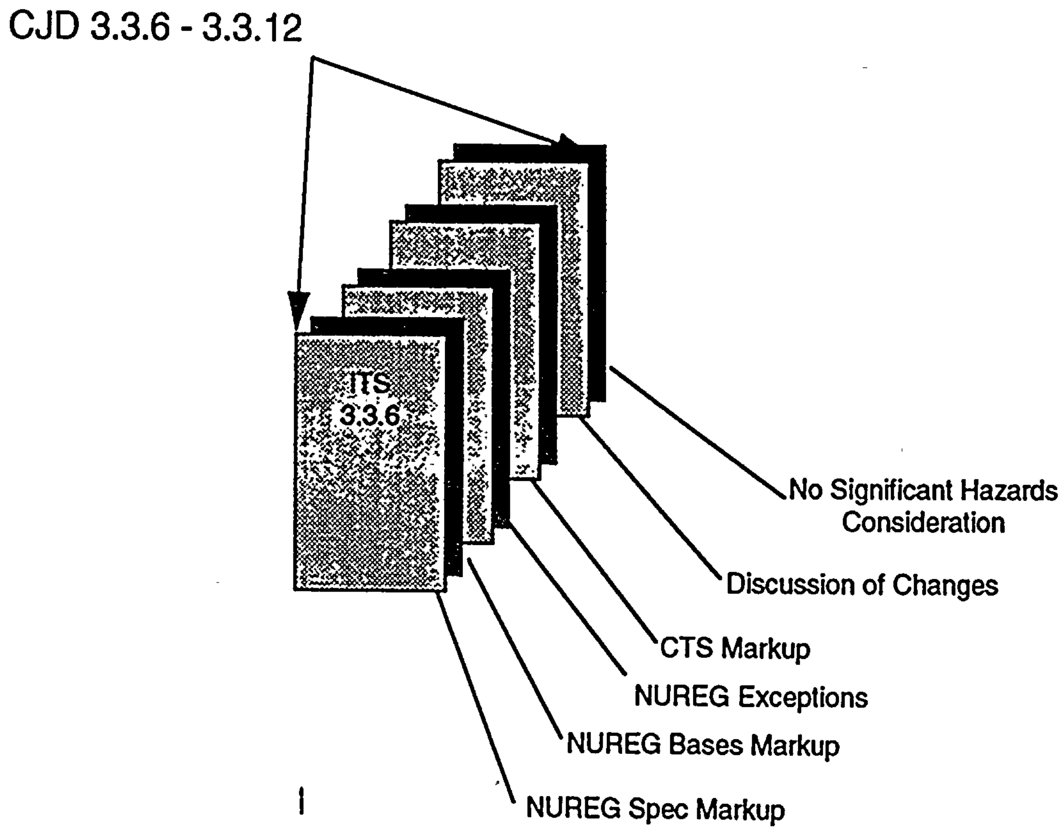
ITS REVIEW PACKAGE CONTENTS
(Volume 7, continued from Volume 6)

CJD 3.3.1 - 3.3.5



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

ITS REVIEW PACKAGE CONTENTS
(Volume 8, continued from Volume 6)



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

SMOOTH COPY

ITS SECTION 3.3

3.3 INSTRUMENTATION

3.3.1 Reactor Protective System (RPS) Instrumentation - Operating

LCO 3.3.1 Four RPS trip and bypass removal channels for each Function in Table 3.3.1-1 shall be OPERABLE.

APPLICABILITY: According to Table 3.3.1-1.

ACTIONS

------------------------------------NOTE------------------------------------
Separate Condition entry is allowed for each RPS Function.

CONDITION	REQUIRED ACTION		COMPLETION TIME
A. One or more Functions with one automatic RPS trip channel inoperable.	A.1	Place channel in bypass or trip.	1 hour
	<u>AND</u>		
	A.2	Restore channel to OPERABLE status.	Prior to entering MODE 2 following next MODE 5 entry
B. One or more Functions with two automatic RPS trip channels inoperable.	B.1	--------NOTE-------- LCO 3.0.4 is not applicable. --------------------	
		Place one channel in bypass and the other in trip.	1 hour

(continued)

ACTIONS (continued)

CONDITION	REQUIRED ACTION	COMPLETION TIME
C. One or more Functions with one automatic bypass removal channel inoperable.	C.1 Disable bypass channel.	1 hour
	OR	
	C.2.1 Place affected automatic trip channel in bypass or trip.	1 hour
	AND	
	C.2.2 Restore bypass removal channel and associated automatic trip channel to OPERABLE status.	Prior to entering MODE 2 following next MODE 5 entry
D. One or more Functions with two automatic bypass removal channels inoperable.	------------NOTE------------ LCO 3.0.4 is not applicable. ----------------------------	
	D.1 Disable bypass channels.	1 hour
	OR	
	D.2 Place one affected automatic trip channel in bypass and place the other in trip.	1 hour
E. One or more core protection calculator (CPC) channels with a cabinet high temperature alarm.	E.1 Perform CHANNEL FUNCTIONAL TEST on affected CPC.	12 hours

(continued)

ACTIONS (continued)

CONDITION	REQUIRED ACTION	COMPLETION TIME
F. One or more CPC channels with three or more autorestarts during a 12 hour period.	F.1 Perform CHANNEL FUNCTIONAL TEST on affected CPC.	24 hours
G. Required Action and associated Completion Time not met.	G.1 Be in MODE 3.	6 hours

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.	12 hours

(continued)

SURVEILLANCE REQUIREMENTS (continued)

SURVEILLANCE		FREQUENCY
SR 3.3.1.2	------------------NOTE------------------ Not required to be performed until 12 hours after THERMAL POWER ≥ 70% RTP. -- Verify total Reactor Coolant System (RCS) flow rate as indicated by each CPC is less than or equal to the RCS total flow rate. If necessary, adjust the CPC addressable constant flow coefficients such that each CPC indicated flow is less than or equal to the RCS flow rate.	12 hours
SR 3.3.1.3	Check the CPC autorestart count.	12 hours

(continued)

SURVEILLANCE REQUIREMENTS (continued)

SURVEILLANCE		FREQUENCY
SR 3.3.1.4	------------------NOTES------------------ 1. Not required to be performed until 12 hours after THERMAL POWER ≥ 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 linear power level signals and the CPC addressable constant multipliers to make the CPC ΔT power and CPC nuclear power calculations agree with the calorimetric, if the absolute difference is ≥ 2% when THERMAL POWER is ≥ 80% RTP. Between 20% and 80% RTP the maximum difference is -0.5% to 10%.	24 hours
SR 3.3.1.5	------------------NOTE------------------ Not required to be performed until 12 hours after THERMAL POWER ≥ 70% RTP. --- Verify total RCS flow rate indicated by each CPC is less than or equal to the RCS flow determined either using the reactor coolant pump differential pressure instrumentation and the ultrasonic flow meter adjusted pump curves or by calorimetric calculations.	31 days

(continued)

SURVEILLANCE REQUIREMENTS (continued)

SURVEILLANCE		FREQUENCY
SR 3.3.1.6	------------------NOTE------------------ Not required to be performed until 12 hours after THERMAL POWER ≥ 15% RTP. -- Verify linear power subchannel gains of the excore detectors are consistent with the values used to establish the shape annealing matrix elements in the CPCs.	31 days
SR 3.3.1.7	------------------NOTES------------------ 1. The CPC CHANNEL FUNCTIONAL TEST shall include verification that the correct values of addressable constants are installed in each OPERABLE CPC. 2. Not required to be performed for logarithmic power level channels until 2 hours after reducing THERMAL POWER below 1E-4% RTP and only if reactor trip circuit breakers (RTCBs) are closed. -- Perform CHANNEL FUNCTIONAL TEST on each channel.	92 days
SR 3.3.1.8	------------------NOTE------------------ Neutron detectors are excluded from the CHANNEL CALIBRATION. -- Perform CHANNEL CALIBRATION of the power range neutron flux channels.	92 days

(continued)

SURVEILLANCE REQUIREMENTS (continued)

SURVEILLANCE		FREQUENCY
SR 3.3.1.9	-------------------NOTE-------------------- Neutron detectors are excluded from CHANNEL CALIBRATION. --- Perform CHANNEL CALIBRATION on each channel, including bypass removal functions.	18 months
SR 3.3.1.10	Perform a CHANNEL FUNCTIONAL TEST on each CPC channel.	18 months
SR 3.3.1.11	Using the incore detectors, verify the shape annealing matrix elements to be used by the CPCs.	Once after each refueling prior to exceeding 70% RTP
SR 3.3.1.12	Perform a CHANNEL FUNCTIONAL TEST on each automatic bypass removal function.	Once within 92 days prior to each reactor startup
SR 3.3.1.13	-------------------NOTE-------------------- Neutron detectors are excluded. --- Verify RPS RESPONSE TIME is within limits.	18 months on a STAGGERED TEST BASIS

Table 3.3.1-1 (page 1 of 3)
Reactor Protective System Instrumentation

FUNCTION	APPLICABLE MODES OR OTHER SPECIFIED CONDITIONS	SURVEILLANCE REQUIREMENTS	ALLOWABLE VALUE
1. Variable Over Power	1,2	SR 3.3.1.1 SR 3.3.1.4 SR 3.3.1.6 SR 3.3.1.7 SR 3.3.1.8 SR 3.3.1.9 SR 3.3.1.13	Ceiling ≤ 111.0% RTP Band ≤ 9.9% RTP Incr. Rate ≤ 11.0%/min RTP Decr. Rate > 5%/sec RTP
2. Logarithmic Power Level — High[(a)]	2	SR 3.3.1.1 SR 3.3.1.7 SR 3.3.1.9 SR 3.3.1.12 SR 3.3.1.13	≤ 0.011%
3. Pressurizer Pressure — High	1,2	SR 3.3.1.1 SR 3.3.1.7 SR 3.3.1.9 SR 3.3.1.13	≤ 2388 psia
4. Pressurizer Pressure — Low	1,2	SR 3.3.1.1 SR 3.3.1.7 SR 3.3.1.9 SR 3.3.1.12 SR 3.3.1.13	≥ 1821 psia
5. Containment Pressure — High	1,2	SR 3.3.1.1 SR 3.3.1.7 SR 3.3.1.9 SR 3.3.1.13	≤ 3.2 psig
6. Steam Generator #1 Pressure — Low	1,2	SR 3.3.1.1 SR 3.3.1.7 SR 3.3.1.9 SR 3.3.1.13	≥ 890 psia
7. Steam Generator #2 Pressure — Low	1,2	SR 3.3.1.1 SR 3.3.1.7 SR 3.3.1.9 SR 3.3.1.13	≥ 890 psia

(continued)

(a) Trip may be bypassed when THERMAL POWER is > 1E-4% RTP. Bypass shall be automatically removed when THERMAL POWER is ≤ 1E-4% RTP.

Table 3.3.1-1 (page 2 of 3)
Reactor Protective System Instrumentation

FUNCTION	APPLICABLE MODES OR OTHER SPECIFIED CONDITIONS	SURVEILLANCE REQUIREMENTS	ALLOWABLE VALUE
8. Steam Generator #1 Level — Low	1,2	SR 3.3.1.1 SR 3.3.1.7 SR 3.3.1.9 SR 3.3.1.13	≥ 43.7%
9. Steam Generator #2 Level — Low	1,2	SR 3.3.1.1 SR 3.3.1.7 SR 3.3.1.9 SR 3.3.1.13	≥ 43.7%
10. Steam Generator #1 Level — High	1,2	SR 3.3.1.1 SR 3.3.1.7 SR 3.3.1.9 SR 3.3.1.13	≤ 91.5%
11. Steam Generator #2 Level — High	1,2	SR 3.3.1.1 SR 3.3.1.7 SR 3.3.1.9 SR 3.3.1.13	≤ 91.5%
12. Reactor Coolant Flow, Steam Generator #1-Low	1,2	SR 3.3.1.1 SR 3.3.1.7 SR 3.3.1.9 SR 3.3.1.13	Ramp: ≤ 0.118 psid/sec. Floor: ≥ 11.7 psid Step: ≤ 10.2 psid
13. Reactor Coolant Flow, Steam Generator #2-Low	1,2	SR 3.3.1.1 SR 3.3.1.7 SR 3.3.1.9 SR 3.3.1.13	Ramp: ≤ 0.118 psid/sec. Floor: ≥ 11.7 psid Step: ≤ 10.2 psid

Table 3.3.1-1 (page 3 of 3)
Reactor Protective System Instrumentation

FUNCTION	APPLICABLE MODES OR OTHER SPECIFIED CONDITIONS	SURVEILLANCE REQUIREMENTS	ALLOWABLE VALUE
14. Local Power Density – High(b)	1,2	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 3.3.1.9 SR 3.3.1.10 SR 3.3.1.11 SR 3.3.1.12 SR 3.3.1.13	≤ 21.0 kW/ft
15. Departure From Nucleate Boiling Ratio (DNBR) – Low(b)	1,2	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 3.3.1.9 SR 3.3.1.10 SR 3.3.1.11 SR 3.3.1.12 SR 3.3.1.13	≥ 1.30

(b) Trip may be bypassed when THERMAL POWER is < 1E-4% RTP. Bypass shall be automatically removed when THERMAL POWER is ≥ 1E-4% RTP.

3.3 INSTRUMENTATION

3.3.2 Reactor Protective System (RPS) Instrumentation – Shutdown

LCO 3.3.2 Four RPS trip and bypass removal channels for each Function in Table 3.3.2-1 shall be OPERABLE.

APPLICABILITY: According to Table 3.3.2-1

ACTIONS

------------------------------------NOTE------------------------------------
Separate condition entry is allowed for each RPS Function.

CONDITION	REQUIRED ACTION		COMPLETION TIME
A. One or more functions with one automatic RPS trip channel inoperable.	A.1	Place channel in bypass or trip.	1 hour
	<u>AND</u>		
	A.2	Restore channel to OPERABLE status.	Prior to entering MODE 2 following next MODE 5 entry
B. One or more functions with two automatic RPS trip channels inoperable.	B.1	--------NOTE--------- LCO 3.0.4 is not applicable. --------------------	
		Place one channel in bypass and place the other in trip.	1 hour

(continued)

ACTIONS (continued)

CONDITION	REQUIRED ACTION	COMPLETION TIME
C. One or more functions with one automatic bypass removal channel inoperable.	C.1 Disable bypass channel. OR C.2.1 Place affected channel in bypass or trip. AND C.2.2 Restore bypass removal channel and associated automatic trip channel to OPERABLE status.	1 hour 1 hour Prior to entering MODE 2 following next MODE 5 entry
D. One or more functions with two automatic bypass removal channels inoperable.	------------NOTE------------ LCO 3.0.4 is not applicable. ---------------------------- D.1 Disable bypass channels. OR D.2 Place one affected automatic trip channel bypass and place the other in trip.	 1 hour 1 hour
E. Required Action and associated Completion Time not met.	E.1 Open all RTCBs.	1 hour

ACTIONS

-----------------------------------NOTE-----------------------------------
Refer to Table 3.3.2-1 to determine which SR shall be performed for each RPS function.

SURVEILLANCE REQUIREMENTS

SURVEILLANCE		FREQUENCY
SR 3.3.2.1	Perform a CHANNEL CHECK of each RPS instrument channel.	12 hours
SR 3.3.2.2	Perform a CHANNEL FUNCTIONAL TEST on each channel.	92 days
SR 3.3.2.3	Perform a CHANNEL FUNCTIONAL TEST on each automatic bypass removal function.	Once within 92 days prior to each reactor startup
SR 3.3.2.4	-------------------NOTE------------------- Neutron detectors are excluded from CHANNEL CALIBRATION. -- Perform a CHANNEL CALIBRATION on each channel, including bypass removal function.	18 months

(continued)

SURVEILLANCE REQUIREMENTS (continued)

SURVEILLANCE		FREQUENCY
SR 3.3.2.5	-------------------NOTE------------------- Neutron detectors are excluded. -- Verify RPS RESPONSE TIME is within limits.	18 months on a STAGGERED TEST BASIS

Table 3.3.2-1
Reactor Protective System Instrumentation - Shutdown

FUNCTION	APPLICABLE MODES OR OTHER SPECIFIED CONDITIONS	SURVEILLANCE REQUIREMENTS	ALLOWABLE VALVE
1. Logarithmic Power Level-High[d]	3[a], 4[a], 5[a]	SR 3.3.2.1 SR 3.3.2.2 SR 3.3.2.3 SR 3.3.2.4 SR 3.3.2.5	≤ 0.011% RTP[c]
2. Steam Generator #1 Pressure-Low[b]	3[a]	SR 3.3.2.1 SR 3.3.2.2 SR 3.3.2.4 SR 3.3.2.5	≥ 890 psia
3. Steam Generator #2 Pressure-Low[b]	3[a]	SR 3.3.2.1 SR 3.3.2.2 SR 3.3.2.4 SR 3.3.2.5	≥ 890 psia

(a) With any Reactor Trip Circuit Breakers (RTCBs) closed and any control element assembly capable of being withdrawn.

(b) The setpoint may be decreased as steam pressure is reduced, provided the margin between steam pressure and the setpoint is maintained ≤ 200 psig. The setpoint shall be automatically increased to the normal setpoint as steam pressure is increased.

(c) The setpoint must be reduced to ≤ 1E-4% RTP when less than 4 RCPs are running.

(d) Trip may be bypassed when THERMAL POWER is > 1E-4% RTP. Bypass shall be automatically removed when THERMAL POWER is ≤ 1E-4% RTP.

3.3 INSTRUMENTATION

3.3.3 Control Element Assembly Calculators (CEACs)

LCO 3.3.3 Two CEACs shall be OPERABLE.

APPLICABILITY: MODES 1 and 2.

ACTIONS

CONDITION	REQUIRED ACTION		COMPLETION TIME
A. One CEAC inoperable.	A.1	Perform SR 3.1.5.1.	Once per 4 hours
	AND		
	A.2	Restore CEAC to OPERABLE status.	7 days
B. Required Action and associated Completion Time of Condition A not met. OR Both CEACs inoperable.	B.1	Verify the departure from nucleate boiling ratio requirement of LCO 3.2.4, "Departure from Nucleate Boiling Ratio (DNBR)," is met.	4 hours
	AND		

(continued)

ACTIONS

CONDITION	REQUIRED ACTION		COMPLETION TIME
B. (continued)	B.2	Verify all full length and part length control element assembly (CEA) groups are fully withdrawn and maintained fully withdrawn, except during Surveillance testing pursuant to SR 3.1.5.3 or for control, when CEA group #5 may be inserted to a maximum of 127.5 inches withdrawn.	4 hours
	AND		
	B.3	Verify the "RSPT/CEAC Inoperable" addressable constant in each core protection calculator (CPC) is set to indicate that both CEACs are inoperable.	4 hours
	AND		
	B.4	Verify the Control Element Drive Mechanism Control System is placed in "STANDBY MODE" and maintained in "STANDBY MODE," except during CEA motion permitted by Required Action B.2.	4 hours
	AND		
	B.5	Perform SR 3.1.5.1.	Once per 4 hours
	AND		(continued)

ACTIONS (continued)

CONDITION	REQUIRED ACTION		COMPLETION TIME
B. (continued)	B.6	Disable the Reactor Power Cutback System (RPCS)	4 hours
C. Receipt of a CPC channel B or C cabinet high temperature alarm.	C.1	Perform CHANNEL FUNCTIONAL TEST on affected CEAC(s).	12 hours
D. One or two CEACs with three or more auto restarts during a 12 hour period.	D.1	Perform CHANNEL FUNCTIONAL TEST on affected CEAC.	24 hours
E. Required Action and associated Completion Time of Condition B, C, or D not met.	E.1	Be in MODE 3.	6 hours

SURVEILLANCE REQUIREMENTS

SURVEILLANCE		FREQUENCY
SR 3.3.3.1	Perform a CHANNEL CHECK.	12 hours
SR 3.3.3.2	Check the CEAC auto restart count.	12 hours
SR 3.3.3.3	Perform a CHANNEL FUNCTIONAL TEST.	92 days

(continued)

SURVEILLANCE REQUIREMENTS (continued)

SURVEILLANCE		FREQUENCY
SR 3.3.3.4	Perform a CHANNEL CALIBRATION.	18 months
SR 3.3.3.5	Perform a CHANNEL FUNCTIONAL TEST.	18 months
SR 3.3.3.6	Verify the isolation characteristics of each CEAC isolation amplifier.	18 months

3.3 INSTRUMENTATION

3.3.4 Reactor Protective System (RPS) Logic and Trip Initiation

LCO 3.3.4 Six channels of RPS Matrix Logic, four channels of RPS Initiation Logic, four channels of reactor trip circuit breakers (RTCBs), and four channels of Manual Trip shall be OPERABLE.

APPLICABILITY: MODES 1 and 2,
MODES 3, 4, and 5, with any RTCBs closed and any control element assemblies capable of being withdrawn.

ACTIONS

CONDITION	REQUIRED ACTION	COMPLETION TIME
A. One Matrix Logic channel inoperable. OR Three Matrix Logic channels inoperable due to a common power source failure de-energizing three matrix power supplies.	A.1 Restore channel to OPERABLE status.	48 hours

(continued)

ACTIONS (continued)

CONDITION	REQUIRED ACTION		COMPLETION TIME
B. ---------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, RTCB, or Initiation Logic inoperable in MODE 1 or 2.	B.1	Open the affected RTCB.	1 hour
	<u>OR</u>		
	B.2.1	Open the redundant RTCB in the affected Trip Leg.	1 hour
	<u>AND</u>		
	B.2.2	Open the affected RTCB.	48 hours
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, RTCB, or Initiation Logic inoperable in MODE 3, 4, or 5.	C.1	Open the affected RTCB.	48 hours
D. Two channels of RTCBs, Manual Trip or Initiation Logic affecting the same trip leg inoperable.	D.1	Open the affected RTCBs.	Immediately

(continued)

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 more than one Manual Trip, Matrix Logic, Initiation Logic, or RTCB channel 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 3.3.4.1	Perform a CHANNEL FUNCTIONAL TEST on each RPS Logic channel and Manual Trip channel.	92 days
SR 3.3.4.2	Perform a CHANNEL FUNCTIONAL TEST, including separate verification of the undervoltage and shunt trips, on each RTCB.	18 months
SR 3.3.4.3	Perform a CHANNEL FUNCTIONAL TEST on each RTCB.	31 days

3.3 INSTRUMENTATION

3.3.5 Engineered Safety Features Actuation System (ESFAS) Instrumentation

LCO 3.3.5 Four ESFAS trip and bypass removal channels for each Function in Table 3.3.5-1 shall be OPERABLE.

APPLICABILITY: According to Table 3.3.5-1.

ACTIONS

-----------------------------------NOTE-----------------------------------
1. Separate Condition entry is allowed for each ESFAS Function.

CONDITION	REQUIRED ACTION		COMPLETION TIME
A. One or more Functions with one automatic ESFAS trip channel inoperable.	A.1	Place channel in bypass or trip.	1 hour
	<u>AND</u>		
	A.2	Restore channel to OPERABLE status.	Prior to entering MODE 2 following next MODE 5 entry
B. One or more Functions with two automatic ESFAS trip channels inoperable.	B.1	--------NOTE--------- LCO 3.0.4 is not applicable. --------------------	
		Place one channel in bypass and the other in trip.	1 hour

(continued)

ACTIONS (continued)

CONDITION	REQUIRED ACTION	COMPLETION TIME
C. One or more Functions with one automatic bypass removal channel inoperable.	C.1 Disable bypass channel.	1 hour
	<u>OR</u>	
	C.2.1 Place affected automatic trip channel in bypass or trip.	1 hour
	<u>AND</u>	
	C.2.2 Restore bypass removal channel and associated automatic trip channel to OPERABLE status.	Prior to entering MODE 2 following next MODE 5 entry
D. One or more Functions with two automatic bypass removal channels inoperable.	------------NOTE------------ LCO 3.0.4 is not applicable. ----------------------------	
	D.1 Disable bypass channels.	1 hour
	<u>OR</u>	
	D.2 Place one affected automatic trip channel in bypass and place the other in trip.	1 hour
E. Required Action and associated Completion Time.	E.1 Be in MODE 3.	6 hours
	<u>AND</u>	
	E.2 Be in MODE 4.	12 hours

SURVEILLANCE REQUIREMENTS

SURVEILLANCE		FREQUENCY
SR 3.3.5.1	Perform a CHANNEL CHECK of each ESFAS channel.	12 hours
SR 3.3.5.2	Perform a CHANNEL FUNCTIONAL TEST of each ESFAS channel.	92 days
SR 3.3.5.3	Perform a CHANNEL CALIBRATION of each ESFAS channel, including bypass removal functions.	18 months
SR 3.3.5.4	Verify ESF RESPONSE TIME is within limits.	18 months on a STAGGERED TEST BASIS
SR 3.3.5.5	Perform a CHANNEL FUNCTIONAL TEST on each automatic bypass removal channel.	Once within 92 days prior to each reactor startup

Table 3.3.5-1 (page 1 of 1)
Engineered Safety Features Actuation System Instrumentation

FUNCTION	APPLICABLE MODES OR OTHER SPECIFIED CONDITIONS	ALLOWABLE VALUE
1. Safety Injection Actuation Signal		
a. Containment Pressure – High	1,2,3	≤ 3.2 psig
b. Pressurizer Pressure – Low[(a)]		≥ 1821 psia
2. Containment Spray Actuation Signal		
a. Containment Pressure – High High	1,2,3	≤ 8.9 psig
3. Containment Isolation Actuation Signal		
a. Containment Pressure – High	1,2,3	≤ 3.2 psig
b. Pressurizer Pressure – Low[(a)]		≥ 1821 psia
4. Main Steam Isolation Signal[(c)]		
a. Steam Generator #1 Pressure–Low[(b)]	1,2,3	≥ 890 psia
b. Steam Generator #2 Pressure–Low[(b)]		≥ 890 psia
c. Steam Generator #1 Level-High		≤ 91.5%
d. Steam Generator #2 Level-High		≤ 91.5%
e. Containment Pressure-High		≤ 3.2 psig
5. Recirculation Actuation Signal		
a. Refueling Water Storage Tank Level-Low	1,2,3	≥ 6.9 and ≤ 7.9%
6. Auxiliary Actuation Signal SG #1 (AFAS-1)		
a. Steam Generator #1 Level-Low	1,2,3	≥ 25.3%
b. SG Pressure Difference–High		≤ 192 psid
7. Auxiliary Actuation Signal SG #2 (AFAS-2)		
a. Steam Generator #2 Level-Low	1,2,3	≥ 25.3%
b. SG Pressure Difference–High		≤ 192 psid

(a) The setpoint may be decreased to a minimum value of 100 psia, as pressurizer pressure is reduced, provided the margin between pressurizer pressure and the setpoint is maintained ≤ 400 psia or ≥ 140 psia greater than the saturation pressure of the RCS cold leg when the RCS cold leg temperature is ≥ 485°F. Trips may be bypassed when pressurizer pressure is < 400 psia. Bypass shall be automatically removed when pressurizer pressure is ≥ 500 psia. The setpoint shall be automatically increased to the normal setpoint as pressurizer pressure is increased.

(b) The setpoint may be decreased as steam pressure is reduced, provided the margin between steam pressure and the setpoint is maintained ≤ 200 psig. The setpoint shall be automatically increased to the normal setpoint as steam pressure is increased.

(c) The Main Steam Isolation Signal (MSIS) Function (Steam Generator Pressure – Low, Steam Generator Level-High and Containment Pressure – High signals) is not required to be OPERABLE when all associated valves isolated by the MSIS Function are closed.

3.3 INSTRUMENTATION

3.3.6 Engineered Safety Features Actuation System (ESFAS) Logic and Manual Trip

LCO 3.3.6 Six channels of ESFAS Matrix Logic, four channels of ESFAS Initiation Logic, two channels of Actuation Logic, and four channels of Manual Trip shall be OPERABLE for each Function in Table 3.3.6-1.

APPLICABILITY: According to Table 3.3.6-1.

ACTIONS

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

CONDITION	REQUIRED ACTION		COMPLETION TIME
A. One or more Functions with one Matrix Logic channel inoperable. <u>OR</u> Three Matrix Logic channels are inoperable due to a common power source failure de-energizing three matrix power supplies.	A.1	Restore channel to OPERABLE status.	48 hours
B. One or more Functions with one Manual Trip or Initiation Logic channel inoperable.	B.1	Restore channel to OPERABLE status.	48 hours

(continued)

ACTIONS (continued)

CONDITION	REQUIRED ACTION		COMPLETION TIME
C. One or more Functions with two Initiation Logic channels or Manual Trip channels affecting the same trip leg inoperable.	C.1	Open at least one contact in the affected trip leg of both ESFAS Actuation Logics.	Immediately
	<u>AND</u>		
	C.2	Restore channels to OPERABLE status.	48 hours
D. One or more Functions with one Actuation Logic channel inoperable.	D.1	--------NOTE--------- One channel of Actuation Logic may be bypassed for up to 1 hour for Surveillances, provided the other channel is OPERABLE. --------------------	
		Restore inoperable channel to OPERABLE status.	48 hours
E. Required Action and associated Completion Time of Conditions for Containment Spray Actuation Signal, Main Steam Isolation Signal or Auxiliary Feedwater Actuation Signal not met.	E.1	Be in MODE 3.	6 hours
	<u>AND</u>		
	E.2	Be in MODE 4.	12 hours

(continued)

ACTIONS (continued)

CONDITION	REQUIRED ACTION	COMPLETION TIME
F. Required Action and associated Completion Time of Conditions for Safety Injection Actuation Signal, Containment Isolation Actuation Signal, or Recirculation Actuation Signal not met.	F.1 Be in MODE 3. AND F.2 Be in MODE 5.	6 hours 36 hours

SURVEILLANCE REQUIREMENTS

SURVEILLANCE		FREQUENCY
SR 3.3.6.1	-------------------NOTE------------------- Testing of Actuation Logic shall include the verification of the proper operation of each initiation relay. -- Perform a CHANNEL FUNCTIONAL TEST on each ESFAS logic channel and Manual Trip channel.	92 days
SR 3.3.6.2	-------------------NOTE------------------- Relays exempt from testing during operation shall be tested each 18 months. -- Perform a subgroup relay test of each Actuation Logic channel, which includes the de-energization of each subgroup relay and verification of the OPERABILITY of each subgroup relay.	9 months on a STAGGERED TEST BASIS

Table 3.3.6-1 (page 1 of 1)
Engineered Safety Features Actuation System Logic and Manual Trip Applicability

FUNCTION	APPLICABLE MODES
1. Safety Injection Actuation Signal	
a. Matrix Logic	1,2,3
b. Initiation Logic	1,2,3,4
c. Actuation Logic	1,2,3,4
d. Manual Trip	1,2,3,4
2. Containment Isolation Actuation Signal	
a. Matrix Logic	1,2,3
b. Initiation Logic	1,2,3,4
c. Actuation Logic	1,2,3,4
d. Manual Trip	1,2,3,4
3. Recirculation Actuation Signal	
a. Matrix Logic	1,2,3
b. Initiation Logic	1,2,3,4
c. Actuation Logic	1,2,3,4
d. Manual Trip	1,2,3,4
4. Containment Spray Actuation Signal	
a. Matrix Logic	1,2,3
b. Initiation Logic	1,2,3
c. Actuation Logic	1,2,3
d. Manual Trip	1,2,3
5. Main Steam Isolation Signal[a]	
a. Matrix Logic	1,2,3
b. Initiation Logic	1,2,3
c. Actuation Logic	1,2,3
d. Manual Trip	1,2,3
6. Auxiliary Feedwater Actuation Signal SG #1 (AFAS-1)	
a. Matrix Logic	1,2,3
b. Initiation Logic	1,2,3
c. Actuation Logic	1,2,3
d. Manual Trip	1,2,3
7. Auxiliary Feedwater Actuation Signal SG #2 (AFAS-2)	
a. Matrix Logic	1,2,3
b. Initiation Logic	1,2,3
c. Actuation Logic	1,2,3
d. Manual Trip	1,2,3

(a) The MSIS Function is not required to be OPERABLE when all associated valves isolated by the MSIS Function are closed.

Table 3.3.6-1 (page 1 of 1)
Engineered Safety Features Actuation System Logic and Manual Trip Applicability

FUNCTION	APPLICABLE MODES
1. Safety Injection Actuation Signal	
a. Matrix Logic	1,2,3
b. Initiation Logic	1,2,3,4
c. Actuation Logic	1,2,3,4
d. Manual Trip	1,2,3,4
2. Containment Isolation Actuation Signal	
a. Matrix Logic	1,2,3
b. Initiation Logic	1,2,3,4
c. Actuation Logic	1,2,3,4
d. Manual Trip	1,2,3,4
3. Recirculation Actuation Signal	
a. Matrix Logic	1,2,3
b. Initiation Logic	1,2,3,4
c. Actuation Logic	1,2,3,4
d. Manual Trip	1,2,3,4
4. Containment Spray Actuation Signal	
a. Matrix Logic	1,2,3
b. Initiation Logic	1,2,3
c. Actuation Logic	1,2,3
d. Manual Trip	1,2,3
5. Main Steam Isolation Signal[a]	
a. Matrix Logic	1,2,3
b. Initiation Logic	1,2,3
c. Actuation Logic	1,2,3
d. Manual Trip	1,2,3
6. Auxiliary Feedwater Actuation Signal SG #1 (AFAS-1)	
a. Matrix Logic	1,2,3
b. Initiation Logic	1,2,3
c. Actuation Logic	1,2,3
d. Manual Trip	1,2,3
7. Auxiliary Feedwater Actuation Signal SG #2 (AFAS-2)	
a. Matrix Logic	1,2,3
b. Initiation Logic	1,2,3
c. Actuation Logic	1,2,3
d. Manual Trip	1,2,3

(a) The MSIS Function is not required to be OPERABLE when all associated valves isolated by the MSIS Function are closed.

3.3 INSTRUMENTATION

3.3.7 Diesel Generator (DG) – Loss of Voltage Start (LOVS)

LCO 3.3.7 Four channels of Loss of Voltage Function and 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

CONDITION	REQUIRED ACTION	COMPLETION TIME
A. One LOVS channel per DG inoperable.	A.1 Place channel in bypass or trip.	1 hour
	<u>AND</u>	
	A.2 Restore channel to OPERABLE status.	Prior to entering MODE 2 following next MODE 5 entry

(continued)

ACTIONS (continued)

CONDITION	REQUIRED ACTION		COMPLETION TIME
B. Two LOVS channels per DG inoperable.	B.1	Enter applicable Conditions and Required Actions for the associated DG made inoperable by DG – LOVS instrumentation.	1 hour
	<u>OR</u>		
	B.2	--------NOTE--------- LCO 3.0.4 is not applicable. ---------------------	
		Place one channel in bypass and the other channel in trip.	1 hour
C. More than two LOVS channels per DG 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 3.3.7.1	Perform CHANNEL CHECK.	12 hours
SR 3.3.7.2	Perform CHANNEL FUNCTIONAL TEST.	18 months
SR 3.3.7.3	Perform CHANNEL CALIBRATION with setpoint Allowable Values as follows: a. Degraded Voltage Function ≥ 3697 V and ≤ 3786 V Time delay: ≤ 35 seconds at 3744 V; and b. Loss of Voltage Function ≥ 3250 V Time delay: ≤ 11.4 seconds at 2929.5 V.	18 months

3.3 INSTRUMENTATION

3.3.8 Containment Purge Isolation Actuation Signal (CPIAS)

LCO 3.3.8 One CPIAS channel shall be OPERABLE.

APPLICABILITY: MODES 1, 2, 3, and 4,
During CORE ALTERATIONS,
During movement of irradiated fuel assemblies within containment.

--------------------------NOTE--------------------------
Only required when the penetration is not isolated by at least one closed automatic valve, closed manual valve, or blind flange.

ACTIONS

CONDITION	REQUIRED ACTION	COMPLETION TIME
A. CPIAS Manual Trip, Actuation Logic, or radiation monitor inoperable in MODES 1, 2, 3, and 4.	A.1 Place and maintain containment purge and exhaust valves in closed position.	Immediately
B. Required Action and associated Completion Time not met.	B.1 Enter applicable Conditions and Required Actions for affected valves of LCO 3.6.3 "Containment Isolation Valves" made inoperable by CPIAS instrumentation.	Immediately

(continued)

ACTIONS (continued)

CONDITION	REQUIRED ACTION	COMPLETION TIME
C. CPIAS Manual Trip, Actuation Logic, or radiation monitor inoperable during CORE ALTERATIONS or movement of irradiated fuel assemblies within containment.	C.1 Place and maintain containment purge and exhaust valves in closed position.	Immediately
	OR	
	C.2.1 Suspend CORE ALTERATIONS.	Immediately
	AND	
	C.2.2 Suspend movement of irradiated fuel assemblies in containment.	Immediately

SURVEILLANCE REQUIREMENTS

SURVEILLANCE		FREQUENCY
SR 3.3.8.1	Perform a CHANNEL CHECK on required radiation monitor channel.	12 hours
SR 3.3.8.2	Perform a CHANNEL FUNCTIONAL TEST on each required radiation monitor channel, and Verify the setpoint ≤ 2.5 mR/hr.	92 days
SR 3.3.8.3	-------------------NOTE------------------- Surveillance of Actuation Logic shall include the verification of the proper operation of each actuation relay. -- Perform a CHANNEL FUNCTIONAL TEST on required CPIAS Actuation Logic channel.	18 months

(continued)

SURVEILLANCE REQUIREMENTS (continued)

SURVEILLANCE		FREQUENCY
SR 3.3.8.4	Perform a CHANNEL CALIBRATION on required radiation monitor channel.	18 months
SR 3.3.8.5	Perform CHANNEL FUNCTIONAL TEST on required CPIAS Manual Trip channel.	18 months

3.3 INSTRUMENTATION

3.3.9 Control Room Essential Filtration Actuation Signal (CREFAS)

LCO 3.3.9 One CREFAS channel shall be OPERABLE.

APPLICABILITY: MODES 1, 2, 3, 4, 5, and 6,
During movement of irradiated fuel assemblies.

ACTIONS

CONDITION	REQUIRED ACTION	COMPLETION TIME
A. CREFAS Manual Trip, Actuation Logic, or radiation monitor inoperable in MODE 1, 2, 3, or 4.	A.1 Place one CREFS train in operation.	1 hour
B. Required Action and associated Completion Time of Condition A not met.	B.1 Be in MODE 3. AND B.2 Be in MODE 5.	6 hours 36 hours

(continued)

ACTIONS (continued)

CONDITION	REQUIRED ACTION		COMPLETION TIME
C. CREFAS Manual Trip, Actuation Logic, or radiation monitor inoperable in MODE 5 or 6, or during movement of irradiated fuel assemblies.	C.1	Place one CREFS train in operation.	Immediately
	<u>OR</u>		
	C.2.1	Suspend movement of irradiated fuel assemblies.	Immediately
	<u>AND</u>		
	C.2.2	Suspend positive reactivity additions.	Immediately
	<u>AND</u>		
	C.2.3	Suspend CORE ALTERATIONS.	Immediately

SURVEILLANCE REQUIREMENTS

SURVEILLANCE		FREQUENCY
SR 3.3.9.1	Perform a CHANNEL CHECK on the required control room radiation monitor channel.	12 hours

(continued)

SURVEILLANCE REQUIREMENTS (continued)

	SURVEILLANCE	FREQUENCY
SR 3.3.9.2	Perform a CHANNEL FUNCTIONAL TEST on required CREFAS radiation monitor channel. Verify CREFAS high radiation setpoint is $\leq 2 \times 10^{-5}$ μCi/cc.	92 days
SR 3.3.9.3	-------------------NOTES----------------- 1. Surveillance of Actuation Logic shall include the verification of the proper operation of each Actuation relay. 2. Relays associated with plant equipment that cannot be operated during plant operation are required to be tested during each MODE 5 entry exceeding 24 hours unless tested within the previous 6 months. --- Perform a CHANNEL FUNCTIONAL TEST on required CREFAS Actuation Logic channel.	18 months
SR 3.3.9.4	Perform a CHANNEL CALIBRATION on required CREFAS radiation monitor channel.	18 months
SR 3.3.9.5	Perform a CHANNEL FUNCTIONAL TEST on required CREFAS Manual Trip channel.	18 months
SR 3.3.9.6	Verify that response time of required CREFAS channel is within limits.	18 months on a STAGGERED TEST BASIS

3.3 INSTRUMENTATION

3.3.10 Post Accident Monitoring (PAM) Instrumentation

LCO 3.3.10 The PAM instrumentation for each Function in Table 3.3.10-1 shall be OPERABLE.

APPLICABILITY: MODES 1, 2, and 3.

ACTIONS

------------------------------------NOTES------------------------------------

1. LCO 3.0.4 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.	30 days
B. Required Action and associated Completion Time of Condition A not met.	B.1 Initiate action in accordance with Specification 5.6.6.	Immediately
C. ---------NOTE--------- Not applicable to hydrogen monitor channels. --------------------- One or more Functions with two required channels inoperable.	C.1 Restore one channel to OPERABLE status.	7 days

(continued)

ACTIONS (continued)

CONDITION	REQUIRED ACTION		COMPLETION TIME
D. Two hydrogen monitor channels inoperable.	D.1	Restore one hydrogen monitor channel to OPERABLE status.	72 hours
E. Required Action and associated Completion Time of Condition C or D not met.	E.1	Enter the Condition referenced in Table 3.3.10-1 for the channel.	Immediately
F. As required by Required Action E.1 and referenced in Table 3.3.10-1.	F.1	Be in MODE 3.	6 hours
	<u>AND</u>		
	F.2	Be in MODE 4.	12 hours
G. As required by Required Action E.1 and referenced in Table 3.3.10-1.	G.1	Initiate action in accordance with Specification 5.6.6.	Immediately

SURVEILLANCE REQUIREMENTS

-----------------------------------NOTE-----------------------------------
These SRs apply to each PAM instrumentation Function in Table 3.3.10-1.

	SURVEILLANCE	FREQUENCY
SR 3.3.10.1	Perform CHANNEL CHECK for each required instrumentation channel that is normally energized.	31 days
SR 3.3.10.2	------------------NOTE------------------ Neutron detectors are excluded from the CHANNEL CALIBRATION. -- Perform CHANNEL CALIBRATION.	18 months

Table 3.3.10-1 (page 1 of 1)
Post Accident Monitoring Instrumentation

	FUNCTION	REQUIRED CHANNELS	CONDITIONS REFERENCED FROM REQUIRED ACTION E.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[(d)]	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	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.	Steam Generator Pressure	2 per steam generator	F
19.	Reactor Coolant System Subcooling Margin Monitoring	2	F
20.	Reactor Coolant System Activity	2	G

(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.

(d) A channel is eight sensors in a probe. A channel is OPERABLE if four or more sensors, two or more in the upper four and two or more in the lower four, are OPERABLE.

3.3 INSTRUMENTATION

3.3.11 Remote Shutdown System

LCO 3.3.11 The Remote Shutdown System Instrumentation Functions in Table 3.3.11-1 and each Remote Shutdown System disconnect switch and control circuit 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 required Functions in Table 3.3.11.1 inoperable.	A.1	Restore required Functions to OPERABLE status.	30 days
B. One or more remote shutdown system disconnect switches or control circuits inoperable.	B.1	Restore required switch(s)/circuit(s) to OPERABLE status	
	<u>OR</u>		
	B.2	Issue procedure changes that identify alternate disconnect methods or control circuits	30 days
C. Required Action and associated Completion Time not met.	C.1	Be in MODE 3.	6 hours
	<u>AND</u>		
	C.2	Be in MODE 4.	12 hours

SURVEILLANCE REQUIREMENTS

SURVEILLANCE		FREQUENCY
SR 3.3.11.1	Perform CHANNEL CHECK for each required instrumentation channel that is normally energized.	31 days
SR 3.3.11.2	Verify each required control circuit and transfer switch is capable of performing the intended function.	18 months
SR 3.3.11.3	-------------------NOTE-------------------- Neutron detectors are excluded from the CHANNEL CALIBRATION. -- Perform CHANNEL CALIBRATION for each required instrumentation channel.	18 months

Table 3.3.11-1 (page 1 of 1)
Remote Shutdown System Instrumentation and Controls

FUNCTION/INSTRUMENT	REQUIRED NUMBER OF CHANNELS
1. Reactivity Control	
a. Log Power Neutron Flux	2
2. Reactor Coolant System Pressure Control	
a. Pressurizer Pressure	1
b. Refueling Water Tank Level	2
c. Charging Line Pressure	1
d. Charging Line Flow	1
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. Steam Generator Pressure	2 per steam generator
d. Steam Generator Level	2 per steam generator
e. Auxiliary Feedwater Flow	2 per steam generator
4. Decay Heat Removal (via Shutdown Cooling System)	
a. Shutdown Cooling Heat Exchanger Temperature	2
b. Shutdown Cooling Flow	2
5. Reactor Coolant System Inventory Control	
a. Pressurizer Level	2

3.3 INSTRUMENTATION

3.3.12 Boron Dilution Alarm System (BDAS)

LCO 3.3.12 Two channels of BDAS shall be OPERABLE.

APPLICABILITY: MODES 3, 4 and 5.

-----------------------------NOTE-----------------------------
Required in MODE 3 within 1 hour after the neutron flux is within the startup range following a reactor shutdown.

ACTIONS

CONDITION	REQUIRED ACTION	COMPLETION TIME
A. One required channel inoperable.	A.1 Determine the RCS boron concentration.	Immediately __AND__ At the monitoring Frequency specified in the CORE OPERATING LIMITS REPORT
	__OR__	
	A.2 Suspend all operations involving positive reactivity additions.	Immediately

(continued)

ACTIONS (continued)

CONDITION	REQUIRED ACTION		COMPLETION TIME
B. Two required channels inoperable.	B.1	Determine the RCS boron concentration by redundant methods.	Immediately AND At the monitoring frequency specified in the CORE OPERATING LIMITS REPORT
	OR		
	B.2	Suspend all operations involving positive reactivity additions.	Immediately

SURVEILLANCE REQUIREMENTS

	SURVEILLANCE	FREQUENCY
SR 3.3.12.1	----------------------NOTE---------------- Not required to be performed until 1 hour after neutron flux is within the startup range. -- Perform CHANNEL CHECK.	12 hours
SR 3.3.12.2	----------------------NOTE---------------- Not required to be performed until 72 hours after neutron flux is within the startup range. -- Perform CHANNEL FUNCTIONAL TEST.	92 days
SR 3.3.12.3	-------------------NOTE------------------- Neutron detectors are excluded from CHANNEL CALIBRATION. -- Perform CHANNEL CALIBRATION.	18 months

SMOOTH COPY
ITS SECTION 3.3 - BASES

B 3.3 INSTRUMENTATION

B 3.3.1 Reactor Protective System (RPS) Instrumentation — Operating

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 (RCPB) 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 (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 (DNB);
- Fuel centerline melting shall not occur; and
- The Reactor Coolant System (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

(continued)

BASES

BACKGROUND (continued)

occurrence. Meeting the acceptable dose limit for an accident category is considered having acceptable consequences for that event.

The RPS is segmented into four interconnected modules. These modules are:

- Measurement channels;
- Bistable trip units;
- 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 and RTCBs are addressed in LCO 3.3.4, "Reactor Protective System (RPS) Logic and Trip Initiation." The CEACs are addressed in LCO 3.3.3, "Control Element Assembly Calculators (CEACs)."

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, the core protection calculators (CPCs), and the CEACs, though complex, are considered components in the measurement channels of the Variable Over Power – High, Logarithmic Power Level – High, DNBR – Low, and Local Power Density (LPD) – High trips.

Four identical measurement channels, designated channels A through D, with electrical and physical separation, are provided for each parameter used in the generation of trip signals, with the exception of the control element assembly (CEA) position indication used in the CPCs. Each measurement channel provides input to one or more RPS bistables within the same RPS channel. In addition, some measurement channels may also be used as inputs to Engineered Safety Features Actuation System (ESFAS)

(continued)

BASES

BACKGROUND

Measurement Channels (continued)

bistables, and most provide indication in the control room. Measurement channels used as an input to the RPS are not used for control functions.

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 bistables monitoring the same parameter in two or more channels will de-energize Matrix Logic, which in turn de-energizes the Initiation Logic. This causes all four RTCBs to open, interrupting power to the 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 10 CFR 50, Appendix A, GDC 21 (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.

Adequate channel to channel independence includes physical and electrical independence of each channel from the others. This allows operation in two-out-of-three logic with one channel removed from service until following the next MODE 5 entry. Since no single failure will either cause or prevent a protective system actuation, and no protective channel feeds a control, this arrangement meets the requirements of IEEE Standard 279-1971 (Ref. 4).

The CPCs perform the calculations required to derive the DNBR and LPD parameters and their associated RPS trips. Four separate CPCs perform the calculations independently, one for each of the four RPS channels. The CPCs provide outputs to drive display indications (DNBR margin, LPD margin, and calibrated neutron flux power levels) and provide DNBR—Low and LPD—High pretrip and trip signals. The CPC channel outputs for the DNBR—Low and LPD—High trips operate contacts in the Matrix Logic in a manner identical to the other RPS trips.

(continued)

BASES

BACKGROUND

Measurement Channels (continued)

Each CPC receives the following inputs:

- Hot leg and cold leg temperatures;
- Pressurizer pressure;
- Reactor coolant pump speed;
- Excore neutron flux levels;
- Target CEA positions; and
- CEAC penalty factors.

Each CPC is programmed with "addressable constants." These are various alignment values, correction factors, etc., that are required for the CPC computations. They can be accessed for display or for the purpose of changing them as necessary.

The CPCs use this constant and variable information to perform a number of calculations. These include the calculation of CEA group and subgroup deviations (and the assignment of conservative penalty factors), correction and calculation of average axial power distribution (APD) (based on excore flux levels and CEA positions), calculation of coolant flow (based on pump speed), and calculation of calibrated average power level (based on excore flux levels and ΔT power).

The DNBR calculation considers primary pressure, inlet temperature, coolant flow, average power, APD, radial peaking factors, and CEA deviation penalty factors from the CEACs to calculate the state of the limiting (hot) coolant channel in the core. A DNBR – Low trip occurs when the calculated value reaches the minimum DNBR trip setpoint.

(continued)

BASES

BACKGROUND

Measurement Channels (continued)

The LPD calculation considers APD, average power, radial peaking factors (based upon target CEA position), and CEAC penalty factors to calculate the current value of compensated peak power density. An LPD – High trip occurs when the calculated value reaches the trip setpoint. The four CPC channels provide input to the four DNBR – Low and four LPD – High RPS trip channels. They effectively act as the sensor (using many inputs) for these trips.

The CEACs perform the calculations required to determine the position of CEAs within their subgroups for the CPCs. Two independent CEACs compare the position of each CEA to its subgroup position. If a deviation is detected by either CEAC, an annunciator sounds and appropriate "penalty factors" are transmitted to all CPCs. These penalty factors conservatively adjust the effective operating margins to the DNBR – Low and LPD – High trips. Each CEAC also drives a single cathode ray tube (CRT), which is switchable between CEACs. The CRT displays individual CEA positions from the selected CEAC.

Each CEA has two separate reed switch assemblies mounted outside the RCPB. Each of the two CEACs receives CEA position input from one of the two reed switch position transmitters on each CEA, so that the position of all CEAs is independently monitored by both CEACs.

CEACs are addressed in LCO 3.3.3.

Bistable Trip Units

Bistable trip units, mounted in the Plant Protection System (PPS) cabinet, receive an analog input from the measurement channels. They 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 bistables, designated A, B, C, and D, for each RPS parameter, one for each measurement channel. Bistables de-energize when a trip occurs, in turn de-energizing bistable relays mounted in the PPS relay card racks.

(continued)

BASES

BACKGROUND

Bistable Trip Units (continued)

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).

Some measurement channels provide contact outputs to the PPS. In these cases, there is no bistable card, and opening the contact input directly de-energizes the associated bistable relays. These include the CPC generated DNBR — Low and LPD — High trips.

The trip setpoints used in the bistables are based on the analytical limits derived from the accident analysis (Ref. 5). 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, instrument drift, and severe environment errors for those RPS channels that must function in harsh environments as defined by 10 CFR 50.49 (Ref. 6), 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 "Plant Protection System Selection of Trip Setpoint Values" (Ref. 7). 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 Allowable Value.

To maintain the margins of safety assumed in the safety analyses, the calculations of the trip variables for the DNBR - Low and Local Power Density - High trips include the measurement, calculational, and processor uncertainties and dynamic allowances as defined in the latest applicable revision of CEN-PSD-335-P, "Functional Design Requirements for a Core Protection Calculation" (Ref. 10) and CEN-PSD-336-P," Functional Design Requirements for a Control Element Assembly Calculator," (Ref. 11).

(continued)

BASES

BACKGROUND

Bistable Trip Units (continued)

Setpoints in accordance with the Allowable Value will ensure that SLs of Chapter 2.0, "SAFETY LIMITS (SLs)," 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 LCO 3.3.1, the Allowable Values of Table 3.3.1-1 are the LSSS.

Functional testing of the entire RPS, from bistable input through the opening of individual RTCBs, can be performed either at power or shutdown and is normally performed on a quarterly basis. Nuclear instrumentation, the CPCs, and the CEACs can be similarly tested. UFSAR, Section 7.2 (Ref. 8), provides more detail on RPS testing. Processing transmitter calibration is normally performed on a refueling basis.

RPS Logic

The RPS Logic, addressed in LCO 3.3.4, consists of both Matrix and Initiation Logic and employs a scheme that provides a reactor trip when bistables in any two of the four channels sense the same input parameter trip. This is called a two-out-of-four trip logic.

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 RTCB initiation relays. The trip paths thus each have six contacts in series, one from each matrix, and perform a

(continued)

BASES

BACKGROUND

RPS Logic (continued)

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 of the four RTCBs. The RTCB initiation 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 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 turn de-energizes all four initiation relays, which simultaneously de-energize the undervoltage and energize the shunt trip attachments in all four RTCBs, tripping them open.

Matrix Logic refers to the matrix power supplies, trip channel bypass contacts, and interconnecting matrix wiring between bistable relay cards, up to but not including the matrix relays. Matrix contacts on the bistable relay cards are excluded from the Matrix Logic definition, since they are addressed as part of the measurement channel.

The Initiation Logic consists of the trip path power source, matrix relays and their associated contacts, all interconnecting wiring, initiation relays, and the initiation relay contacts in the RTCB control circuitry.

(continued)

BASES

BACKGROUND

RPS Logic (continued)

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. 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.

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. These bypasses are enabled manually 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. Operating bypasses are normally implemented in the bistable, so that normal trip indication is also disabled. Trips with operating bypasses include Pressurizer Pressure—Low, Logarithmic Power Level—High, and CPC (DNBR—Low and LPD—High).

Reactor Trip Circuit Breakers (RTCBs)

The reactor trip switchgear, addressed in LCO 3.3.4, consists of four RTCBs. 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. Power is supplied from the MG sets to the CEDM's via two redundant paths (trip legs). Trip legs 1 and 3 are in parallel with Trip legs 2 and 4. 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.

(continued)

BASES

BACKGROUND

Reactor Trip Circuit Breakers (RTCBs) (continued)

Each of the two trip legs consists of two RTCBs in series. The two RTCBs within a trip leg are actuated by separate initiation circuits.

Each RTCB is operated by either a manual reactor trip push button, a Supplementary Protection System (SPS) trip relay or an RPS actuated Initiation relay. There are four Manual Trip push buttons each push button operates one of the four RTCBs. Depressing either of the push buttons in both trip legs will result in a reactor trip.

When a Manual Trip is initiated using the control room push buttons, the RPS trip paths and Initiation relays are not utilized, 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 the RTCBs necessary to actuate both the undervoltage and shunt trip attachments but excludes the Initiation 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 RTCBs, can be performed either at power or shutdown and is normally performed on a quarterly basis. UFSAR, Section 7.2 (Ref. 8), explains RPS testing in more detail.

APPLICABLE SAFETY ANALYSES

Design Basis Definition

The RPS is designed to ensure that the following operational criteria are met:

- The associated actuation will occur when the parameter monitored by each channel reaches its setpoint and the specific coincidence logic is satisfied;
- Separation and redundancy are maintained to permit a channel to be out of service for testing or maintenance while still maintaining redundancy within the RPS instrumentation network.

(continued)

BASES

APPLICABLE SAFETY ANALYSES

Design Basis Definition (continued)

Each of the analyzed accidents and transients can be detected by one or more RPS Functions. The accident analysis takes credit for most of the RPS trip Functions. Those functions for which no credit is taken, termed equipment protective functions, are not needed from a safety perspective.

Each RPS setpoint is chosen to be consistent with the function of the respective trip. The basis for each trip setpoint falls into one of three general categories:

Category 1: To ensure that the SLs are not exceeded during AOOs;

Category 2: To assist the ESFAS during accidents; and

Category 3: To prevent material damage to major plant components (equipment protective).

The RPS maintains the SLs during AOOs and mitigates the consequences of DBAs in all MODES in which the RTCBs are closed.

Each of the analyzed transients and accidents can be detected by one or more RPS Functions. Functions not specifically credited in the accident analysis are part of the NRC staff approved licensing basis for the plant. Noncredited Functions include the Steam Generator #1 Level – High, and the Steam Generator #2 Level – High. These trips minimize the potential for equipment damage.

The specific safety analysis applicable to each protective function are identified below:

1. Variable Over Power-High

   The Variable Over Power - High Trip (VOPT) is provided to protect the reactor core during positive reactivity addition excursions. Under steady state conditions the trip setpoint will stay above the neutron power level signal by a preset value, called the band function. When the power level increases the setpoint will increase to attempt to maintain the separation defined by the Band function, however the rate of the

(continued)

BASES

APPLICABLE SAFETY ANALYSES

Design Basis Definition (continued)

1. Variable Over Power-High (continued)

setpoint change is limited by the rate function. If the power level signal increases faster than the setpoint, a trip will occur when the power level eventually equals the trip setpoint. The maximum value the setpoint can have is determined by the ceiling function.

The Variable Over Power – High trip provides protection against core damage during the following events:

- Uncontrolled CEA Withdrawal From Low Power (AOO);
- Uncontrolled CEA Withdrawal at Power (AOO); and
- CEA Ejection (Accident).

2. Logarithmic Power Level – High

The Logarithmic Power Level – High trip protects the integrity of the fuel cladding and helps protect the RCPB in the event of an unplanned criticality from a shutdown condition.

In MODES 2, 3, 4, and 5, with the RTCBs closed and the CEA Drive System capable of CEA withdrawal, protection is required for CEA withdrawal events originating when THERMAL POWER is < 1E-4% RTP. For events originating above this power level, other trips provide adequate protection.

MODES 3, 4, and 5, with the RTCBs closed, are addressed in LCO 3.3.2, "Reactor Protective System (RPS) Instrumentation – Shutdown."

In MODES 3, 4, or 5, with the RTCBs open or the CEAs not capable of withdrawal, the Logarithmic Power Level – High trip does not have to be OPERABLE. The indication and alarm functions required to indicate a boron dilution event are addressed in LCO 3.3.12, "Boron Dilution Alarm System (BDAS)".

(continued)

BASES

APPLICABLE SAFETY ANALYSES

Design Basis Definition (continued)

3. Pressurizer Pressure - High

The Pressurizer Pressure - High trip provides protection for the high RCS pressure SL. In conjunction with the pressurizer safety valves and the main steam safety valves (MSSVs), it provides protection against overpressurization of the RCPB during the following events:

- Loss of Condenser Vacuum (AOO);
- CEA Withdrawal From Low Power Conditions (AOO);
- Chemical and Volume Control System Malfunction (AOO); and
- Main Feedwater System Pipe Break (Accident).

4. Pressurizer Pressure - Low

The Pressurizer Pressure - Low trip is provided to trip the reactor to assist the ESF System in the event of loss of coolant accidents (LOCAs). During a LOCA, the Sls may be exceeded; however, the consequences of the accident will be acceptable. A Safety Injection Actuation Signal (SIAS) and a Containment Isolation Actuation Signal (CIAS) are initiated simultaneously.

5. Containment Pressure - High

The Containment Pressure - High trip prevents exceeding the containment design pressure psig during a design basis LOCA or main steam line break (MSLB) accident. During a LOCA or MSLB the SLs may be exceeded; however, the consequences of the accident will be acceptable. An SIAS, CIAS, and MSIS are initiated simultaneously.

(continued)

BASES

APPLICABLE SAFETY ANALYSES

Design Basis Definition (continued)

6, 7. Steam Generator Pressure – Low

The Steam Generator #1 Pressure – Low and Steam Generator #2 Pressure – Low trips provide protection against an excessive rate of heat extraction from the steam generators and resulting rapid, uncontrolled cooldown of the RCS. This trip is needed to shut down the reactor and assist the ESF System in the event of an MSLB or main feedwater line break accident. A main steam isolation signal (MSIS) is initiated simultaneously.

8, 9. Steam Generator Level – Low

The Steam Generator #1 Level – Low and Steam Generator #2 Level – Low trips ensure that a reactor trip signal is generated for the following events to help prevent exceeding the design pressure of the RCS due to the loss of the heat sink:

- Inadvertent Opening of a Steam Generator Atmospheric Dump Valve (AOO);
- Loss of Condenser Vacuum (AOO);
- Loss of Normal Feedwater Event (AOO);
- Feedwater System Pipe Break (Accident); and
- Single RCP Rotor Seizure (AOO)

10, 11. Steam Generator Level – High

The Steam Generator #1 Level – High and Steam Generator #2 Level – High trips are provided to protect the turbine from excessive moisture carryover in case of a steam generator overfill event. A Main Steam Isolation Signal (MSIS) is initiated simultaneously.

(continued)

BASES

APPLICABLE SAFETY ANALYSES

Design Basis Definition (continued)

12, 13. Reactor Coolant Flow – Low

The Reactor Coolant Flow Steam Generator #1-Low and Reactor Coolant Flow Steam Generator #2-Low trips provide protection against an RCP Sheared Shaft Event and a large steam line break with concurrent loss of offsite AC power. A trip is initiated when the pressure differential across the primary side of either steam generator decreases below a variable setpoint. This variable setpoint stays below the pressure differential by a preset value called the step function, unless limited by a preset maximum decreasing rate determined by the Ramp Function, or a set minimum value determined by the Floor Function. The setpoints ensure that a reactor trip occurs to prevent violation of the peak linear heat rate or DNBR Safety Limits.

14. Local Power Density – High

The CPCs perform the calculations required to derive the DNBR and LPD parameters and their associated RPS trips. The DNBR – Low and LPD – High trips provide plant protection during the following AOOs and assist the ESF systems in the mitigation of the following accidents.

The LPD – High trip provides protection against fuel centerline melting due to the occurrence of excessive local power density peaks during the following AOOs:

- Decrease in Feedwater Temperature;
- Increase in Feedwater Flow;
- Increased Main Steam Flow (not due to the steam line rupture) Without Turbine Trip;
- Uncontrolled CEA Withdrawal From Low Power;
- Uncontrolled CEA Withdrawal at Power; and
- CEA Misoperation; Single Part Length CEA Drop.

For the events listed above (except CEA Misoperation; Single Part Length CEA Drop), DNBR – Low will trip the reactor first, since DNB would occur before fuel centerline melting would occur.

(continued)

BASES

APPLICABLE SAFETY ANALYSES

Design Basis Definition (continued)

15. Departure from Nucleate Boiling Ratio (DNBR) - Low

The CPCs perform the calculations required to derive the DNBR and LPD parameters and their associated RPS trips. The DNBR - Low and LPD - High trips provide plant protection during the following AOOs and assist the ESF systems in the mitigation of the following accidents.

The DNBR - Low trip provides protection against core damage due to the occurrence of locally saturated conditions in the limiting (hot) channel during the following events and is the primary reactor trip (trips the reactor first) for these events:

- Decrease in Feedwater Temperature;
- Increase in Feedwater Flow;
- Increased Main Steam Flow (not due to steam line rupture) Without Turbine Trip;
- Increased Main Steam Flow (not due to steam line rupture) With a Concurrent Single Failure of an Active Component;
- Steam Line Break With Concurrent Loss of Offsite AC Power;
- Loss of Normal AC Power;
- Partial Loss of Forced Reactor Coolant Flow;
- Total Loss of Forced Reactor Coolant Flow;
- Single Reactor Coolant Pump (RCP) Shaft Seizure;
- Uncontrolled CEA Withdrawal From Low Power;
- Uncontrolled CEA Withdrawal at Power;
- CEA Misoperation; Full Length CEA Drop;
- CEA Misoperation; Part Length CEA Subgroup Drop;
- Primary Sample or Instrument Line Break; and
- Steam Generator Tube Rupture.

In the above list, only the steam generator tube rupture, the RCP shaft seizure, and the sample or instrument line break are accidents. The rest are AOOs.

(continued)

BASES

APPLICABLE SAFETY ANALYSES

15. Departure from Nucleate Boiling Ratio (DNBR)-Low (continued)

The DNBR algorithm used in the CPC is valid only within the limits indicated below and operation outside of these limits will result in a CPC initiated trip.

PARAMETER	LIMITING VALUE
RCS Cold Leg Temperature - Low	≥ 505°F
RCS Cold Leg Temperature - High	≤ 590°F
Axial Shape Index - Positive	Not more positive than +0.5
Axial Shape Index - Negative	Not more negative than -0.5
Pressurizer Pressure - Low	≥ 1860 psia
Pressurizer Pressure - High	≤ 2388 psia
Integrated Radial Peaking Factor - Low	≥ 1.28
Integrated Radial Peaking Factor - High	≤ 7.00
Quality Margin - Low	> 0

Interlocks/Bypasses

The operating 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 operating 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 basis for each of the operating bypasses is discussed under individual trips in the LCO section:

a. Logarithmic Power Level – High;

b. DNBR – Low and LPD – High.

The RPS satisfies Criterion 3 of 10 CFR 50.36 (c)(2)(ii).

(continued)

BASES

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.

Actions allow maintenance (trip channel) bypass of individual channels, but the bypass activates interlocks that prevent operation with a second channel in the same Function bypassed. With one channel in each Function trip channel bypassed, this effectively places the plant in a two-out-of-three logic configuration in those Functions.

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. A channel is inoperable if its actual trip setpoint is not within its required Allowable Value. 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. 7).

The Bases for the individual Function requirements are as follows:

1. <u>Variable Over Power-High</u>

   This LCO requires all four channels of Variable Over Power High to be OPERABLE in MODES 1 and 2.

   The Allowable Value is high enough to provide an operating envelope that prevents unnecessary Variable Over Power High reactor 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.

(continued)

BASES

LCO

2. Logarithmic Power Level – High

This LCO requires all four channels of Logarithmic Power Level – High to be OPERABLE in MODE 2.

In MODES 3, 4, or 5 when the RTCBs are shut and the CEA Drive System is capable of CEA withdrawal conditions are addressed in LCO 3.3.2.

The Allowable Value is high enough to provide an operating envelope that prevents unnecessary Logarithmic Power Level – High reactor 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 withdrawal event occur.

The Logarithmic Power Level – High trip may be bypassed when THERMAL POWER is above 1E-4% RTP to allow the reactor to be brought to power during a reactor startup. This operating bypass is automatically removed when THERMAL POWER decreases below 1E-4% RTP. Above 1E-4% RTP, the Variable Over Power – High and Pressurizer Pressure – High trips provide protection for reactivity transients.

3. 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 below the nominal lift setting of the pressurizer code safety valves, and its operation avoids the undesirable operation of these valves during normal plant operation. In the event of a loss of condenser vacuum at 100% power, this setpoint ensures the reactor trip will take place, thereby limiting further heat input to the RCS and consequent pressure rise. The pressurizer safety valves may lift to prevent overpressurization of the RCS.

(continued)

BASES

LCO

4. Pressurizer Pressure-Low (continued)

This LCO requires four channels of Pressurizer Pressure-Low to be OPERABLE in MODES 1 and 2.

The Allowable Value is set low enough to prevent a reactor trip during normal plant operation and pressurizer pressure transients. However, the setpoint is high enough that with a LOCA, the reactor trip will occur soon enough to allow the ESF systems to perform as expected in the analyses and mitigate the consequences of the accident.

5. Containment Pressure-High

The LCO requires four channels of Containment Pressure-High to be OPERABLE in MODES 1 and 2.

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 abnormal condition. It is set low enough to initiate a reactor trip when an abnormal condition is indicated.

6, 7. Steam Generator Pressure-Low

This LCO requires four channels of Steam Generator #1 Pressure-Low and Steam Generator #2 Pressure-Low to be OPERABLE in MODES 1 and 2.

This Allowable Value is sufficiently below the full load operating value for steam pressure so as not to interfere with normal plant operation, but still high enough to provide the required protection in the event of excessive steam demand. Since excessive steam demand causes the RCS to cool down, resulting in positive reactivity addition to the core. If the moderator temperature coefficient is negative a reactor trip is required to offset that effect.

(continued)

BASES

LCO

6, 7. Steam Generator Pressure - Low (continued)

The trip setpoint may be manually decreased as steam generator pressure is reduced during controlled plant cooldown, provided the margin between steam generator pressure and the setpoint is maintained ≤ 200 psia. This allows for controlled depressurization of the secondary system while still maintaining an active reactor trip setpoint and MSIS setpoint, until the time is reached when the setpoints are no longer needed to protect the plant. The setpoint increases automatically as steam generator pressure increases until the specified trip setpoint is reached.

8, 9. Steam Generator Level - Low

This LCO requires four channels of Steam Generator #1 Level - Low and Steam Generator #2 Level - Low for each 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 input signal providing the reactor trip input also provides an input to a bistable that initiates auxiliary feedwater to the affected generator via the Auxiliary Feedwater Actuation Signal (AFAS). The trip setpoint ensures that there will be sufficient water inventory in the steam generator at the time of the trip to provide a margin of at least 10 minutes before auxiliary feedwater is required to prevent degraded core cooling. The reactor trip will remove the heat source (except decay heat), thereby conserving the reactor heat sink.

10, 11. Steam Generator Level - High

This LCO requires four channels of Steam Generator #1 Level - High and Steam Generator #2 Level - High to be OPERABLE in MODES 1 and 2.

The Allowable Value is high enough to allow for normal plant operation and transients without causing a reactor trip. It is set low enough to ensure a reactor trip occurs before the level reaches the steam dryers. Having steam generator water level at the trip value is indicative of the plant not being operated in a controlled manner.

(continued)

BASES

12, 13. <u>Reactor Coolant Flow – Low</u>

This LCO requires four channels of Reactor Coolant Flow Steam Generator #1-Low and Reactor Coolant Flow Steam Generator # 2-Low to be OPERABLE in MODES 1 and 2. The Allowable Value is set low enough to allow for slight variations in reactor coolant flow during normal plant operations while providing the required protection. Tripping the reactor ensures that the resultant power to flow ratio provides adequate core cooling to maintain DNBR under the expected pressure conditions for this event.

LCO 3.4.5, "RCS Loops – MODE 3," LCO 3.4.6, "RCS Loops – MODE 4," and LCO 3.4.7, "RCS Loops – MODE 5, Loops Filled," ensure adequate RCS flow rate is maintained.

14. <u>Local Power Density – High</u>

This LCO requires four channels of LPD – High to be OPERABLE.

The LCO on the CPCs ensures that the SLs are maintained during all AOOs and the consequences of accidents are acceptable.

A CPC is not considered inoperable if CEAC inputs to the CPC are inoperable. The Required Actions required in the event of CEAC channel failures ensure the CPCs are capable of performing their safety Function.

The CPC channels may be manually bypassed below 1E-4% RTP, as sensed by the logarithmic nuclear instrumentation. This bypass is enabled manually in all four CPC channels when plant conditions do not warrant the trip protection. The bypass effectively removes the DNBR – Low and LPD – High trips from the RPS Logic circuitry. The operating bypass is automatically removed when enabling bypass conditions are no longer satisfied.

(continued)

BASES

LCO

14. Local Power Density – High (continued)

This operating bypass is required to perform a plant startup, since both CPC generated trips will be in effect whenever shutdown CEAs are inserted. It also allows system tests at low power with Pressurizer Pressure – Low or RCPs off.

15. Departure from Nucleate Boiling Ratio (DNBR) – Low

This LCO requires four channels of DNBR – Low to be OPERABLE.

The LCO on the CPCs ensures that the SLs are maintained during all AOOs and the consequences of accidents are acceptable.

A CPC is not considered inoperable if CEAC inputs to the CPC are inoperable. The Required Actions required in the event of CEAC channel failures ensure the CPCs are capable of performing their safety Function.

The CPC channels may be manually bypassed below 1E-4% RTP, as sensed by the logarithmic nuclear instrumentation. This bypass is enabled manually in all four CPC channels when plant conditions do not warrant the trip protection. The bypass effectively removes the DNBR – Low and LPD – High trips from the RPS logic circuitry. The operating bypass is automatically removed when enabling bypass conditions are no longer satisfied.

This operating bypass is required to perform a plant startup, since both CPC generated trips will be in effect whenever shutdown CEAs are inserted. It also allows system tests at low power with Pressurizer Pressure – Low or RCPs off.

(continued)

BASES

LCO

Interlocks/Bypasses (continued)

The LCO on operating bypass permissive removal channels requires that the automatic operating 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.

This LCO applies to the operating bypass removal feature only. If the bypass enable Function is failed so as to prevent entering a bypass condition, operation may continue. In the case of the Logarithmic Power Level - High trip (Function 2), the absence of a bypass will limit maximum power to below the trip setpoint.

The interlock function Allowable Values are based upon analysis of functional requirements for the bypassed Functions. These are discussed above as part of the LCO discussion for the affected Functions.

APPLICABILITY

This LCO is applicable to the RPS Instrumentation in MODES 1 and 2. LCO 3.3.2 is applicable to the RPS Instrumentation in MODES 3, 4, and 5 with any RTCB closed and any CEA capable of withdrawal. The requirements for the CEACs in MODES 1 and 2 are addressed in LCO 3.3.3. The RPS Matrix Logic, Initiation Logic, RTCBs, and Manual Trips in MODES 1, 2, 3, 4, and 5 are addressed in LCO 3.3.4.

Most RPS trips are required to be OPERABLE in MODES 1 and 2 because the reactor is critical in these MODES. The reactor trips are designed to take the reactor subcritical, which maintains the SLs during AOOs and assists the ESFAS in providing acceptable consequences during accidents. Most trips are not required to be OPERABLE in MODES 3, 4, and 5. In MODES 3, 4, and 5, the emphasis is placed on return to power events. The reactor is protected in these MODES by ensuring adequate SDM. Exceptions to this are:

- The Logarithmic Power Level - High trip, RPS Logic RTCBs, and Manual Trip are required in MODES 3, 4, and 5, with the RTCBs closed, to provide protection for boron dilution and CEA withdrawal events.

(continued)

BASES

APPLICABILITY (continued)

- Steam Generator Pressure-Low trip, is required in MODE 3, with the RTCBs closed to provide protection for steam line break events in MODE 3.

The Logarithmic Power Level - High trip, and the Steam Generator Pressure-Low trip in these lower MODES are addressed in LCO 3.3.2. The Logarithmic Power Level - High trip is bypassed prior to MODE 1 entry and is not required in MODE 1.

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 unit must enter the Condition for the particular protection Function affected.

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.

(continued)

BASES

ACTIONS (continued)

One Note has been added to the ACTIONS. Note 1 has been added 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 for that Function.

With a channel process measurement circuit that affects multiple functional units inoperable or in test, bypass or trip all associated functional units as listed below:

Process Measurement Circuit	Functional Unit (Bypassed or Tripped)
1. Linear Power (Subchannel or Linear)	Variable Overpower (RPS) Local Power Density-High (RPS) DNBR-Low (RPS)
2. Pressurizer Pressure-High (Narrow Range)	Pressurizer Pressure-High (RPS) Local Power Density-High (RPS) DNBR-Low (RPS)
3. Steam Generator Pressure-Low	Steam Generator Pressure-Low (RPS) Steam Generator #1 Level-Low (ESF) Steam Generator #2 Level-Low (ESF)
4. Steam Generator Level-Low (Wide Range)	Steam Generator Level-Low (RPS) Steam Generator #1 Level-Low (ESF) Steam Generator #2 Level-Low (ESF)
5. Core Protection Calculator	Local Power Density-High (RPS) DNBR-Low (RPS)

A.1 and A.2

Condition A applies to the failure of a single trip channel or associated instrument channel inoperable in any RPS automatic trip Function. RPS coincidence logic is two-out-of-four.

(continued)

BASES

ACTIONS (continued)

If one RPS channel is inoperable, startup or power operation is allowed to continue, providing the inoperable channel is placed in bypass or trip in 1 hour (Required Action A.1). The 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. The failed channel must be restored to OPERABLE status prior to entering MODE 2 following the next MODE 5 entry. With a channel in bypass, the coincidence logic is now in a two-out-of-three configuration.

The Completion Time of prior to entering MODE 2 following the next MODE 5 entry is based on adequate channel to channel independence, which allows a two-out-of-three channel operation since no single failure will cause or prevent a reactor trip.

B.1

Condition B applies to the failure of two channels in any RPS automatic trip Function.

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.

Required Action B.1 provides for placing one inoperable channel in bypass and the other channel in trip within the Completion Time of 1 hour. This Completion Time is sufficient to allow the operator to take all appropriate actions for the failed channels while ensuring the risk involved in operating with the failed channels is acceptable. With one channel of protective instrumentation bypassed, 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.

(continued)

BASES

ACTIONS

B.1 (continued)

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 of the two inoperable channels will need to be restored to operable status prior to the next required CHANNEL FUNCTIONAL TEST, because channel surveillance testing on an OPERABLE channel requires that the OPERABLE channel be placed in bypass. However, it is not possible to bypass more than one RPS channel, and placing a second channel in trip will result in a reactor trip. Therefore, if one RPS channel is in trip and a second channel is in bypass, a third inoperable channel would place the unit in LCO 3.0.3.

C.1, C.2.1, and C.2.2

Condition C applies to one automatic bypass removal channel inoperable. If the inoperable operating bypass removal channel for any operating bypass channel cannot be restored to OPERABLE status within 1 hour, the associated RPS channel may be considered OPERABLE only if the operating bypass is not in effect. Otherwise, the affected RPS channel must be declared inoperable, as in Condition A, and the affected automatic trip channel placed in maintenance (trip channel) bypass or trip. The operating bypass removal channel and the automatic trip channel must be repaired prior to entering MODE 2 following the next MODE 5 entry. The Bases for the Required Actions and required Completion Times are consistent with Condition A.

D.1 and D.2

Condition D applies to two inoperable automatic operating bypass removal channels. If the operating bypass removal channels for two operating bypasses cannot be restored to OPERABLE status within 1 hour, the associated RPS channel may be considered OPERABLE only if the operating bypass is not in effect. Otherwise, the affected RPS channels must be declared inoperable, as in Condition B, and the operating bypass either removed or one automatic trip channel placed in maintenance (trip channel) bypass and the other in trip within 1 hour.

(continued)

BASES

ACTIONS

D.1 and D.2 (continued)

The restoration of one affected bypassed automatic trip channel must be completed prior to the next CHANNEL FUNCTIONAL TEST, or the plant must shut down per LCO 3.0.3 as explained in Condition B.

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.

E.1

Condition E applies if any CPC cabinet receives a high temperature alarm. There are redundant temperature sensors in each of the four CPC bays. Since CPC bays B and C also house CEAC calculators 1 and 2, respectively, a high temperature in either of these bays requires entry into LCO 3.3.3, Condition C.

If a CPC cabinet high temperature alarm is received, it is possible for an OPERABLE CPC to be affected and not be completely reliable. Therefore, a CHANNEL FUNCTIONAL TEST must be performed on OPERABLE CPCs within 12 hours. The Completion Time of 12 hours is adequate considering the low probability of undetected failure, the consequences of a single channel failure, and the time required to perform a CHANNEL FUNCTIONAL TEST.

F.1

Condition F applies if an OPERABLE CPC has three or more autorestarts in a 12 hour period.

CPCs and CEACs will attempt to autorestart if they detect a fault condition, such as a calculator malfunction or loss of power. A successful autorestart restores the calculator to operation; however, excessive autorestarts might be indicative of a calculator problem.

(continued)

BASES

ACTIONS

F.1 (continued)

If a nonbypassed CPC has three or more autorestarts, it may not be completely reliable. Therefore, a CHANNEL FUNCTIONAL TEST must be performed on the CPC to ensure it is functioning properly. Based on plant operating experience, the Completion Time of 24 hours is adequate and reasonable to perform the test while still keeping the risk of operating in this condition at an acceptable level, since overt channel failure will most likely be indicated and annunciated in the control room by CPC online diagnostics.

G.1

Condition G is entered when the Required Action and associated Completion Time of Condition A, B, C, D, E, or F are not met.

If the Required Actions associated with these Conditions cannot be completed within the required Completion Time, the reactor must be brought to a MODE where the Required Actions do not apply. The allowed Completion Time of 6 hours is reasonable, based on operating experience, for reaching the required MODE from full power conditions in an orderly manner and without challenging plant systems.

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, CHANNEL CALIBRATION, and response time testing.

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.

(continued)

BASES

SURVEILLANCE REQUIREMENTS

SR 3.3.1.1 (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 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 transmitter or the signal processing equipment has drifted outside its limits.

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.

In the case of RPS trips with multiple inputs, such as the DNBR and LPD inputs to the CPCs, a CHANNEL CHECK must be performed on all inputs.

SR 3.3.1.2

The RCS flow rate indicated by each CPC is verified, as required by a Note, to be less than or equal to the actual RCS total flow rate, determined by either using the reactor coolant pump differential pressure instrumentation or by calorimetric calculations, every 12 hours when THERMAL POWER is ≥ 70% RTP. The 12 hours after reaching 70% RTP is for plant stabilization, data taking, and flow verification. This check (and if necessary, the adjustment of the CPC addressable constant flow coefficients) ensures that the DNBR setpoint is conservatively adjusted with respect to actual flow indications, as determined by the Core Operating Limits Supervisory System (COLSS).

(continued)

BASES

SURVEILLANCE REQUIREMENTS

SR 3.3.1.2 (continued)

The flow measurement uncertainty may be included in the BERR1 term in the CPC and is equal to or greater than 4%.

SR 3.3.1.3

The CPC autorestart count is checked every 12 hours to monitor the CPC and CEAC for normal operation. If three or more autorestarts of a nonbypassed CPC occur within a 12 hour period, the CPC may not be completely reliable. Therefore, the Required Action of Condition F must be performed. The auto restart periodic tests restart (Code 30) and normal system load (Code 33) are not included in this total. The Frequency is based on operating experience that demonstrates the rarity of more than one channel failing within the same 12 hour interval.

SR 3.3.1.4

A daily calibration (heat balance) is performed when THERMAL POWER is ≥ 20%. The Linear Power Level signal and the CPC addressable constant multipliers are adjusted to make the CPC ΔT power and nuclear power calculations agree with the calorimetric calculation if the absolute difference is ≥ 2% when THERMAL POWER is ≥ 80% RTP, and -0.5% to 10% when THERMAL POWER is between 20% and 80%. The value of 2% when THERMAL POWER is ≥ 80% RTP, and -0.5% to 10% when THERMAL POWER is between 20% and 80% is adequate because this value is assumed in the safety analysis. These checks (and, if necessary, the adjustment of the Linear Power Level signal and the CPC addressable constant coefficients) are adequate to ensure that the accuracy of these CPC calculations is maintained within the analyzed error margins. The power level must be > 20% RTP to obtain accurate data. At lower power levels, the accuracy of calorimetric data is questionable.

The tolerance between 20% and 80% RTP is +10% to reduce the number of adjustments required as the power level increases. The -0.5% tolerance between 20% and 80% RTP is based on the reduced accuracy of the calorimetric data inputs at low power levels. Performing a calorimetric

(continued)

BASES

SURVEILLANCE REQUIREMENTS (continued)

SR 3.3.1.4 (continued)

calibration with a -0.5% tolerance at low power levels ensures the difference will remain within -2.0% when power is increased above 80% RTP. If a calorimetric calculation is performed above 80% RTP, it will use accurate inputs to the calorimetric calculation available at higher power levels. When the power level is decreased below 80% RTP an additional performance of the SR to the -0.5% to 10% tolerance is not required if the SR has been performed above 80% RTP.

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 need only be performed within 12 hours after reaching 20% RTP.

The 12 hours after reaching 20% RTP is required for plant stabilization, data taking, and flow verification. The secondary calorimetric is inaccurate at lower power levels. A second Note in the SR indicates the SR may be suspended during PHYSICS TESTS. The conditional suspension of the daily calibrations under strict administrative control is necessary to allow special testing to occur.

SR 3.3.1.5

The RCS flow rate indicated by each CPC is verified to be less than or equal to the RCS total flow rate every 31 days. The Note indicates the Surveillance is performed within 12 hours after THERMAL POWER is ≥ 70% RTP. This check (and, if necessary, the adjustment of the CPC addressable flow constant coefficients) ensures that the DNBR setpoint is conservatively adjusted with respect to actual flow indications as determined either using the reactor coolant pump differential pressure instrumentation and the ultrasonic flow meter adjusted pump curves or by a calorimetric calculation. Operating experience has shown the specified Frequency is adequate, as instrument drift is minimal and changes in actual flow rate are minimal over core life.

(continued)

BASES

SURVEILLANCE REQUIREMENTS (continued)

SR 3.3.1.6

The three vertically mounted excore nuclear instrumentation detectors in each channel are used to determine APD for use in the DNBR and LPD calculations. Because the detectors are mounted outside the reactor vessel, a portion of the signal from each detector is from core sections not adjacent to the detector. This is termed shape annealing and is compensated for after every refueling by performing SR 3.3.1.11, which adjusts the gains of the three detector amplifiers for shape annealing. SR 3.3.1.6 ensures that the preassigned gains are still proper. When power is < 15% the CPCs do not use the excore generated signals for axial flux shape information. The Note allowing 12 hours after reaching 15% RTP is required for plant stabilization and testing. The 31 day Frequency is adequate because the demonstrated long term drift of the instrument channels is minimal.

SR 3.3.1.7

A CHANNEL FUNCTIONAL TEST on each channel is performed every 92 days to ensure the entire channel will perform its intended function when needed. The SR is modified by two Notes. Note 1 is a requirement to verify the correct CPC addressable constant values are installed in the CPCs when the CPC CHANNEL FUNCTIONAL TEST is performed. Note 2 allows the CHANNEL FUNCTIONAL TEST for the Logarithmic Power Level – High channels to be performed 2 hours after power drops below 1E-4% RTP and is required to be performed only if the RTCBs are closed.

The RPS CHANNEL FUNCTIONAL TEST consists of three overlapping tests as described in Reference 8. These tests verify that the RPS is capable of performing its intended function, from bistable input through the RTCBs. They include:

(continued)

BASES

SURVEILLANCE REQUIREMENTS (continued)

Bistable Tests

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 interval between surveillance interval extension analysis.

The requirements for this review are outlined in Reference 9.

Matrix Logic Tests

Matrix Logic tests are addressed in LCO 3.3.4. 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 3.3.4. 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, thereby opening the affected RTCB. The RTCB 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. 9).

The CPC and CEAC channels and excore nuclear instrumentation channels are tested separately.

(continued)

BASES

SURVEILLANCE REQUIREMENTS (continued)

Trip Path Tests (continued)

The excore channels use preassigned test signals to verify proper channel alignment. The excore logarithmic channel test signal is inserted into the preamplifier input, so as to test the first active element downstream of the detector.

The power range excore test signal is inserted at the drawer input, since there is no preamplifier.

The quarterly CPC CHANNEL FUNCTIONAL TEST is performed using software. This software includes preassigned addressable constant values that may differ from the current values.

Provisions are made to store the addressable constant values on a computer disk prior to testing and to reload them after testing. A Note is added to the Surveillance Requirements to verify that the CPC CHANNEL FUNCTIONAL TEST includes the correct values of addressable constants.

SR 3.3.1.8

A Note indicates that neutron detectors are excluded from CHANNEL CALIBRATION. A CHANNEL CALIBRATION of the power range neutron flux channels every 92 days ensures that the channels are reading accurately and within tolerance (Ref. 9). 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 interval between surveillance interval extension analysis. The requirements for this review are outlined in Reference 9. Operating experience has shown this Frequency to be satisfactory. The detectors are excluded from CHANNEL CALIBRATION because they are passive devices with minimal drift and because of the difficulty of simulating a

(continued)

BASES

SURVEILLANCE REQUIREMENTS (continued)

SR 3.3.1.8 (continued)

meaningful signal. Slow changes in detector sensitivity are compensated for by performing the daily calorimetric calibration (SR 3.3.1.4) and the monthly linear subchannel gain check (SR 3.3.1.6). In addition, the associated control room indications are monitored by the operators.

SR 3.3.1.9

SR 3.3.1.9 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 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 9.

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 as well as operating experience and consistency with the typical 18 month fuel cycle.

The Surveillance is modified by a Note to indicate that 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 3.3.1.4) and the monthly linear subchannel gain check (SR 3.3.1.6).

(continued)

BASES

SURVEILLANCE REQUIREMENTS (continued)

SR 3.3.1.10

Every 18 months, a CHANNEL FUNCTIONAL TEST is performed on the CPCs. The CHANNEL FUNCTIONAL TEST shall include the injection of a signal as close to the sensors as practicable to verify OPERABILITY including alarm and trip Functions.

The basis for the 18 month Frequency is that the CPCs perform a continuous self monitoring function that eliminates the need for frequent CHANNEL FUNCTIONAL TESTS. This CHANNEL FUNCTIONAL TEST essentially validates the self monitoring function and checks for a small set of failure modes that are undetectable by the self monitoring function. Operating experience has shown that undetected CPC or CEAC failures do not occur in any given 18 month interval.

SR 3.3.1.11

The three excore detectors used by each CPC channel for axial flux distribution information are far enough from the core to be exposed to flux from all heights in the core, although it is desired that they only read their particular level. The CPCs adjust for this flux overlap by using the predetermined shape annealing matrix elements in the CPC software.

After refueling, it is necessary to re-establish or verify the shape annealing matrix elements for the excore detectors based on more accurate incore detector readings. This is necessary because refueling could possibly produce a significant change in the shape annealing matrix coefficients.

Incore detectors are inaccurate at low power levels. THERMAL POWER should be significant but < 70% to perform an accurate axial shape calculation used to derive the shape annealing matrix elements.

By restricting power to ≤ 70% until shape annealing matrix elements are verified, excessive local power peaks within the fuel are avoided. Operating experience has shown this Frequency to be acceptable.

(continued)

BASES

SURVEILLANCE REQUIREMENTS (continued)

SR 3.3.1.12

SR 3.3.1.12 is a CHANNEL FUNCTIONAL TEST similar to SR 3.3.1.7, except SR 3.3.1.12 is applicable only to operating bypass functions and is performed once within 92 days prior to each startup. Proper operation of operating bypass permissives is critical during plant startup because the operating bypasses must be in place to allow startup operation and must be automatically removed at the appropriate points during power ascent to enable certain reactor trips. Consequently, the appropriate time to verify operating bypass removal function OPERABILITY is just prior to startup. The allowance to conduct this Surveillance 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 3.3.1.7. Therefore, further testing of the operating bypass function after startup is unnecessary.

SR 3.3.1.13

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 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.

(continued)

BASES

SURVEILLANCE REQUIREMENTS

SR 3.3.1.13 (continued)

A Note is added to indicate that the neutron detectors are excluded from RPS RESPONSE TIME testing 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 3.3.1.4).

REFERENCES

1. 10 CFR 50, Appendix A, GDC 21.
2. 10 CFR 100.
3. NRC Safety Evaluation Report, July 15, 1994.
4. IEEE Standard 279-1971, April 5, 1972.
5. UFSAR, Chapters 6 and 15.
6. 10 CFR 50.49.
7. "Calculation of Trip Setpoint Values, Plant Protection System". CEN-286(v), or Calculation 13-JC-SG-203 for the Low Steam Generator Pressure Trip function.
8. UFSAR, Section 7.2.
9. CEN-327, June 2, 1986, including Supplement 1, March 3, 1989, and Calculation 13-JC-SB-200.
10. CEN-PSD-335-P, "Functional Design Requirements for a Core Protection Calculator."
11. CEN-PSD-336-P, "Functional Design Requirements for a Control Element Assembly Calculator."

B 3.3 INSTRUMENTATION

B 3.3.2 Reactor Protective System (RPS) Instrumentation – Shutdown

BASES

BACKGROUND

The RPS initiates a reactor trip to protect against violating the core fuel design limits and reactor coolant pressure boundary (RCPB) integrity 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 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 (continued) accident category is considered having acceptable consequences for that event.

(continued)

BASES

BACKGROUND (continued)

The RPS is segmented into four interconnected modules. These modules are:

- Measurement channels;
- Bistable trip units;
- RPS Logic; and
- Reactor trip circuit breakers (RTCBs).

This LCO applies to the Logarithmic Power Level – High trip in MODES 3, 4, and 5 with the RTCBs closed and the CEAs capable of withdrawal. In MODES 1 and 2, this trip function is addressed in LCO 3.3.1, "Reactor Protective System (RPS) Instrumentation – Operating." LCO 3.3.12, "Boron Dilution Alarm System (BDAS)," applies when the RTCBs are open.

This LCO applies to the Steam Generator #1 and the Steam Generator #2 Pressure-Low trip in MODE 3, with the RTCBs closed and the CEAs capable of withdrawal. In MODES 1 and 2, this trip function is addressed in LCO 3.3.1, "Reactor Protective System (RPS) Instrumentation-Operating."

(continued)

BASES

BACKGROUND (continued)

Measurement Channels and Bistable Trip Units

The measurement channels providing input to the Logarithmic Power Level – High trip consist of the four logarithmic nuclear instrumentation channels detecting neutron flux leakage from the reactor vessel. Other aspects of the Logarithmic Power Level – High trip are similar to the other measurement channels and bistables. These are addressed in the Background section of LCO 3.3.1.

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. Nuclear instrumentation can be similarly tested. UFSAR, Section 7.2 (Ref. 3), provides more detail on RPS testing.

APPLICABLE SAFETY ANALYSES

The RPS functions to maintain the SLs during AOOs and mitigates the consequence of DBAs in all MODES in which the RTCBs are closed.

Each of the analyzed transients and accidents can be detected by one or more RPS Functions. Functions not specifically credited in the accident analysis were qualitatively credited in the safety analysis and the NRC staff approved licensing basis for the plant. Noncredited Functions include the Steam Generator Water Level - High Trip. The Steam Generator Water Level - High Trip is purely equipment protective, and its use minimizes the potential for equipment damage.

The Logarithmic Power Level – High trip protects the integrity of the fuel cladding and helps protect the RCPB in the event of an unplanned criticality from a shutdown condition.

The Steam Generator Pressure-Low trip function provides shutdown margin to prevent or minimize the return to power, following a large Main Steam Line Break (MSLB) in MODE 3.

With less than 4 RCPs running the trip setpoint for the Logarithmic Power Level-High trip is reduced to $\leq 10^{-4}\%$ RTP. The lower setpoint is required for a bank CEA withdrawal with less than 4 RCPs running.

(continued)

BASES

APPLICABLE SAFETY ANALYSES (continued)

In MODES 2, 3, 4, and 5, with the RTCBs closed, and the Control Element Assembly (CEA) Drive System capable of CEA withdrawal, protection is required for CEA withdrawal events, and excessive cooldown due to a MSLB originating when THERMAL POWER is < 1E-4% RTP. For events originating above this power level, other trips provide adequate protection.

MODES 3, 4, and 5, with the RTCBs closed, are addressed in this LCO. MODE 2 is addressed in LCO 3.3.1.

In MODES 3, 4, or 5, with the RTCBs open or the CEAs not capable of withdrawal, the Logarithmic Power Level – High trip does not have to be OPERABLE. The indication and alarm functions required to indicate a boron dilution event are addressed in LCO 3.3.12 "Boron Dilution Alarm System (BDAS)".

Interlock/Bypasses

The operating bypasses and their Allowable Values are addressed in footnotes to Table 3.3.2-1. They are not otherwise addressed as specific Table entries.

The automatic operating 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 basis for the Logarithmic Power Level -High operating bypass is discussed under individual trips in the LCO section.

The RPS satisfies Criterion 3 of 10 CFR 50.36 (c)(2)(ii).

(continued)

BASES

LCO

The LCO requires the Logarithmic Power Level – High, the Steam Generator #1 Pressure-Low, and the Steam Generator #2 Pressure-Low, RPS Functions 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 Function.

Actions allow maintenance (trip channel) bypass of individual channels, but the bypass activates interlocks that prevent operation with a second channel in the same Function bypassed. With one channel in each Function trip channel bypassed, this effectively places the plant in a two-out-of-three logic configuration in those Functions.

Only the Allowable Values are specified for this RPS trip Function in the LCO. Nominal trip setpoints are specified in the plant specific setpoint calculations. The nominal setpoint is selected to ensure 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 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. 4). A channel is inoperable if its actual trip setpoint is not within its required Allowable Value.

This LCO requires all four channels of the Logarithmic Power Level – High to be OPERABLE MODES in 3, 4, or 5 when the RTCBs are closed and the CEA Drive System is capable of CEA withdrawal.

A CEA is considered capable of withdrawal when power is applied to the Control Element Drive Mechanisms (CEDMs). There are several methods used to remove power from the CEDMs, such as de-energizing the CEDM MGs, opening the CEDM MG output breakers, opening the Control Element Assembly Control System (CEDMCS) CEA breakers, opening the RTCBs, or disconnecting the power cables from the CEDMs. Any method

(continued)

BASES

LCO (continued)

that removes power from the CEDMs may be used. The CEAs are still capable of withdrawal if the CEDMCS withdrawal circuits are disabled with power applied to the CEDMs because failures in the CEDMCS could result in CEA withdrawal.

This LCO requires all four channels of Steam Generator #1 Pressure-Low, and Steam Generator #2 Pressure-Low, to be OPERABLE in MODE 3, when the RTCBs are closed and the CEA Drive System is capable of CEA withdrawal. These RPS functions are not required in MODES 4 and 5 because the Steam Generator temperature is low, therefore the energy release and resulting cooldown following a large MSLB in MODES 4 and 5 is not significant.

The Allowable Values are high enough to provide an operating envelope that prevents unnecessary Logarithmic Power Level – High reactor trips during normal plant operations. The Allowable Values are low enough for the system to maintain a safety margin for unacceptable fuel cladding damage should a CEA withdrawal or MSLB event occur.

The Logarithmic Power Level – High trip may be bypassed when THERMAL POWER is above 1E-4% RTP to allow the reactor to be brought to power during a reactor startup. This bypass is automatically removed when THERMAL POWER decreases below 1E-4% RTP. Above 1E-4% RTP, the Variable Over Power – High and Pressurizer Pressure – High trips provide protection for reactivity transients.

APPLICABILITY

This LCO is applicable to the RPS Instrumentation in MODES 3, 4, and 5 with any RTCB closed and any CEA capable of withdrawal. LCO 3.3.1 is applicable to the RPS Instrumentation in MODES 1 and 2. The requirements for the CEACs in MODES 1 and 2 are addressed in LCO 3.3.3. The RPS Matrix Logic, Initiation Logic, RTCBs, and Manual Trips in MODES 1, 2, 3, 4, and 5 are addressed in LCO 3.3.4.

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, which maintains the SLs during AOOs and assists the Engineered Safety Features Actuation System (ESFAS) in providing acceptable consequences during accidents. Most trips are not required to be OPERABLE in MODES 3, 4, and 5.

(continued)

BASES

APPLICABILITY (continued)

In MODES 3, 4, and 5, the emphasis is placed on return to power events. The reactor is protected in these MODES by ensuring adequate SDM. Exceptions to this are:

- The Logarithmic Power Level – High trip, RPS Logic RTCBs, and Manual Trip are required in MODES 3, 4, and 5, with the RTCBs closed, to provide protection for boron dilution and CEA withdrawal events. The Logarithmic Power Level – High trip in these lower MODES is addressed in this LCO. The RPS Logic in MODES 1, 2, 3, 4, and 5 is addressed in LCO 3.3.4, "Reactor Protective System (RPS) Logic and Trip Initiation."

- The Steam Generator #1 Pressure-Low, and the Steam Generator #2 Pressure-Low trips, RPS Logic, RTCBs, and Manual Trip are required in MODE 3 with the RTCBs closed, to provide protection for large MSLB events in MODE 3. The Steam Generator Pressure-Low trip in this lower MODE is addressed in this LCO. The RPS Logic in MODES 1,2,3,4, and 5 is addressed in LCO 3.3.4, Reactor Protection System (RPS) Logic and Trip Initiation.

The applicability for the Logarithmic Power Level-High function is modified by a Note that allows the trip to be bypassed when THERMAL POWER is > 1E-4% RTP, and the bypass is automatically removed when THERMAL POWER is ≤ 1E-4% RTP.

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 stated in the LCO, the channel is declared inoperable immediately, and the appropriate Condition(s) must be entered immediately.

(continued)

BASES

ACTIONS (continued)

In the event a channel's trip setpoint is found nonconservative with respect to the Allowable Value, or the excore logarithmic power channel or RPS bistable trip unit is found inoperable, then all affected Functions provided by that channel must be declared inoperable and the unit must enter the Condition for the particular protection Function affected.

With a channel process measurement circuit that affects multiple functional units inoperable or in test, bypass or trip all associated functional units as listed below:

PROCESS MEASUREMENT CIRCUIT	FUNCTIONAL UNIT (Bypassed or Tripped)
Steam Generator Pressure-Low	Steam Generator Pressure - Low (RPS) Steam Generator #1 Level - Low (ESF) Steam Generator #2 Level - Low (ESF)

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.1, and A.2

Condition A applies to the failure of a single trip channel or associated instrument channel inoperable in any RPS function.

The RPS coincidence logic is two-out-of-four. If one channel is inoperable, operation in MODES 3, 4, and 5 is allowed to continue, providing the inoperable channel is placed in bypass or trip in 1 hour (Required Action A.1).

The 1 hour allotted to 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 must be restored to OPERABLE status prior to entering MODE 2 following the next MODE 5 entry. With a channel bypassed, the coincidence logic is now in a two-out-of-three configuration. The Completion Time is based on adequate channel to channel independence, which allows a two-out-of-three channel operation since no single failure will cause or prevent a reactor trip.

(continued)

BASES

ACTIONS (continued)

B.1

Condition B applies to the failure of two trip channels or associated instrument channels, in any RPS automatic trip function. Required Action B.1 provides for placing one inoperable channel in bypass and the other channel in trip within the Completion Time of 1 hour. This Completion Time is sufficient to allow the operator to take all appropriate actions for the failed channels and still ensures the risk involved in operating with the failed channels is acceptable. With one channel of protective instrumentation bypassed, 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 of the two inoperable channels will need to be restored to OPERABLE status prior to the next required CHANNEL FUNCTIONAL TEST because channel surveillance testing on an OPERABLE channel requires that the OPERABLE channel be placed in bypass. However, it is not possible to bypass more than one RPS channel, and placing a second channel in trip will result in a reactor trip. Therefore, if one RPS channel is in trip and a second channel is in bypass, a third inoperable channel would place the unit in LCO 3.0.3.

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.

C.1, C.2.1, and C.2.2

Condition C applies to one automatic operating bypass removal channel inoperable. If the operating bypass removal channel for the high logarithmic power level operating bypass cannot be restored to OPERABLE status within 1 hour,

(continued)

BASES

ACTIONS

C.1, C.2.1 and C.2.2 (continued)

the associated RPS channel may be considered OPERABLE only if the operating bypass is not in effect. Otherwise, the affected RPS channel must be declared inoperable, as in Condition A, and the operating bypass either removed or the affected automatic channel placed in trip or maintenance (trip channel) bypass. Both the operating bypass removal channel and the associated automatic trip channel must be repaired prior to entering MODE 2 following the next MODE 5 entry. The Bases for the Required Actions and required Completion Times are consistent with Condition A.

D.1 and D.2

Condition D applies to two inoperable automatic operating bypass removal channels. If the operating bypass removal channels for two operating bypasses cannot be restored to OPERABLE status within 1 hour, the associated RPS channel may be considered OPERABLE only if the operating bypass is not in effect. Otherwise, the affected RPS channels must be declared inoperable, as in Condition B, and the operating bypass either removed or one automatic trip channel placed in maintenance (trip channel) bypass and the other in trip within 1 hour. The restoration of one affected bypassed automatic trip channel must be completed prior to the next CHANNEL FUNCTIONAL TEST or the plant must shut down per LCO 3.0.3, as explained in Condition B. Completion Times are consistent with Condition B.

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.

E.1

Condition E is entered when the Required Actions and associated Completion Times of Condition A, B, C, or D are not met.

(continued)

BASES

ACTIONS

E.1 (continued)

If Required Actions associated with these Conditions cannot be completed within the required Completion Time, all RTCBs must be opened, placing the plant in a condition where the RPS trip channels are not required to be OPERABLE. A Completion Time of 1 hour is a reasonable time to perform the Required Action, which maintains the risk at an acceptable level while having one or two channels inoperable.

SURVEILLANCE REQUIREMENTS

The SRs are an extension of those listed in LCO 3.3.1, listed here because of their Applicability in these MODES.

SR 3.3.2.1

SR 3.3.2.1 is the performance of a CHANNEL CHECK of each RPS channel. This SR is identical to SR 3.3.1.1. Only the Applicability differs.

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 another channel. 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 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 limits.

(continued)

BASES

SURVEILLANCE REQUIREMENTS

SR 3.3.2.1 (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, 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 3.3.2.2

A CHANNEL FUNCTIONAL TEST on each channel, except power range neutron flux, is performed every 92 days to ensure the entire channel will perform its intended function when needed. This SR is identical to SR 3.3.1.7. Only the Applicability differs.

The RPS CHANNEL FUNCTIONAL TEST consists of three overlapping tests as described in the UFSAR, Section 7.2 (Ref. 3). These tests verify that the RPS is capable of performing its intended function, from bistable input through the RTCBs. They include:

Bistable Tests

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 surveillance interval extension analysis. The requirements for this review are outlined in Reference 6.

(continued)

BASES

SURVEILLANCE REQUIREMENTS (continued)

Matrix Logic Tests

Matrix Logic Tests are addressed in LCO 3.3.4. 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 Test

Trip path (Initiation Logic) tests are addressed in LCO 3.3.4. 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, 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. 6). The excore channels use preassigned test signals to verify proper channel alignment. The excore logarithmic channel test signal is inserted into the preamplifier input, so as to test the first active element downstream of the detector.

SR 3.3.2.3

SR 3.3.2.3 is a CHANNEL FUNCTIONAL TEST similar to SR 3.3.2.2, except SR 3.3.2.3 is applicable only to operating bypass functions and is performed once within 92 days prior to each startup. This SR is identical to SR 3.3.1.12. Only the Applicability differs.

Proper operation of operating bypass permissives is critical during plant startup because the operating bypasses must be in place to allow startup operation and must be automatically removed at the appropriate points during power ascent to enable certain reactor trips. Consequently, the appropriate time to verify operating bypass removal function

(continued)

BASES

SURVEILLANCE REQUIREMENTS

SR 3.3.2.3 (continued)

OPERABILITY is just prior to startup. The allowance to conduct this Surveillance within 92 days of startup is based on the reliability analysis presented in topical report CEN-327, "RPS/ESFAS Extended Test Interval Evaluation" (Ref. 6). Once the operating bypasses are removed, the operating 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 3.3.2.2. Therefore, further testing of the operating bypass function after startup is unnecessary.

SR 3.3.2.4

SR 3.3.2.4 is the performance of a CHANNEL CALIBRATION every 18 months. This SR is identical to SR 3.3.1.9. Only the Applicability differs.

CHANNEL CALIBRATION is a complete check of the instrument channel including the sensor (the sensor is excluded for the Logarithmic Power Level Function). 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 surveillance interval extension analysis. The requirements for this review are outlined in Reference 6.

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 and includes operating experience and consistency with the typical 18 month fuel cycle.

The Surveillance is modified by a Note to indicate that the neutron detectors are excluded from CHANNEL CALIBRATION because they are passive devices with minimal drift and

(continued)

BASES

SURVEILLANCE REQUIREMENTS

SR 3.3.2.4 (continued)

because of the difficulty of simulating a meaningful signal. Slow changes in detector sensitivity are compensated for by performing the daily calorimetric calibration (SR 3.3.1.4).

SR 3.3.2.5
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 tests of a given channel of n x 18 months, where n is the number of channels in the Function. The 18 month Frequency 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 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.

A Note is added to indicate that the neutron detectors are excluded from RPS RESPONSE TIME testing 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 3.3.1.4).

REFERENCES

1. 10 CFR 50.

2. 10 CFR 100.

3. UFSAR, Section 7.2.

4. "Calculation of Trip Setpoint Values Plant Protection System, CEN-286(v)", or Calculation 13-JC-SG-203 for the Low Steam Generator Pressure Trip Function.

(continued)

BASES

REFERENCES (continued)

5. NRC Safety Evaluation Report, July 15, 1994.
6. CEN-327, June 2, 1986, including Supplement 1, March 3, 1989, and Calculation 13-JC-SB-200.

B 3.3 INSTRUMENTATION

B 3.3.3 Control Element Assembly Calculators (CEACs)

BASES

BACKGROUND

The Reactor Protective System (RPS) initiates a reactor trip to protect against violating the core Specified Acceptable Fuel Design Limits (SAFDLs) and breaching the Reactor Coolant Pressure Boundary (RCPB) 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 thresholds 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 (DNBR) 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

(continued)

BASES

BACKGROUND (continued)

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 four interconnected modules. These modules are:

- Measurement channels;
- Bistable trip units;
- RPS Logic; and
- Reactor Trip Circuit Breakers (RTCBs).

This LCO addresses the CEACs. LCO 3.3.1, "Reactor Protective System (RPS) Instrumentation–Operating," provides a description of this equipment in the RPS.

The excore nuclear instrumentation, the Core Protection Calculators (CPCs), and the CEACs are considered components in the measurement channels of the Variable Over Power-High, Logarithmic Power Level–High, DNBR–Low, and Local Power Density (LPD)–High trips. The CEACs are addressed by this Specification.

All four CPCs receive Control Element Assembly (CEA) deviation penalty factors from each CEAC and use the larger of the penalty factors from the two CEACs in the calculation of DNBR and LPD. CPCs are further described in the Background section of LCO 3.3.1.

The CEACs perform the calculations required to determine the position of CEAs within their subgroups for the CPCs. Two independent CEACs compare the position of each CEA to its subgroup position. If a deviation is detected by either CEAC, an annunciator sounds and appropriate "penalty factors" are transmitted to all CPCs. These penalty factors conservatively adjust the effective operating margins to the DNBR–Low and LPD–High trips. Each CEAC also drives a single Cathode Ray Tube (CRT), which is switchable between CEACs. The CRT displays individual CEA positions from the selected CEAC.

(continued)

BASES

BACKGROUND (continued)

Each CEA has two separate reed switch assemblies mounted outside the RCPB. Each of the two CEACs receives CEA position input from one of the two reed switch position transmitters on each CEA, so that the position of all CEAs is independently monitored by both CEACs.

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. Nuclear instrumentation, the CPCs, and the CEACs can be similarly tested. UFSAR, Section 7.2 (Ref. 3), provides more detail on RPS testing. Process transmitter calibration is normally performed on a refueling basis.

APPLICABLE SAFETY ANALYSES

Each of the analyzed transients and accidents can be detected by one or more RPS Functions.

The effect of any misoperated CEA within a subgroup on the core power distribution is assessed by the CEACs, and an appropriately augmented power distribution penalty factor will be supplied as input to the CPCs. As the reactor core responds to the reactivity changes caused by the misoperated CEA and the ensuing reactor coolant and doppler feedback effects, the CPCs will initiate a DNBR-Low or LPD-High trip signal if SAFDLs are approached. Each CPC also directly monitors one "target CEA" from each subgroup and uses this information to account for excessive radial peaking factors for events involving CEA groups out of sequence and subgroup deviations within a group, without the need for CEACs.

Therefore, although the CEACs do not provide a direct reactor trip Function, their input to the CPCs is taken credit for in the CEA misoperation analysis.

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

LCO

This LCO on the CEACs ensures that the CPCs are either informed of individual CEA position within each subgroup, using one or both CEACs, or that appropriate conservatism is included in the CPC calculations to account for anticipated

(continued)

BASES

LCO (continued)	CEA deviations. Each CEAC provides an identical input into all four CPC channels. Each CPC uses the higher of the two CEAC transmitted CEA deviation penalty factors. Thus, only one OPERABLE CEAC is required to provide CEA deviation protection. This LCO requires both CEACs to be OPERABLE so that no single CEAC failure can prevent a required reactor trip from occurring.
APPLICABILITY	This LCO is applicable to the CEACs in MODES 1 and 2. The RPS Instrumentation in MODES 1 and 2 is addressed in LCO 3.3.1. The RPS Instrumentation in MODES 3, 4, and 5 with any RTCB closed and any CEA capable of withdrawal is addressed in LCO 3.3.2. The RPS Matrix Logic, Initiation Logic, RTCB, and Manual Trips in Modes 1, 2, 3, 4, and 5 are addressed in LCO 3.3.4. 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, which maintains the SLs during AOOs and assists the Engineered Safety Features Actuation System in providing acceptable consequences during accidents. Most trips are not required to be OPERABLE in MODES 3, 4, and 5. In MODES 3, 4, and 5, the emphasis is placed on return to power events. The reactor is protected in these MODES by ensuring adequate SDM. Because CEACs provide the inputs to the DNBR-Low and LPD-High trips, they are required to be OPERABLE in MODES 1 and 2 for the same reasons.

(continued)

BASES

ACTIONS

A.1 and A.2

Condition A applies to the failure of a single CEAC channel. There are only two CEACs, each providing CEA deviation input into all four CPC channels. The CEACs include complex diagnostic software, making it unlikely that a CEAC will fail without informing the CPCs of its failed status. With one failed CEAC, the CPC will receive CEA deviation penalty factors from the remaining OPERABLE CEAC. If the second CEAC should fail (Condition B), the CPC will use large preassigned penalty factors. The specific Required Actions allowed are as follows:

With one CEAC inoperable, the second CEAC still provides a comprehensive set of comparison checks on individual CEAs within subgroups, as well as outputs to all CPCs, CEA deviation alarms, and position indication for display. Verification every 4 hours that each CEA is within 6.6 inches of the other CEAs in its group provides a check on the position of all CEAs and provides verification of the proper operation of the remaining CEAC. An OPERABLE CEAC will not generate penalty factors until deviations of > 6.6 inches within a subgroup are encountered.

The Completion Time of once per 4 hours is adequate based on operating experience, considering the low probability of an undetected CEA deviation coincident with an undetected failure in the remaining CEAC within this limited time frame.

As long as Required Action A.1 is accomplished as specified, the inoperable CEAC can be restored to OPERABLE status within 7 days. The Completion Time of 7 days is adequate for most repairs, while minimizing risk, considering that dropped CEAs are detectable by the redundant CEAC, and other LCOs specify Required Actions necessary to maintain DNBR and LPD margin.

(continued)

BASES

ACTIONS (continued)

B.1, B.2, B.3, B.4, B.5 and B.6

Condition B applies if the Required Action and associated Completion Time of Required Action A are not met, or if both CEACs are inoperable. Actions associated with this Condition involve disabling the Control Element Drive Mechanism Control System (CEDMCS), while providing increased assurance that CEA deviations are not occurring and informing all OPERABLE CPC channels, via a software flag, that both CEACs are failed. This will ensure that the large penalty factor associated with two CEAC failures will be applied to CPC calculations. The penalty factor for two failed CEACs is sufficiently large that power must be maintained significantly < 100% RTP if CPC generated reactor trips are to be avoided. The Completion Time of 4 hours is adequate to accomplish these actions while minimizing risks.

The Required Actions are as follows:

B.1

Meeting the DNBR margin requirements of LCO 3.2.4, "DNBR" ensures that power level is within a conservative region of operation based on actual core conditions.

B.2

This Action requires that the CEAs are maintained fully withdrawn (≥ 144.75"), except as required for specified testing or flux control via group #5. This verification ensures that undesired perturbations in local fuel burnup are prevented. The Upper Electrical Limit (UEL) CEA reed switches provide an acceptable indication of CEA position.

B.3

The "RSPT/CEAC Inoperable" addressable constant in each of the OPERABLE CPCs is set to indicate that both CEACs are inoperable. This provides a conservative penalty factor to ensure that a conservative effective margin is maintained by the CPCs in the computation of DNBR and LPD trips.

(continued)

BASES

ACTIONS (continued)

B.4

The CEDMCS is placed and maintained in "STANDBY MODE," except during CEA motion permitted by Required Action B.2, to prevent inadvertent motion and possible misalignment of the CEAs.

B.5

A comprehensive set of comparison checks on individual CEAs within groups must be made within 4 hours. Verification that each CEA is within 6.6 inches of other CEAs in its group provides a check that no CEA has deviated from its proper position within the group.

B.6

The Reactor Power Cutback (RPCB) System must be disabled. This ensures that CEA position will not be affected by RPCB operation.

C.1

Condition C applies if the CPC channel B or C cabinet receives a high temperature alarm. There are redundant temperature sensors in each of the four CPC bays. A high temperature alarm in any CPC cabinet requires entry into LCO 3.3.1, Condition E. Since CPC bays B and C also house CEAC calculators 1 and 2, respectively, a high temperature in either of these bays may also indicate a problem with the associated CEAC.

If a CPC channel B or C cabinet high temperature alarm is received, it is possible for an OPERABLE CEAC to be affected and not be completely reliable. Therefore, a CHANNEL FUNCTIONAL TEST must be performed on OPERABLE CEACs within 12 hours. The Completion Time of 12 hours is adequate, considering the low probability of undetected failure, the consequences of failure, and the time required to perform a CHANNEL FUNCTIONAL TEST.

(continued)

BASES

ACTIONS (continued)

D.1

Condition D applies if an OPERABLE CEAC has three or more auto restarts in a 12 hour period.

CPCs and CEACs will attempt to auto restart if they detect a fault condition such as a calculator malfunction or loss of power. A successful auto restart restores the calculator to operation; however, excessive auto restarts might be indicative of a calculator problem. The auto restart periodic test restart (Code 30), and normal system load (Code 33) are not included in the total.

If an operable CEAC has three or more auto restarts, it may not be completely reliable: Therefore, a CHANNEL FUNCTIONAL TEST must be performed on the CEAC to ensure it is functioning properly. Based on plant operating experience, the Completion Time of 24 hours is adequate and reasonable to perform the test while still keeping the risk of operating in this condition at an acceptable level, since overt channel failure will most likely be indicated and annunciated by CPC online diagnostics.

E.1

Condition E is entered when the Required Action and associated Completion Time of Condition B, C, or D are not met.

If the Required Actions associated with these Conditions cannot be completed within the required Completion Time, the reactor must be brought to a MODE where the Required Actions do not apply. The Completion Time of 6 hours is reasonable, based on operating experience, for reaching the required plant conditions from full power conditions in an orderly manner and without challenging plant systems.

(continued)

BASES

SURVEILLANCE REQUIREMENTS

SR 3.3.3.1

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 another channel. 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 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 limits.

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 3.3.3.2

The CEAC auto restart count is checked every 12 hours to monitor the CPC and CEAC for normal operation. If three or more auto restarts of a nonbypassed CPC occur within a 12 hour period, the CPC may not be completely reliable. The autorestart periodic test restart (code 30) and normal system load (code 33) are not included in the total. Therefore, the Required Action of Condition D must be performed. The Frequency is based on operating experience that demonstrates the rarity of more than one channel failing within the same 12 hour interval.

(continued)

BASES

SURVEILLANCE REQUIREMENTS (continued)

SR 3.3.3.3

A CHANNEL FUNCTIONAL TEST on each CEAC channel is performed every 92 days to ensure the entire channel will perform its intended function when needed. The quarterly CHANNEL FUNCTIONAL TEST is performed using test software. 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 3.3.3.4

SR 3.3.3.4 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 surveillance. 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 5.

The Frequency is based upon the assumption of an 18 month calibration interval in the determination of the magnitude of equipment drift in the setpoint analysis and includes operating experience and consistency with the typical 18 month fuel cycle.

SR 3.3.3.5

Every 18 months, a CHANNEL FUNCTIONAL TEST is performed on the CEACs. The CHANNEL FUNCTIONAL TEST shall include the injection of a signal as close to the sensors as practicable to verify OPERABILITY, including alarm and trip Functions.

(continued)

BASES

SURVEILLANCE REQUIREMENTS (continued)

SR 3.3.3.5 (continued)

The basis for the 18 month Frequency is that the CEACs perform a continuous self monitoring function that eliminates the need for frequent CHANNEL FUNCTIONAL TESTS. This CHANNEL FUNCTIONAL TEST essentially validates the self monitoring function and checks for a small set of failure modes that are undetectable by the self monitoring function. Operating experience has shown that undetected CPC or CEAC failures do not occur in any given 18 month interval.

SR 3.3.3.6

The isolation characteristics of each CEAC CEA position isolation amplifier are verified once per refueling to ensure that a fault in a CEAC or a CPC channel will not render another CEAC or CPC channel inoperable. The CEAC CEA position isolation amplifiers, mounted in CPC cabinets A and D, prevent a CEAC fault from propagating back to CPC A or D.

The CEA position Isolation amplifier isolation characteristics test shall include the following; 1) with 120 VAC (60 HZ) applied for at least 30 seconds across the output, the reading on the input does not change by more than 0.015 VDC, with an applied input voltage of 5-10 VDC, and 2) with 120 VAC (60 HZ) applied for at least 30 seconds across the input, the reading on the output does not exceed 15 VDC.

The Frequency is based on plant operating experience with regard to channel OPERABILITY, which demonstrates the failure of a channel in any 18 month interval is rare.

REFERENCES

1. 10 CFR 50.
2. 10 CFR 100.
3. UFSAR, Section 7.2.
4. NRC Safety Evaluation Report, July 15, 1994
5. CEN-327, June 2, 1986, including Supplement 1, March 3, 1989, and Calculation 13-JC-SB-200.

B 3.3 INSTRUMENTATION

B 3.3.4 Reactor Protective System (RPS) Logic and Trip Initiation

BASES

BACKGROUND

The RPS initiates a reactor trip to protect against violating the core 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

(continued)

[illegible]

BASES

BACKGROUND (continued)

occurrence. Meeting the acceptable dose limit for an accident category is considered having acceptable consequences for that event.

The RPS is segmented into four interconnected modules. These modules are:

- Measurement channels;
- Bistable trip units;
- 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, consisting of Matrix and Initiation Logic, employs a scheme that provides a reactor trip when bistables in any two of the four channels sense the same input parameter trip. This is called a two-out-of-four trip logic.

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

(continued)

BASES

BACKGROUND

RPS Logic (continued)

provides power to one of the four normally energized RTCB Initiation relays. The trip paths thus each have six contacts in series, one from each matrix, 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 of the four RTCBs. The RTCB Initiation 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 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 turn de-energizes all four initiation relays, which simultaneously de-energize the undervoltage and energize the shunt trip attachments in all four RTCBs, tripping them open.

Matrix Logic refers to the matrix power supplies, trip channel bypass contacts and interconnecting matrix wiring between bistable relay cards, up to but not including the matrix relays. Matrix contacts on the bistable relay cards are excluded from the Matrix Logic definition, since they are addressed as part of the measurement channel.

The Initiation Logic consists of the trip path power source, matrix relays and their associated contacts, all interconnecting wiring, and initiation relays and the initiation relay contacts in the RTCB control circuitry.

(continued)

BASES

BACKGROUND

RPS Logic (continued)

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. 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 consists of four RTCBs. 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. Power is supplied from the MG sets to the CEDMS via two redundant paths (trip legs). Trip legs 1 and 3 are in parallel with Trip legs 2 and 4. 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 two trip legs consists of two RTCBs in series. The two RTCBs within a trip leg are actuated by separate initiation circuits.

(continued)

BASES

BACKGROUND

Reactor Trip Circuit Breakers (RTCBs) (continued)

Each RTCB is operated by either a Manual Trip push button, a Supplementary Protection System (SPS) Trip relay, or an RPS actuated Initiation relay. There are four Manual Trip push buttons, each of the pushbuttons operates one of the RTCBs. Depressing either of the push buttons in both trip legs will result in a reactor trip.

When a Manual Trip is initiated using the control room push buttons, the RPS trip paths and Initiation relays are not utilized 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 the RTCBs necessary to actuate both the undervoltage and shunt trip attachments, but excludes the Initiation 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 the individual RTCBs, can be performed either at power or shutdown and is normally performed on a quarterly basis. UFSAR, 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.

(continued)

BASES

APPLICABLE SAFETY ANALYSES (continued)

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.

The RPS instrumentation satisfies Criterion 3 of 10 CFR 50.36 (c)(2)(ii).

LCO

Reactor Protective System (RPS) Logic

The LCO on the RPS Logic channels ensures that each of the following requirements are met:

- A reactor trip will be initiated when necessary;
- The required protection system coincidence logic is maintained (minimum two-out-of-three, normal two-out-of-four); and
- Sufficient redundancy is maintained to permit a channel to be out of service for testing or maintenance.

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.

Loss of a single vital bus will de-energize one of the two power supplies in each of three matrices. This will result in two RTCBs opening; however, the remaining two 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.

(continued)

BASES

LCO

Reactor Protective System (RPS) Logic (continued)

Each of the four Initiation Logic channels opens one RTCB if any of the six coincidence matrices de-energize their associated matrix relays. They thus perform a logical OR function. 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 Initiation 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 RTCBs.

If one RTCB has been opened in response to a single RTCB channel, Initiation Logic channel, or Manual Trip channel failure, the affected RTCB 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 RTCB 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 RTCBs, Manual Trip and RTCB testing on the closed breakers cannot be performed without causing a trip.

1. 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 when any RTCBs are 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 the RTCBs are closed and any CEA is capable of being withdrawn.

(continued)

BASES

LCO (continued)

3. Reactor Trip Circuit Breakers

The LCO requires four RTCB channels to be OPERABLE in MODES 1 and 2, as well as in MODES 3, 4, and 5 when the RTCBs are closed and any CEA is capable of being withdrawn.

Each channel consists of a breaker operated by the Initiation Logic or Manual Trip circuitry.

Without reliable RTCBs and associated support circuitry, a reactor trip cannot occur whether initiated automatically or manually.

Each channel of RTCBs starts after the contacts that are actuated by the Initiation relay and the Manual Trip for each set of breakers. The Initiation 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 RTCB has been opened in response to a single RTCB channel, Initiation Logic channel, or Manual Trip channel failure, the affected RTCB 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 RTCB will provide protection. If a single matrix power supply or vital bus failure has opened two RTCBs, Manual Trip and RTCB testing on the closed breakers cannot be performed without causing a trip.

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 the RTCBs are closed and any CEA is capable of being withdrawn.

Four independent push buttons are provided. Each push button is considered a channel and operates one of the four RTCBs.

(continued)

BASES

LCO

4. Manual Trip (continued)

Depressing either of the two pushbuttons in both trip legs 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.

Manual Trip push buttons are also provided at the reactor trip switchgear (locally) in case the control room push buttons become inoperable or the control room becomes uninhabitable. These are not part of the RPS and cannot be credited in fulfilling the LCO OPERABILITY requirements. Furthermore, LCO ACTIONS need not be entered due to failure of a local Manual Trip.

APPLICABILITY

This LCO is applicable to the RPS Matrix Logic, Initiation Logic, RTCB, and Manual Trips in MODES 1, 2, 3, 4, and 5. The RPS Instrumentation in MODES 1 and 2 is addressed in LCO 3.3.1. The RPS Instrumentation in MODES 3, 4, and 5 with any RTCB closed and any CEA capable of withdrawal is addressed in LCO 3.3.2. The requirement for the CEACs in MODES 1 and 2 are addressed in LCO 3.3.3.

The RPS Logic, RTCBs, and Manual Trip are required to be OPERABLE in any MODE when the CEAs are capable of being withdrawn off the bottom of the core (i.e., RTCBs closed and power available to the CEDMs). This ensures that the reactor can be tripped when necessary, but allows for maintenance and testing when the reactor trip is not needed.

In MODES 3, 4, and 5 with the RTCBs open, the CEAs are not capable of withdrawal and these functions do not have to be OPERABLE. The indication alarm functions required to indicate a boron dilution event are addressed in LCO 3.3.12, "Boron Dilution Alarm System (BDAS)".

(continued)

BASES

ACTIONS

A.1

Condition A applies if one Matrix Logic channel is inoperable or three Matrix Logic channels inoperable due to a common power source failure de-energizing three matrix power supplies 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, providing the matrix relays associated with the failed power supplies de-energize as required. 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 E is entered.

B.1, B.2.1, and B.2.2

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 of the affected RTCB, or the redundant RTCB in the affected Trip Leg. This removes the need for the affected Trip Leg by performing its associated safety function. With an 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. 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.

(continued)

BASES

ACTIONS

B.1, B.2.1, and B.2.2 (continued)

Required Action B.1 provides for opening the RTCB associated with the inoperable Trip Leg within a Completion Time of 1 hour. This Required Action is conservative, since depressing the Manual Trip push button associated with either breaker 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 for opening the affected RTCB while maintaining the risk of having it closed at an acceptable level.

Required Actions B.2.1 and B.2.2 provide for opening one of the redundant RTCB in the affected Trip leg within 1 hour and opening the affected RTCB within 48 hours. These actions allow a RTCB that fails to open to remain undisturbed for 48 hours for failure analysis, while placing the plant in a conservative condition. Opening either RTCB in the affected Trip leg ensures that opening either of the RTCBs in the other Trip leg will cause a reactor trip. This places the affected functions in one-out-of-two logic, which meets redundancy requirements. The allotted Completion Time to open one of the RTCBs in the affected Trip leg is adequate for opening the affected RTCB while maintaining the risk of having it closed at an acceptable level. The allotted action time to open the affected RTCB is adequate to preserve the failure information.

C.1

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, the affected RTCB must be opened. This removes the need for the affected channel by performing its associated safety function. With a RTCB open, the affected functions are in one-out-of-two logic, which meets redundancy requirements.

The Completion Time of 48 hours is consistent with that of other RPS instrumentation and should be adequate to repair most failures.

(continued)

BASES

ACTIONS

C.1 (continued)

Testing on the OPERABLE channels cannot be performed without causing a reactor trip unless the RTCB in the inoperable channels is closed to permit testing. Therefore, a Note has been added specifying that the RTCB associated with one inoperable channel may be closed for up to 1 hour for the performance of an RPS CHANNEL FUNCTIONAL TEST.

D.1

Condition D applies to the failure of both Initiation Logic channels or manual trips affecting the same trip leg. Since this will open two channels of RTCBs, this Condition is also applicable to RTCB 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 relay failures). With only one Initiation Logic channel failed in a nontrip condition, there is still the redundant RTCB in the trip leg. With both failed in a nontrip condition, the reactor will not trip automatically when 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 of RTCB, independent of the initiation circuitry. Caution must be exercised, since depressing the wrong push buttons may result in a reactor trip.

If the affected RTCBs cannot be opened, Required Action 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 D are not met within the required Completion Time or, if for one or more Functions, more than one Manual Trip, Matrix Logic, Initiation Logic, or RTCB channel is inoperable for reasons other than Condition A or D.

(continued)

BASES

ACTIONS

E.1 and E.2 (continued)

If the RTCB associated with the inoperable channel, or the redundant RTCB in the affected Trip Leg 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, for reaching the required plant conditions from full power conditions in an orderly manner and without challenging plant systems and for opening 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.

SURVEILLANCE REQUIREMENTS

SR 3.3.4.1

A CHANNEL FUNCTIONAL TEST on each RPS Logic channel and Manual Trip channel is performed every 92 days to ensure the entire channel will perform its intended function when needed.

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 3.3.1.7 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.

(continued)

BASES

SURVEILLANCE REQUIREMENTS (continued)

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, allowing the initiation circuit to de-energize, opening the affected RTCB. The RTCB must then be closed prior to testing the other three initiation circuits, or a reactor trip may result.

During the Matrix Logic and Initiation Logic tests, power is applied to the Matrix relay tests coils. The test coils prevent an actuation during testing by preventing the Matrix relay contacts in the Initiation Logic from changing state during the test. This does not affect the Operability of the Initiation Logic since only one of the six logic combinations that are available to trip the Initiation Logic are affected during the test because only one Matrix Logic combination can be tested at any time. The remaining five matrix combinations available ensure that a trip in any three channels will de-energize all four Initiation paths.

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 3.3.4.2

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, and following maintenance or adjustment of the reactor trip breakers, a CHANNEL FUNCTIONAL TEST is performed that individually tests all four undervoltage coils and all four shunt trip coils. During undervoltage coil testing, the shunt trip coils must remain de-energized, preventing their operation. Conversely, during shunt trip coil testing, the undervoltage coils must remain energized, preventing their operation.

(continued)

[illegible]

BASES

SURVEILLANCE REQUIREMENTS

SR 3.3.4.2 (continued)

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 operating experience that has shown these components usually pass the Surveillance when performed at the Frequency of once every 18 months.

SR 3.3.4.3

A CHANNEL FUNCTIONAL TEST on each RTCB is performed every 31 days. This verifies proper operation of each RTCB. The RTCB must then be closed prior to testing the other three initiation circuits, or a Reactor Trip may result. The frequency of 31 days is based on the reliability analysis presented in Topical Report CEN-327, "RPS/ESFAS Extended Test Interval Evaluation" (Ref. 5).

REFERENCES

1. 10 CFR 50, Appendix A.
2. 10 CFR 100.
3. UFSAR, Section 7.2.
4. NRC Safety Evaluation Report, July 15, 1994.
5. CEN-327, June 2, 1986, including Supplement 1, March 3, 1989, and Calculation 13-JC-SB-200.

B 3.3 INSTRUMENTATION

B 3.3.5 Engineered Safety Features Actuation System (ESFAS) Instrumentation

BASES

BACKGROUND

The ESFAS initiates necessary safety systems, based upon the values of selected unit parameters, to protect against violating core design limits and the Reactor Coolant System (RCS) pressure boundary during anticipated operational occurrences (AOOs) and ensures acceptable consequences during accidents.

The ESFAS contains devices and circuitry that generate the following signals when monitored variables reach levels that are indicative of conditions requiring protective action:

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); and

6, 7. Auxiliary Feedwater Actuation Signal (AFAS).

Equipment actuated by each of the above signals is identified in the UFSAR (Ref. 1).

Each of the above ESFAS instrumentation systems is segmented into three interconnected modules. These modules are:

- Measurement channels;
- Bistable trip units; and
- ESFAS Logic:
  - Matrix Logic,
  - Initiation Logic (trip paths), and
  - Actuation Logic.

(continued)

BASES

BACKGROUND (continued)

This LCO addresses measurement channels and bistables. Logic is addressed in LCO 3.3.6, "Engineered Safety Features Actuation System (ESFAS) Logic and Manual Trip."

The role of each of these modules in the ESFAS, including the logic of LCO 3.3.6, 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.

Four identical measurement channels with electrical and physical separation are provided for each parameter used in the generation of trip signals. These channels are designated A through D. Measurement channels provide input to ESFAS bistables within the same ESFAS channel. In addition, some measurement channels are 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 ESFAS are not used for control Functions.

When a channel monitoring a parameter indicates an unsafe condition, the bistable monitoring the parameter in that channel will trip. Tripping two or more channels of bistables monitoring the same parameter will de-energize Matrix Logic, which in turn de-energizes the Initiation Logic. This causes both channels of Actuation Logic to de-energize. Each channel of Actuation Logic controls one train 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 (trip channel bypass) for maintenance or testing while still maintaining a minimum two-out-of-three logic.

(continued)

BASES

BACKGROUND

Measurement Channels (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, mounted in the Plant Protection System (PPS) cabinet, receive an analog input from the measurement channels, compare the analog input to trip setpoints, and provide contact output to the Matrix Logic for each ESFAS Function. They also provide local trip indication and remote annunciation.

There are four channels of bistables, designated A through D, for each ESFAS 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 CIAS and SIAS), the same bistable may be used to satisfy both Functions. Similarly, bistables may be shared between the RPS and ESFAS (e.g., Pressurizer Pressure – Low input to the RPS and SIAS). Bistable output relays de-energize when a trip occurs, in turn de-energizing bistable relays mounted in the PPS relay card racks.

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 an ESF actuation (two-out-of-four logic).

(continued)

BASES

BACKGROUND

Bistable Trip Units (continued)

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 processing time delays are taken into account. To allow for calibration tolerances, 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 3.3.5-1, 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 "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. A channel is inoperable if its actual trip setpoint is not within its required Allowable Value.

Setpoints in accordance with the Allowable Value will ensure that Safety Limits of LCO Section 2.0, "Safety Limits," are not violated during AOOs and 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.

Functional testing of the ESFAS, from the bistable input through the opening of initiation relay contacts in the ESFAS Actuation Logic, can be performed either at power or at shutdown and is normally performed on a quarterly basis. UFSAR, Section 7.2 (Ref. 8), provides more detail on ESFAS testing. Process transmitter calibration is normally performed on a refueling basis. SRs for the channels are specified in the Surveillance Requirements section.

(continued)

BASES

BACKGROUND (continued)

ESFAS Logic

The ESFAS Logic, consisting of Matrix, Initiation and Actuation Logic, employs a scheme that provides an ESF actuation of both trains when bistables in any two of the four channels sense the same input parameter trip. This is called a two-out-of-four trip logic.

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 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 relay contact from each matrix relay in each of the four trip paths. Each trip path controls two initiation relays. Each of the two initiation relays in each trip path controls contacts in the Actuation Logic for one train of ESF.

Each of the two channels of Actuation Logic, mounted in the Auxiliary Relay Cabinet (ARCs), is responsible for actuating one train of ESF equipment. Each ESF Function has separate Actuation Logic in each ARC.

The contacts from the Initiation Logic are configured in a selective two-out-of-four logic in the Actuation Logic, similar to the configuration employed by the RPS in the RTCBs. This logic controls ARC mounted subgroup relays, which are normally energized. Contacts from these relays, when de-energized, actuate specific ESF equipment.

When a coincidence occurs in two ESFAS channels, all four matrix relays in the affected matrix will de-energize. This in turn will de-energize all eight initiation relays, four used in each Actuation Logic.

Matrix Logic refers to the matrix power supplies, trip channel bypass contacts, and interconnecting matrix wiring between bistable relay cards, up to but not including the matrix relays. Matrix contacts on the bistable relay cards,

(continued)

BASES

BACKGROUND

ESFAS Logic (continued)

are excluded from the Matrix Logic definition, since they are addressed as part of the measurement channel.

Initiation Logic consists of the trip path power source, matrix relays and their associated contacts, all interconnecting wiring, and the initiation relays.

Actuation Logic consists of all circuitry housed within the ARCs used to actuate the ESF Function, excluding the subgroup relays, and interconnecting wiring to the initiation relay contacts mounted in the PPS cabinet.

The subgroup relays are actuated by the ESFAS logic. Each ESFAS Function typically employs several subgroup relays, with each subgroup relay responsible for actuating one or more components in the ESFAS Function. Subgroup relays and their contacts are considered part of the actuated equipment and are addressed under the applicable LCO for this equipment. Initiation and Actuation Logic up to the subgroup relays is addressed in LCO 3.3.6.

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 trip channel bypassing select portions

(continued)

BASES

BACKGROUND

ESFAS Logic (continued)

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 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. 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.

In addition to the trip channel bypasses, there are also operating bypasses on select ESFAS actuation trips. These bypasses are enabled manually in all four 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. Operating bypasses normally are implemented in the bistable, so that normal trip indication is also disabled. The Pressurizer Pressure – Low input to the SIAS shares an operating bypass with the Pressurizer Pressure – Low reactor trip.

Manual ESFAS initiation capability is provided to permit the operator to manually actuate an ESF System when necessary.

Four handswitches (located in the control room) for each ESF Function are provided, and each handswitch actuates both trains. Each Manual Trip handswitch opens one trip path, de-energizing one set of two initiation relays, one affecting each train of ESF. Initiation relay contacts are arranged in a selective two-out-of-four configuration in the Actuation Logic. Operating either handswitch in both trip legs will result in an ESFAS Actuation. This arrangement ensures that Manual actuation will not be prevented in the event of a single random failure. Each handswitch is designated a single channel in LCO 3.3.6.

(continued)

BASES

APPLICABLE SAFETY ANALYSES

Each of the analyzed accidents can be detected by one or 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 the secondary, or backup, actuation signal for one or more other accidents.

ESFAS protective Functions are as follows:

1. <u>Safety Injection Actuation Signal</u>

   SIAS ensures acceptable consequences during large break loss of coolant accidents (LOCAs), small break LOCAs, control element assembly ejection accidents, and main steam line breaks (MSLBs) 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 filtration, and starting the diesel generators.

2. <u>Containment Spray Actuation Signal</u>

   CSAS actuates containment spray, preventing containment overpressurization during large break LOCAs, small break LOCAs, and MSLBs or feedwater line breaks (FWLBs) inside containment. CSAS is initiated by high high containment pressure.

3. <u>Containment Isolation Actuation Signal</u>

   CIAS ensures acceptable mitigating actions during large and small break LOCAs, and MSLBs either inside or outside containment, and FWLBs inside containment. CIAS is initiated by low pressurizer pressure or high containment pressure.

4. <u>Main Steam Isolation Signal</u>

   MSIS ensures acceptable consequences during an MSLB or FWLB (between the steam generator and the main feedwater check valve), either inside or outside containment. MSIS isolates both steam generators if either generator indicates a low pressure condition, a

(continued)

BASES

APPLICABLE SAFETY ANALYSES (continued)

4. Main Steam Isolation Signal (continued)

high level condition or if a high containment pressure condition exists. This prevents an excessive 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, 7. Auxiliary Feedwater Actuation Signal

AFAS consists of two steam generator (SG) specific signals (AFAS-1 and AFAS-2). AFAS-1 initiates auxiliary feed to SG #1, and AFAS-2 initiates auxiliary feed to SG #2.

AFAS maintains a steam generator heat sink during a steam generator tube rupture event and an MSLB or FWLB event either inside or outside containment.

Low steam generator water level initiates auxiliary feed to the affected steam generator, providing the generator is not identified (by the rupture detection circuitry) as faulted (a steam or FWLB).

AFAS logic includes steam generator specific inputs from the SG Pressure Difference – High (SG #1 > SG #2 or SG #2 > SG #1, bistable comparators) to determine if a fault in either generator has occurred.

(continued)

BASES

APPLICABLE SAFETY ANALYSES

6, 7. Auxiliary Feedwater Actuation Signal (continued)

Not feeding a faulted generator prevents containment overpressurization during the analyzed events.

The ESFAS satisfies Criterion 3 of 10 CFR 50.36 (c)(2)(ii).

LCO

The LCO requires all channel components necessary to provide an ESFAS actuation to be OPERABLE.

The Bases for the LCOs on ESFAS Functions are:

1. Safety Injection Actuation Signal

a. Containment Pressure-High

This LCO requires four channels of Containment Pressure-High to be OPERABLE in MODES 1, 2 and 3.

The Containment Pressure-High signal is shared among the SIAS (Function 1), CIAS (Function 3), and MSIS (Function 4).

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 abnormal condition. The setting is low enough to initiate the ESF Functions when an abnormal condition is indicated. This allows the ESF systems to perform as expected in the accident analyses to mitigate the consequences of the analyzed accidents.

b. Pressurizer Pressure-Low

This LCO requires four channels of Pressurizer Pressure-Low to be OPERABLE in MODES 1, 2 and 3.

(continued)

BASES

LCO

b. Pressurizer Pressure-Low (continued)

The Allowable Value for this trip is set low enough to prevent actuating the ESF Functions (SIAS and CIAS) during normal plant operation and pressurizer pressure transients. The setting is high enough that, with the specified accidents, the ESF systems will actuate to perform as expected, mitigating the consequences of the accident.

The Pressurizer Pressure-Low trip setpoint, which provides SIAS, CIAS, and RPS trip, may be manually decreased to a floor value of 100 psia to allow for a controlled cooldown and depressurization of the RCS without causing a reactor trip, CIAS, or SIAS. The margin between actual pressurizer pressure and the trip setpoint must be maintained less than or equal to the specified value (400 psia) to ensure a reactor trip, CIAS, and SIAS will occur if required during RCS cooldown and depressurization. When the RCS cold leg temperature is ≥ 485°F the setpoint must be ≥ 140 psia greater than the saturation pressure of the RCS cold leg. This is required to ensure a SIAS prior to reactor vessel upper head void formation in the event of RCS depressurization caused by a steam line break.

From this reduced setting, the trip setpoint will increase automatically as pressurizer pressure increases, tracking actual RCS pressure until the trip setpoint is reached.

When the trip setpoint has been lowered below the bypass permissive setpoint of 400 psia, the Pressurizer Pressure-Low reactor trip, CIAS, and SIAS actuation may be manually bypassed in preparation for shutdown cooling. When RCS pressure rises above the bypass removal setpoint, the bypass is removed.

(continued)

BASES

LCO (continued)

Bypass Removal

This LCO requires four channels of operating bypass removal for Pressurizer Pressure—Low to be OPERABLE in MODES 1, 2 and 3.

Each of the four channels enables and disables the operating bypass capability for a single channel. Therefore, this LCO applies to the operating bypass removal feature only. If the bypass enable function is failed so as to prevent entering a operating bypass condition, operation may continue.

Because the trip·setpoint has a floor value of 100 psia, a channel trip will result if pressure is decreased below this setpoint without bypassing.

The operating bypass removal Allowable Value was chosen because MSLB events originating from below this setpoint add less positive reactivity than that which can be compensated for by required SDM.

2. Containment Spray Actuation Signal

a. Containment Pressure—High High

This LCO requires four channels of Containment Pressure—High 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 abnormal condition. The setting is low enough to initiate CSAS in time to prevent containment pressure from exceeding design.

(continued)

BASES

LCO (continued)

3. Containment Isolation Actuation Signal

The SIAS and CIAS are actuated on Pressurizer Pressure–Low or Containment Pressure–High, the SIAS and CIAS share the same input channels, bistables, and matrices and matrix relays. The remainder of the initiation channels, the manual channels, and the Actuation Logic are separate and are addressed in LCO 3.3.6.

a. Containment Pressure–High

This LCO requires four channels of Containment Pressure–High to be OPERABLE in MODES 1, 2, and 3.

The Containment Pressure–High signal is shared among the SIAS (Function 1), CIAS (Function 3), and MSIS (Function 4).

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 abnormal condition. The setting is low enough to initiate the ESF Functions when an abnormal condition is indicated. This allows the ESF systems to perform as expected in the accident analyses to mitigate the consequences of the analyzed accidents.

b. Pressurizer Pressure–Low

This LCO requires four channels of Pressurizer Pressure–Low to be OPERABLE in MODES 1, 2, and 3.

The Allowable Value for this trip is set low enough to prevent actuating the ESF Functions (SIAS and CIAS) during normal plant operation and pressurizer pressure transients. The setting is high enough that, with the specified accident, the ESF systems will actuate to perform as expected, mitigating the consequences of the accidents.

(continued)

BASES

LCO

b. Pressurizer Pressure-Low (continued)

The Pressurizer Pressure–Low trip setpoint, which provides an SIAS, CIAS, and RPS trip, may be manually decreased to a floor Allowable Value of 100 psia to allow for a controlled cooldown and depressurization of the RCS without causing a reactor trip, CIAS or SIAS.

The safety margin between actual pressurizer pressure and the trip setpoint must be maintained less than or equal to the specified value (400 psi) to ensure a reactor trip, CIAS, and SIAS will occur if required during RCS cooldown and depressurization.

From this reduced setting, the trip setpoint will increase automatically as pressurizer pressure increases, tracking actual RCS pressure until the trip setpoint is reached.

When the trip setpoint has been lowered below the operating bypass permissive setpoint of 400 psia, the Pressurizer Pressure–Low reactor trip, CIAS, and SIAS actuation may be manually bypassed in preparation for shutdown cooling. When RCS pressure rises above the bypass removal, the bypass is removed.

Bypass Removal

This LCO requires four channels of operating bypass removal for Pressurizer Pressure–Low to be OPERABLE in MODES 1, 2, and 3.

Each of the four channels enables and disables the operating bypass capability for a single channel. Therefore all four operating bypass removal channels must be OPERABLE to ensure that none of the four channels are inadvertently bypassed.

(continued)

BASES

LCO

Bypass Removal (continued)

This LCO applies to the operating bypass removal feature only. If the operating bypass enable function is failed so as to prevent entering a operating bypass condition, operation may continue. Because the trip setpoint has a floor value of 100 psia, a channel trip will result if pressure is decreased below this setpoint without bypassing.

The operating bypass removal Allowable Value was chosen because MSLB events originating from below this setpoint add less positive reactivity than that which can be compensated for by required SDM.

4. Main Steam Isolation Signal

The LCO is applicable to the MSIS in MODES 1, 2 and 3 except when all associated valves are closed.

a. Steam Generator Pressure - Low

This LCO requires four channels of Steam Generator Pressure - Low to be OPERABLE in MODES 1, 2 and 3.

The Allowable Value for this trip 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 an MSIS (Function 4) during an excessive steam demand event. An excessive steam demand event causes the RCS to cool down, resulting in a positive reactivity addition to the core.

MSIS limits this cooldown by isolating both steam generators if the pressure in either drops below the trip setpoint. An RPS trip on Steam Generator Pressure - Low is initiated simultaneously, using the same bistable.

(continued)

BASES

LCO

a. Steam Generator Pressure - Low (continued)

The Steam Generator Pressure – Low trip setpoint may be manually decreased as steam generator pressure is reduced. This prevents an RPS trip or MSIS actuation during controlled plant cooldown. The margin between actual steam generator pressure and the trip setpoint must be maintained less than or equal to the specified value of 200 psia to ensure a reactor trip and MSIS will occur when required.

b. Containment Pressure – High

This LCO requires four channels of Containment Pressure – High to be OPERABLE in MODES 1, 2 and 3. The Containment Pressure – High signal is shared among the SIAS (Function 1), CIAS (Function 3), and MSIS (Function 4).

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 abnormal condition. The setting is low enough to initiate the ESF Functions when an abnormal condition is indicated. This allows the ESF systems to perform as expected in the accident analyses to mitigate the consequences of the analyzed accidents.

c. Steam Generator Level-High

This LCO requires four channels of Steam Generator Level-High to be OPERABLE in MODES 1, 2 and 3.

The allowable value for this trip is set high enough to ensure it does not interfere with normal plant operation. The setting is low enough to prevent moisture damage to secondary plant components in the case of a steam generator overfill event.

(continued)

BASES

LCO (continued)

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 recirculation system if recirculation begins before the sump has enough water to prevent air entrainment 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 RWT.

6, 7. Auxiliary Feedwater Actuation Signal SG #1 and SG #2 (AFAS-1 and AFAS-2)

AFAS-1 is initiated to SG #1 by either a low steam generator level coincident with no differential pressure trip present or by a low steam generator level coincident with a differential pressure between the two generators with the higher pressure in SG #1. AFAS-2 is similarly configured to feed SG #2.

The steam generator secondary differential pressure is used, as an input of the AFAS logic where it is used to determine if a generator is intact. The AFAS logic inhibits feeding a steam generator if the pressure in that steam generator is less than the pressure in the other steam generator by the Steam Generator Pressure Difference (SGPD) - High setpoint.

(continued)

BASES

LCO

6, 7. Auxiliary Feedwater Actuation Signal SG #1 and SG #2 (AFAS-1 and AFAS-2) (continued)

The SGPD setpoint is high enough to allow for small pressure differences and normal instrumentation errors between the steam generator channels during normal operation.

The following LCO description applies to both AFAS signals.

a. Steam Generator Level – Low

This LCO requires four channels of Steam Generator Level – Low to be OPERABLE for each AFAS in MODES 1, 2, and 3.

The Steam Generator Level – Low AFAS input is shared with the Steam Generator Level-Low RPS function. The Steam Generator Level-Low AFAS and RPS use separate bistables. This allows the AFAS setpoint to be set lower than the RPS setpoint. The allowable value is high enough to ensure the steam generator is available as a heat sink. The setting is low enough to prevent inadvertent AFAS actuations during plant transients. This setpoint provides allowance that there will be sufficient inventory in the steam generator at the time of the RPS trip to provide a margin of at least 10 minutes before auxiliary feedwater is required to prevent degraded core cooling.

b. SG Pressure Difference – High (SG #1 > SG #2) or (SG #2 > SG #1)

This LCO requires four channels of SG Pressure Difference – High to be OPERABLE for each AFAS 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

(continued)

BASES

LCO

b. <u>SG Pressure Difference-High (SG #1 > SG #2) or (SG #2 > SG #1)</u> (continued)

to detect and inhibit feeding of a faulted (MSLB or FWLB) steam generator in the event of an MSLB or FWLB, while permitting the feeding of the intact steam generator.

APPLICABILITY

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 auxiliary feedwater 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 water 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 these Functions is not required because adequate time is available to evaluate plant conditions and respond by manually operating the ESF components if required, as addressed by LCO 3.3.6.

Several trips have operating bypasses, discussed in the preceding LCO section. The interlocks that allow these bypasses shall be OPERABLE whenever the RPS Function they support is OPERABLE.

(continued)

BASES

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. 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.

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 ESFAS bistable is found inoperable, then all affected Functions provided by that channel must be declared inoperable and the LCO Condition entered for the particular protection Function affected.

With a channel process measurement circuit that affects multiple functional units inoperable or in test, bypass on trip all associated functional units as listed below.

<u>Process Measurement Circuit</u>

1.	Steam Generator Pressure-Low	Steam Generator Pressure-Low Steam Generator Level 1-Low (ESF) Steam Generator Level 2-Low (ESF)
2.	Steam Generator Level (Wide Range)	Steam Generator Level-Low (RPS) Steam Generator Level 1-Low (ESF) Steam Generator Level 2-Low (ESF)

With a Steam Generator Pressure Difference-High channel inoperable or in test, bypass or trip the associated Steam Generator Level-Low (ESF) function.

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. The 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. The Completion Time for the inoperable channel of a Function will be tracked separately for each Function starting from the time the Condition was entered for that Function.

(continued)

BASES

ACTIONS (continued)

A.1 and A.2

Condition A 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

2. Containment Spray Actuation Signal
   Containment Pressure – High High

3. Containment Isolation Actuation Signal
   Containment Pressure – High
   Pressurizer Pressure – Low

4. Main Steam Isolation Signal
   Steam Generator #1 Pressure – Low
   Steam Generator #2 Pressure – Low
   Steam Generator #1 Level-High
   Steam Generator #2 Level-High
   Containment Pressure – High

5. Recirculation Actuation Signal
   Refueling Water Storage Tank Level – Low

6. Auxiliary Feedwater Actuation Signal SG #1 (AFAS-1)
   Steam Generator #1 Level – Low
   SG Pressure Difference (SG #2 > SG #1) – High

7. Auxiliary Feedwater Actuation Signal SG #2 (AFAS-2)
   Steam Generator #2 Level – Low
   SG Pressure Difference (SG #1 > SG #2) – High

ESFAS coincidence logic is normally two-out-of-four.

If one ESFAS channel is inoperable, startup or power operation is allowed to continue, providing the inoperable channel is placed in bypass or trip within 1 hour (Required Action A.1).

(continued)

BASES

ACTIONS

A.1 and A.2 (continued)

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 and still ensures that the risk involved in operating with the failed channel is acceptable.

The failed channel must be restored to OPERABLE status prior to entering MODE 2 following the next MODE 5 entry. With a channel bypassed, the coincidence logic is now in a two-out-of-three configuration. The Completion Time of prior to entering MODE 2 following the next MODE 5 entry is based on adequate channel to channel independence, which allows a two-out-of-three channel operation, since no single failure will cause or prevent an ESF actuation.

B.1

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.

Condition B applies to the failure of two channels of one or more input parameters in the following ESFAS automatic trip Functions:

1. Safety Injection Actuation Signal
   Containment Pressure—High
   Pressurizer Pressure—Low

2. Containment Spray Actuation Signal
   Containment Pressure—High High

3. Containment Isolation Actuation Signal
   Containment Pressure—High
   Pressurizer Pressure—Low

(continued)

BASES

ACTIONS

B.1 (continued)

4. Main Steam Isolation Signal
   Steam Generator #1 Pressure – Low
   Steam Generator #2 Pressure – Low
   Steam Generator #1 Level-High
   Steam Generator #2 Level-High
   Containment Pressure-High

5. Recirculation Actuation Signal
   Refueling Water Storage Tank Level – Low

6. Auxiliary Feedwater Actuation Signal SG #1 (AFAS-1)
   Steam Generator #1 Level – Low
   SG Pressure Difference (SG #2 > SG #1) – High

7. Auxiliary Feedwater Actuation Signal SG #2 (AFAS-2)
   Steam Generator #2 Level – Low
   SG Pressure Difference (SG #1 > SG #2) – High

With two inoperable channels, power operation may continue, provided one inoperable channel is placed in bypass and the other channel is placed in trip within 1 hour. With one channel of protective instrumentation bypassed, the ESFAS Function is in two-out-of-three logic in the bypassed input parameter, 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 ESFAS Function in a one-out-of-two logic. If any of the other OPERABLE channels receives a trip signal, ESFAS actuation will occur.

One of the two inoperable channels will need to be restored to OPERABLE status prior to the next required CHANNEL FUNCTIONAL TEST because channel surveillance testing on an OPERABLE channel requires that the OPERABLE channel be placed in bypass. However, it is not possible to bypass more than one ESFAS channel, and placing a second channel in trip will result in an ESFAS actuation. Therefore, if one ESFAS channel is in trip and a second channel is in bypass, a third inoperable channel would place the unit in LCO 3.0.3.

(continued)

BASES

ACTIONS (continued)

C.1, C.2.1, and C.2.2

Condition C applies to one automatic operating bypass removal channel inoperable. The only automatic operating bypass removal on an ESFAS is on the Pressurizer Pressure – Low signal. This operating bypass removal is shared with the RPS Pressurizer Pressure – Low bypass removal.

If the bypass removal channel for any operating bypass cannot be restored to OPERABLE status, the associated ESFAS channel may be considered OPERABLE only if the bypass is not in effect. Otherwise, the affected ESFAS channel must be declared inoperable, as in Condition A, and the operating bypass either removed or the bypass removal channel repaired. The Bases for the Required Actions and required Completion Times are consistent with Condition A.

D.1 and D.2

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.

Condition D applies to two inoperable automatic operating bypass removal channels. If the operating bypass removal channels for two operating bypasses cannot be restored to OPERABLE status, the associated ESFAS channel may be considered OPERABLE only if the operating bypass is not in effect. Otherwise, the affected ESFAS channels must be declared inoperable, as in Condition B, and either the operating bypass removed or the bypass removal channel repaired. The restoration of one affected bypassed automatic trip channel must be completed prior to the next CHANNEL FUNCTIONAL TEST or the plant must shut down per LCO 3.0.3, as explained in Condition B. Completion Times are consistent with Condition B.

(continued)

BASES

ACTIONS (continued)

E.1 and E.2

If the Required Actions and associated Completion Times of Condition A, B, C, or D cannot be 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 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.

SURVEILLANCE REQUIREMENTS

SR 3.3.5.1

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.

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.

(continued)

BASES

SURVEILLANCE REQUIREMENTS

SR 3.3.5.1 (continued)

The Frequency, 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 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 displays associated with the LCO required channels.

SR 3.3.5.2

A CHANNEL FUNCTIONAL TEST is performed every 92 days to ensure the entire channel will perform its intended function when needed.

The CHANNEL FUNCTIONAL TEST is part of an overlapping test sequence similar to that employed in the RPS. This sequence, consisting of SR 3.3.5.2, SR 3.3.6.1, and SR 3.3.6.2, tests the entire ESFAS from the bistable input through the actuation of the individual subgroup relays. These overlapping tests are described in Reference 1. SR 3.3.5.2 and SR 3.3.6.1 are normally performed together and in conjunction with ESFAS testing. SR 3.3.6.2 verifies that the subgroup relays are capable of actuating their respective ESF components when de-energized.

These tests verify that the ESFAS is capable of performing its intended function, from bistable input through the actuated components. SRs 3.3.6.1 and 3.3.6.2 are addressed in LCO 3.3.6. SR 3.3.5.2 includes bistable tests.

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 trip channel bypassed. Any setpoint adjustment shall be consistent with the assumptions of the current plant specific setpoint analysis.

(continued)

BASES

SURVEILLANCE REQUIREMENTS

SR 3.3.5.2 (continued)

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 9.

SR 3.3.5.3

CHANNEL CALIBRATION is a complete check of the instrument channel including the detector and the bypass removal functions. 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.

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 9.

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.

SR 3.3.5.4

This Surveillance ensures that the train actuation response times are within the maximum values assumed in the safety analyses.

Response time testing acceptance criteria are included in Reference 8.

ESF RESPONSE TIME tests are conducted on a STAGGERED TEST BASIS of once every 18 months. The 18 month Frequency is consistent with the typical industry refueling cycle and 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.

(continued)

BASES

SURVEILLANCE REQUIREMENTS (continued)

SR 3.3.5.5

SR 3.3.5.5 is a CHANNEL FUNCTIONAL TEST similar to SR 3.3.5.2, except SR 3.3.5.5 is performed within 92 days prior to startup and is only applicable to operating bypass functions. Since the Pressurizer Pressure – Low operating bypass is identical for both the RPS and ESFAS, this is the same Surveillance performed for the RPS in SR 3.3.1.13.

The CHANNEL FUNCTIONAL TEST for proper operation of the operating bypass permissives 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 operating bypass function OPERABILITY. Once the operating 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 SR 3.3.5.2.

The allowance to conduct this test with 92 days of startup is based on the reliability analysis presented in topical report CEN-327, "RPS/ESFAS Extended Test Interval Evaluation" (Ref. 9).

REFERENCES

1. UFSAR, Section 7.3.

2. 10 CFR 50, Appendix A.

3. NRC Safety Evaluation Report, July 15, 1994

4. IEEE Standard 279-1971.

5. UFSAR, Chapter 15.

6. 10 CFR 50.49.

7. "Calculation of Trip Setpoint Valves Plant Protection System", CEN-286(v), or Calculation 13-JC-SG-203 for the Low Steam Generator Pressure Trip Function.

8. UFSAR, Section 7.2.

9. CEN-327, May 1986, including Supplement 1, March 1989, and Calculation 13-JC-SB-200.

B 3.3 INSTRUMENTATION

B 3.3.6 Engineered Safety Features Actuation System (ESFAS) Logic and Manual Trip

BASES

BACKGROUND

The ESFAS initiates necessary safety systems, based upon the values of selected unit parameters, to protect against violating core design limits and the Reactor Coolant System (RCS) pressure boundary during anticipated operational occurrences (AOOs) and ensures acceptable consequences during accidents.

The ESFAS contains devices and circuitry that generate the following signals when monitored variables reach levels that are indicative of conditions requiring protective action:

1. Safety Injection Actuation Signal (SIAS);
2. Containment Isolation Actuation Signal (CIAS);
3. Recirculation Actuation Signal (RAS);
4. Containment Spray Actuation Signal (CSAS);
5. Main Steam Isolation Signal (MSIS);
6. Auxiliary Feedwater Actuation Signal SG #1 (AFAS-1); and
7. Auxiliary Feedwater Actuation Signal SG #2 (AFAS-2).

Equipment actuated by each of the above signals is identified in the UFSAR (Ref. 1).

Each of the above ESFAS instrumentation systems is segmented into three interconnected modules. These modules are:

- Measurement channels;
- Bistable trip units; and
- ESFAS Logic:

(continued)

BASES

BACKGROUND (continued)

- Matrix Logic,
- Initiation Logic (trip paths), and
- Actuation Logic.

This LCO addresses ESFAS Logic. Bistables and measurement channels are addressed in LCO 3.3.5, "Engineered Safety Features Actuation System (ESFAS) Instrumentation."

The role of the measurement channels and bistables is described in LCO 3.3.5. The role of the ESFAS Logic is described below.

ESFAS Logic

The ESFAS Logic, consisting of Matrix, Initiation and Actuation Logic, employs a scheme that provides an ESF actuation of both trains when bistables in any two of the four channels sense the same input parameter trip. This is called a two-out-of-four trip logic.

Bistable relay contact outputs from the four channels are configured into six Matrix Logics. Each Matrix Logic 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 Matrix Logic contains four normally energized matrix relays. When a coincidence is detected in the two channels being monitored by the Matrix Logic, all four matrix relays de-energize.

The matrix relay contacts are arranged into trip paths, with one relay contact from each matrix relay in each of the four trip paths. Each trip path controls two initiation relays. Each of the two initiation relays in each trip path controls contacts in the Actuation Logic for one train of ESF.

Each of the two channels of Actuation Logic, mounted in the Auxiliary Relay Cabinets (ARCs), is responsible for actuating one train of ESF equipment. Each ESF Function has separate Actuation Logic in each ARC.

The contacts from the Initiation Logic are configured in a selective two-out-of-four logic in the Actuation Logic, similar to the configuration employed by the RPS in the RTCBs. This logic controls ARC mounted subgroup relays,

(continued)

BASES

BACKGROUND

ESFAS Logic (continued)

which are normally energized. Contacts from these relays, when de-energized, actuate specific ESF equipment.

When a coincidence occurs in two ESFAS channels, all four matrix relays in the affected matrix will de-energize. This, in turn, will de-energize all eight initiation relays, four used in each Actuation Logic.

Matrix Logic refers to the matrix power supplies, trip channel bypass contacts and interconnecting matrix wiring between bistable relay cards, up to but not including the matrix relays. Matrix contacts on the bistable relay cards are excluded from the Matrix Logic definition, since they are addressed as part of the measurement channel.

Initiation Logic consists of the trip path power source, matrix relays and their associated contacts, all interconnecting wiring, and the initiation relays.

Actuation Logic consists of all circuitry housed within the ARCs used to actuate the ESF Function, excluding the subgroup relays, and interconnecting wiring to the initiation relay contacts mounted in the PPS cabinet.

(continued)

BASES

BACKGROUND

ESFAS Logic (continued)

The subgroup relays are actuated by the ESFAS Logic. Each ESFAS Function typically employs several subgroup relays, with each subgroup relay responsible for actuating one or more components in the ESFAS Function. Subgroup relays and their contacts are considered part of the actuated equipment and are addressed under the applicable LCO for this equipment.

It is possible to change the two-out-of-four ESFAS Logic to 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 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. 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. Trip channel bypassing is addressed in LCO 3.3.5.

Manual ESFAS initiation capability is provided to permit the operator to manually actuate an ESF System when necessary.

Four handswitches (located in the control room) for each ESF Function are provided, and each handswitch actuates both trains. Each Manual Trip handswitch opens one trip path, de-energizing one set of two initiation relays, one affecting each train of ESF. Initiation relay contacts are arranged in a selective two-out-of-four configuration in the Actuation Logic. Operating either handswitch in both Trip Legs will result in an ESFAS Actuation. This arrangement ensures that Manual Actuation will not be prevented in the event of a single random failure. Each handswitch is designated a single channel in this LCO.

(continued)

BASES

APPLICABLE SAFETY ANALYSES

Each of the analyzed accidents can be detected by one or 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.

ESFAS Functions are as follows:

1. <u>Safety Injection Actuation Signal</u>

   SIAS ensures acceptable consequences during large break loss of coolant accidents (LOCAs), small break LOCAs, control element assembly ejection accidents, and main steam line breaks (MSLBs) 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. <u>Containment Isolation Actuation Signal</u>

   CIAS ensures acceptable mitigating actions during large and small break LOCAs and during MSLBs either inside or outside containment and feedwater line breaks (FWLBs) inside containment. CIAS is initiated by low pressurizer pressure or high containment pressure.

3. <u>Recirculation Actuation Signal</u>

   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.

(continued)

BASES

APPLICABLE SAFETY ANALYSES

3. Recirculation Actuation Signal (continued)

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.

4. Containment Spray Actuation Signal

CSAS actuates containment spray, preventing containment overpressurization during large break LOCAs, small break LOCAs, and MSLBs or FWLBs inside containment. CSAS is initiated by high high containment pressure.

5. Main Steam Isolation Signal

MSIS ensures acceptable consequences during an MSLB or FWLB (between the steam generator and the main feedwater check valve) either inside or outside containment. MSIS isolates both steam generators if either generator indicates a low pressure condition or a high level condition or if a high containment pressure condition exists. This prevents an excessive rate of heat extraction and subsequent cooldown of the RCS during these events.

6, 7. Auxiliary Feedwater Actuation Signal

AFAS consists of two Steam Generator (SG) specific signals AFAS-1 and AFAS-2. AFAS-1 initiates auxiliary feed to SG #1, and AFAS-2 initiates auxiliary feed to SG #2.

AFAS maintains a steam generator heat sink during a steam generator tube rupture event and an MSLB or FWLB event either inside or outside containment.

Low steam generator water level initiates auxiliary feed to the affected steam generator, providing the generator is not identified (by the rupture detection circuitry) as faulted (an MSLB or FWLB).

(continued)

BASES

APPLICABLE SAFETY ANALYSES

6, 7. Auxiliary Feedwater Actuation Signal (continued)

AFAS logic includes steam generator specific inputs from the SG Pressure Difference—High (SG #1 > SG #2 or SG #2 > SG #1, bistable comparators) to determine if a fault in either generator has occurred.

Not feeding a faulted generator prevents containment overpressurization during the analyzed events.

The ESFAS satisfies Criterion 3 of 10 CFR 50.36 (c)(2)(ii).

LCO

The LCO on the ESFAS Logic channels ensures that each of the following requirements are met:

- An ESFAS Actuation Signal will be initiated when necessary;
- The required protection system coincidence logic is maintained (minimum two-out-of-three, normal two-out-of-four); and
- Sufficient redundancy is maintained to permit a channel to be out of service for testing or maintenance.

Failures of individual bistable relays and their contacts are addressed in LCO 3.3.5. 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.

Loss of a single vital bus will de-energize one of the two power supplies in each of the three matrices. This will result in two trip path contacts opening in each ESFAS Actuation Logic channel; however, the remaining two contacts in each ESFAS Actuation Logic channel will remain closed, preventing an ESFAS Actuation. 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 trip path contacts in each ESFAS Actuation Logic channel.

(continued)

BASES

Each of the four Initiation Logic channels controls two Initiation relays, each Initiation relay opens a contact in its Actuation Logic channel if any of the six coincidence matricies de-energize their associated matrix relays. They thus form a logical OR function. 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 Initiation relay contacts, and the interconnecting wiring to the Actuation Logic channels.

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 two contacts in each of the ESFAS Actuation Logic channels.

The requirements for each Function are listed below. The reasons for the applicable MODES for each Function are addressed under APPLICABILITY.

1. Safety Injection Actuation Signal

   Automatic SIAS occurs in Pressurizer Pressure–Low or Containment Pressure–High and is explained in Bases 3.3.5.

   a. Manual Trip

      This LCO requires four channels of SIAS Manual Trip to be OPERABLE in MODES 1, 2, 3, and 4.

   b. Matrix Logic

      This LCO requires six channels of SIAS Matrix Logic to be OPERABLE in MODES 1, 2 and 3.

(continued)

BASES

LCO (continued)

c. Initiation Logic

This LCO requires four channels of SIAS Initiation Logic to be OPERABLE in MODES 1, 2, 3, and 4.

d. Actuation Logic

This LCO requires two channels of SIAS Actuation Logic to be OPERABLE in MODES 1, 2, 3, and 4.

2. Containment Isolation Actuation Signal

The SIAS and CIAS are actuated on Pressurizer Pressure—Low or Containment Pressure—High, the SIAS and CIAS share the same input channels, bistables, and matrices and matrix relays. The remainder of the initiation channels, the manual channels, and the Actuation Logic are separate. Since their applicability is also the same, they have identical actions.

a. Manual Trip

This LCO requires four channels of CIAS Manual Trip to be OPERABLE in MODES 1, 2, 3, and 4.

b. Matrix Logic

This LCO requires six channels of CIAS Matrix Logic to be OPERABLE in MODES 1, 2, and 3.

c. Initiation Logic

This LCO requires four channels of CIAS Initiation Logic to be OPERABLE in MODES 1, 2, 3, and 4.

d. Actuation Logic

This LCO requires two channels of CIAS Actuation Logic to be OPERABLE in MODES 1, 2, 3, and 4.

(continued)

BASES

LCO (continued)

3. Recirculation Actuation Signal

a. Manual Trip

This LCO requires four channels of RAS Manual Trip to be OPERABLE in MODES 1, 2, 3, and 4.

b. Matrix Logic

This LCO requires six channels of RAS Matrix Logic to be OPERABLE in MODES 1, 2, and 3.

c. Initiation Logic

This LCO requires four channels of RAS Initiation Logic to be OPERABLE in MODES 1, 2, 3, and 4.

d. Actuation Logic

This LCO requires two channels of RAS Actuation Logic to be OPERABLE in MODES 1, 2, 3, and 4.

4. Containment Spray Actuation Signal

a. Manual Trip

This LCO requires four channels of CSAS Manual Trip to be OPERABLE in MODES 1, 2, and 3.

b. Matrix Logic

This LCO requires six channels of CSAS Matrix Logic to be OPERABLE in MODES 1, 2, and 3.

c. Initiation Logic

This LCO requires four channels of CSAS Initiation Logic to be OPERABLE in MODES 1, 2, and 3.

d. Actuation Logic

This LCO requires two channels of CSAS Actuation Logic to be OPERABLE in MODES 1, 2, and 3.

(continued)

BASES

LCO (continued)

5. Main Steam Isolation Signal

a. Manual Trip

This LCO requires four channels of MSIS Manual Trip to be OPERABLE in MODES 1, 2 and 3, except when all associated valves are closed.

b. Matrix Logic

This LCO requires six channels of MSIS Matrix Logic to be OPERABLE in MODES 1, 2 and 3, except when all associated valves are closed.

c. Initiation Logic

This LCO requires four channels of MSIS Initiation Logic to be OPERABLE in MODES 1, 2 and 3, except when all associated valves are closed.

d. Actuation Logic

This LCO requires two channels of MSIS Actuation Logic to be OPERABLE in MODES 1, 2 and 3, except when all associated valves are closed.

6. Auxiliary Feedwater Actuation Signal SG #1 (AFAS-1)

AFAS-1 is initiated either by a low steam generator level coincident with no differential pressure trip present or by a low steam generator level coincident with a differential pressure between the two generators with the higher pressure in SG #1.

The steam generator secondary differential pressure is used, as an input of the AFAS logic where it is used to determine if a generator is intact. The AFAS logic inhibits feeding a steam generator if the pressure in that steam generator is less than the Steam Generator Pressure Difference (SGPD)—High setpoint pressure.

(continued)

BASES

LCO

6. Auxiliary Feedwater Actuation Signal SG #1 (AFAS-1) (continued)

The setpoint is high enough to allow for small pressure differences and normal instrumentation errors between the steam generator channels during normal operation.

a. Manual Trip

This LCO requires four channels of Manual Trip to be OPERABLE in MODES 1, 2, and 3.

b. Matrix Logic

This LCO requires six channels of Matrix Logic to be OPERABLE in MODES 1, 2, and 3.

c. Initiation Logic

This LCO requires four channels of Initiation Logic to be OPERABLE in MODES 1, 2, and 3.

d. Actuation Logic

This LCO requires two channels of Actuation Logic to be OPERABLE in MODES 1, 2, and 3.

7. Auxiliary Feedwater Actuation Signal SG #2 (AFAS-2)

AFAS-2 is initiated either by a low steam generator level coincident with no differential pressure trip present or by a low steam generator level coincident with a differential pressure between the two generators with the higher pressure in SG #2.

The steam generator secondary differential pressure is used, as an input of the AFAS Logic where it is used to determine if a generator is intact. The AFAS Logic inhibits feeding a steam generator if the pressure in that steam generator is less than the SGPD—High setpoint pressure.

(continued)

BASES

LCO (continued)

7. Auxiliary Feedwater Actuation Signal SG #2 (AFAS-2)

The setpoint is high enough to allow for small pressure differences and normal instrumentation errors between the steam generator channels during normal operation.

a. Manual Trip

This LCO requires four channels of Manual Trip to be OPERABLE in MODES 1, 2, and 3.

b. Matrix Logic

This LCO requires six channels of Matrix Logic to be OPERABLE in MODES 1, 2, and 3.

c. Initiation Logic

This LCO requires four channels of Initiation Logic to be OPERABLE in MODES 1, 2, and 3.

d. Actuation Logic

This LCO requires two channels of Actuation Logic to be OPERABLE in MODES 1, 2, and 3.

APPLICABILITY

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 auxiliary feedwater 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

(continued)

BASES

APPLICABILITY (continued)

- Actuate ESF systems to ensure sufficient borated water 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 these Functions is not required because adequate time is available to evaluate plant conditions and respond by manually operating the ESF components if required.

ESFAS Manual Trip capability is required in MODE 4 for SIAS, CIAS, and RAS even though automatic actuation is not required. Because of the large number of components actuated by these Functions, ESFAS actuation is simplified by the use of the Manual Trip.

CSAS, MSIS, and AFAS have relatively few components, which can be actuated individually if required in MODE 4, and the systems may be disabled or reconfigured, making system level Manual Trip impossible and unnecessary.

The ESFAS 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, the systems initiated by ESFAS 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

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 the Completion Time rules. The Conditions of this Specification may be entered independently for each Function. The Completion Time for the inoperable channel 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 Matrix Logic channel is inoperable. Since matrix power supplies in a given matrix (e.g., AB, BC, etc.) are common to all ESFAS Functions, a single power supply failure may affect more than one matrix.

Failures of individual bistables, their relays, and the trip channel bypass relays and their contacts are considered measurement channel failures. This section describes failures of the Matrix Logic not addressed in the above, such as the failure of matrix relay power supplies. Loss of a single vital bus will de-energize one of the two power supplies in each of three matrices. This will result in two initiation circuits de-energizing, reducing the ESFAS Actuation Logic to a one-out-of-two logic in both trains.

Condition A also applies when de-energizing up to three matrix power supplies due to a single failure, such as loss of a vital instrument bus. This is to be treated as a single matrix channel failure, providing the affected matrix relays de-energize as designed. Although each of the six matrices within an ESFAS Function uses separate power supplies, the matrices for the different ESFAS Functions share power supplies. Thus, failure of a matrix power supply may force entry into the Condition specified for each of the affected ESFAS Functions.

(continued)

BASES

ACTIONS

A.1 (continued)

The channel must be restored to OPERABLE status within 48 hours. This provides the operator with 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 period. If the channel cannot be restored to OPERABLE status with 48 hours, Condition E is entered.

B.1

Condition B applies to one Manual Trip or Initiation Logic channel inoperable.

The channel must be restored to OPERABLE status within 48 hours. Operating experience has demonstrated that the probability of a random failure in a second channel is low during any given 48 hour period.

Failure of a single Initiation Logic channel may open one contact affecting both Actuation Logic channels. For the purposes of this Specification, the Actuation Logic is not inoperable. This prevents the need to enter LCO 3.0.3 in the event of an Initiation Logic channel failure. The Actions differ from those involving one RPS manual channel inoperable, because in the case of the RPS, opening RTCBs can be easily performed and verified. Opening an initiation relay contact is more difficult to verify, and subsequent shorting of the contact is always possible.

C.1 and C.2

Condition C applies to the failure of both Initiation Logic channels affecting the same trip leg.

In this case, the Actuation Logic channels are not inoperable, since they are in one-out-of-two logic and capable of performing as required. This obviates the need to enter LCO 3.0.3 in the event of a matrix or vital bus power failure.

(continued)

BASES

ACTIONS

C.1 and C.2 (continued)

Both Initiation Logic channels in the same trip leg will de-energize if a matrix power supply or vital instrument bus is lost. This will open the Actuation Logic contacts, satisfying the Required Action to open at least one set of contacts in the affected trip leg. Indefinite operation in this condition is prohibited because of the difficulty of ensuring the contacts remain open under all conditions. Thus, the channel must be restored to OPERABLE status within 48 hours. This provides the operator with 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 channel is low during any given 48 hour period. If the channel cannot be restored to OPERABLE status with 48 hours, Condition E is entered.

Of greater concern is the failure of the initiation circuit in a nontrip condition, e.g., due to two initiation relay failures. With one failed, there is still the redundant contact in the trip leg of each Actuation Logic. With both failed in a nontrip condition, the ESFAS Function is lost in the affected train. To prevent this, immediate opening of at least one contact in the affected trip leg is required. If the required contact has not opened, as indicated by annunciation or trip leg current lamps, Manual Trip of the affected trip leg contacts may be attempted. Caution must be exercised, since operating the wrong ESFAS handswitch may result in an ESFAS actuation.

D.1

Condition D applies to Actuation Logic.

With one Actuation Logic channel inoperable, automatic actuation of one train of ESF may be inhibited. The remaining train provides adequate protection in the event of Design Basis Accidents, but the single failure criterion may be violated. For this reason operation in this condition is restricted.

(continued)

BASES

ACTIONS

D.1 (continued)

The channel must be restored to OPERABLE status within 48 hours. Operating experience has demonstrated that the probability of a random failure in the Actuation Logic of the second train is low during a given 48 hour period.

Failure of a single Initiation Logic channel, matrix channel power supply, or vital instrument bus may open one or both contacts in the same trip leg in both Actuation Logic channels. For the purposes of this Specification, the Actuation Logic is not inoperable. This obviates the need to enter LCO 3.0.3 in the event of a vital bus, matrix, or initiation channel failure.

Each Actuation Logic channel has two sets of redundant power supplies. The power supplies in each set are powered from different vital instrument buses. Failure of a single power supply or a set of power supplies due to the loss of a vital instrument bus, does not affect the operation of the Actuation Logic because the redundant power supplies can supply the full system load. For the purposes of this specification, the Actuation Logic is not inoperable.

Required Action D.1 is modified by a Note to indicate that one channel of Actuation Logic may be bypassed for up to 1 hour for Surveillance, provided the other channel is OPERABLE.

This allows performance of a PPS CHANNEL FUNCTIONAL TEST on an OPERABLE ESFAS train without generating an ESFAS actuation in the inoperable train.

E.1 and E.2

If the Required Actions and associated Completion Times of Conditions for CSAS, MSIS or AFAS cannot be 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 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.

(continued)

BASES

ACTIONS (continued)

F.1 and F.2

If the Required Actions and associated Completion Times for SIAS, CIAS, or RAS 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 5 within 36 hours. If the Required Actions and associated Completion Times for SIAS, CIAS, or RAS Matrix Logic are not met this Action may be exited when the plant is brought to MODE 4 since the LCO does not apply in MODE 4. 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 3.3.6.1

A CHANNEL FUNCTIONAL TEST is performed every 92 days to ensure the entire channel will perform its intended function when needed.

The CHANNEL FUNCTIONAL TEST is part of an overlapping test sequence similar to that employed in the RPS. This sequence, consisting of SR 3.3.5.2, SR 3.3.6.1, and SR 3.3.6.2, tests the entire ESFAS from the bistable input through the actuation of the individual subgroup relays. These overlapping tests are described in Reference 1. SR 3.3.5.2 and SR 3.3.6.1 are normally performed together and in conjunction with ESFAS testing. SR 3.3.6.2 verifies that the subgroup relays are capable of actuating their respective ESF components when de-energized.

These tests verify that the ESFAS is capable of performing its intended function, from bistable input through the actuated components. SR 3.3.5.2 is addressed in LCO 3.3.5. SR 3.3.6.1 includes Matrix Logic tests and trip path (Initiation Logic) tests, and Manual Actuation Tests.

(continued)

BASES

SURVEILLANCE REQUIREMENTS (continued)

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 to the matrix relays. During testing, power is applied to the matrix relay test coils, preventing 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 (Initiation Logic) Tests

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, opening one contact in each Actuation Logic channel.

The initiation circuit lockout relay must be reset (except for AFAS, which lacks initiation circuit lockout relays) prior to testing the other three initiation circuits, or an ESFAS actuation may result.

Automatic Actuation Logic operation is verified during Initiation Logic testing by verifying that current is interrupted in each trip leg in the selective two-out-of-four actuation circuit logic whenever the initiation relay is de-energized. A Note is added to indicate that testing of Actuation Logic shall include verification of the proper operation of each initiation relay.

(continued)

BASES

SURVEILLANCE

<u>Trip Path (Initiation Logic) Tests</u> (continued)

During the Matrix Logic and Initiation Logic test, power is applied to the Matrix relay test coils. The test coils prevent an actuation during testing by preventing the Matrix relay contacts in the Initiation Logic from changing state during the test. This does not affect the Operability of the Initiation Logic since only one of the six logic combinations that are available to trip the Initiation Logic are affected during the test because only one Matrix Logic combination can be tested at any time. The remaining five matrix combinations available ensure that a trip in any three channels will de-energize all four Initiation paths.

<u>Manual Trip Tests</u>

This test verifies that the manual trip handswitches are capable of opening contacts in the Actuation Logic as designed.

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).

<u>SR 3.3.6.2</u>

Individual ESFAS subgroup relays must also be tested, one at a time, to verify the individual ESFAS components will actuate when required. Proper operation of the individual subgroup relays is verified by de-energizing these relays one at a time using an ARC mounted test circuit. Proper operation of each component actuated by the individual relays is thus verified without the need to actuate the entire ESFAS function.

The 9 months Staggered Test Frequency is based on operating experience and ensures individual relay problems can be detected within this time frame. Considering the large number of similar relays in the ARC, and the similarity in their use, a large test sample can be assembled to verify the validity of this Frequency. The actual justification is based on CEN-403, "ESFAS Subgroup Relay Test Interval Extension (Ref. 3).

(continued)

BASES

SURVEILLANCE REQUIREMENTS

SR 3.3.6.2 (continued)

Some components cannot be tested at power since their actuation might lead to plant trip or equipment damage. Reference 1 lists those relays exempt from testing at power, with an explanation of the reason for each exception. Relays not tested at power must be tested in accordance with the Note to this SR.

REFERENCES

1. UFSAR, Section 7.3.
2. CEN-327, May 1986, including Supplement 1, March 1989, and Calculation 13-JC-SB-200.
3. CEN-403, "ESFAS Subgroup Relay Test Interval Extension".

B 3.3 INSTRUMENTATION

B 3.3.7 Diesel Generator (DG)-Loss of Voltage Start (LOVS)

BASES

BACKGROUND

The DGs provide a source of emergency power when offsite power is either unavailable or insufficiently stable to allow safe unit operation. Undervoltage protection will generate a LOVS in the event a Loss of Voltage (LOV) or Degraded Voltage (DV) condition occurs. There is one LOVS for each 4.16 kV vital bus.

Four solid-state degraded voltage relays and 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, respectively. The Loss Of Voltage relays generate a LOVS if the voltage is below 70% for a short time or below 78% for a longer time. The Degraded Voltage relays generate a LOVs if voltage is below 90% for a long time. The Balance of Plant Engineered Safety Features Activation System (BOP ESFAS) Loss of Power/Load Shed (LOP/LS) module receives inputs from the LOV and DV relays. The LOP/LS module has four channels, each of the channels has one LOV input and one DV input. If either a LOV or DV signal is received in that channel, the channel trips. If any 2 of the 4 channels trip, a signal is sent to the BOP ESFAS Diesel Generator Start Signal (DGSS) module starting the diesel. The LOVS initiated actions are described in "Onsite Power Systems" (Ref. 1).

Trip Setpoints and Allowable Values

The trip setpoints and Allowable Values are based on the analytical limits presented in "Onsite Power Systems," Reference 1. 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 3.3.7.3 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 Reference 3. The actual nominal trip setpoint is normally still more

(continued)

BASES

BACKGROUND

Trip Setpoints and Allowable Values (continued)

conservative than that required by the plant specific setpoint calculations. If the measured trip setpoint does not exceed the documented Surveillance 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. A complete loss of offsite power will result in approximately a 2 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 sensor failure will cause or prevent protective system actuation.

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 ESFAS.

(continued)

BASES

APPLICABLE SAFETY ANALYSES (continued)

Accident analyses credit the loading of the DG based on a loss of offsite power during a loss of coolant accident. The actual DG start has historically been associated with the ESFAS actuation. 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, 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. The response of the DG to a loss of power must be demonstrated to fall within this analysis response time when including the contributions of all portions of the delay.

The required channels of 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. LOVS channels are required to meet the redundancy and testability requirements of GDC 21 in 10 CFR 50, Appendix A (Ref. 4).

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 in LCO 3.3.5, "Engineered Safety Features Actuation System (ESFAS) Instrumentation," include the appropriate DG loading and sequencing delay.

The DG-LOVS channels satisfy Criterion 3 of 10 CFR 50.36(C)(2)(ii).

LCO

The LCO for the LOVS requires that four channels per bus of LOVS instrumentation 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 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.

(continued)

BASES

LCO (continued)

Actions allow maintenance (trip channel) bypass of individual channels.

Loss of LOVS 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 is 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.

APPLICABILITY

The DG-LOVS actuation Function is required in MODES 1, 2, 3, and 4 because ESF Functions are designed to provide protection in these MODES. Actuation in MODE 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.

(continued)

BASES

ACTIONS

A LOVS channel is inoperable when it does not satisfy the OPERABILITY criteria for the channel's function. 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 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 LCO Condition entered. The required channels are specified on a per DG basis.

A.1 and A.2

Condition A applies if one channel per DG bus is inoperable.

If the channel cannot be restored to OPERABLE status, the affected channel should either be bypassed or tripped within 1 hour (Required Action A.1).

(continued)

BASES

ACTIONS

A.1 and A.2 (continued)

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 allows prior to entering MODE 2 following the next MODE 5 entry to repair the inoperable channel. If the channel cannot be restored to OPERABLE status, the plant cannot enter MODE 2 following the next MODE 5 entry. The time allowed to repair or trip the channel is reasonable to repair the affected channel while ensuring that the risk involved in operating with the inoperable channel is acceptable. The prior to entering MODE 2 following the next MODE 5 entry Completion Time is based on adequate channel independence, which allows a two-out-of-three channel operation since no single failure will cause or prevent a system actuation.

B.1 and B.2

Condition B applies if two channels per DG bus are 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 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.

If the channel cannot be placed in bypass or trip 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. This places the Function in one-out-of-two logic. The 1 hour Completion Time is sufficient to perform the Required Actions.

(continued)

BASES

ACTIONS

B.1 and B.2 (continued)

One of the two inoperable channels will need to be restored to OPERABLE status prior to the next required CHANNEL FUNCTIONAL TEST because channel surveillance testing on an OPERABLE channel requires that the OPERABLE channel be placed in bypass. However, it is not permitted to bypass more than one DG-LOVS channel, and placing a second channel in trip will result in a loss of voltage diesel start signal.

After one channel is restored to OPERABLE status, the provisions of Condition A still apply to the remaining inoperable channel.

C.1

Condition C.1 applies when more than two 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 the DG-LOVS signal for valid Loss of Voltage or degraded voltage condition. The 1 hour Completion Time is 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.1 applies if the Required Actions and associated Completion Times are not met.

Required Action D.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 are required immediately.

(continued)

BASES

SURVEILLANCE REQUIREMENTS

The following SRs apply to each DG-LOVS Function.

SR 3.3.7.1

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 qualitative assessment, by observation, of channel behavior during operation. This determination shall include, where possible, comparison of the channel indication and status to other indications or status derived from independent instrument channels measuring the same parameter. A CHANNEL CHECK consists of verifying all relay status lights on the control board are lit. 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. If the channels are within the criteria, it is an indication that the channels are OPERABLE.

The Frequency, about once every shift, is based upon 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, 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 3.3.7.2

A CHANNEL FUNCTIONAL TEST is performed every 18 months to ensure that the entire channel will perform its intended function when needed.

The Frequency of 18 months 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 18 months Frequency is a rare event. Any setpoint adjustment shall be consistent with the assumptions of the current plant specific setpoint analysis.

(continued)

BASES

SURVEILLANCE REQUIREMENTS

SR 3.3.7.2 (continued)

The as found and as left values must also be recorded and reviewed for consistency.

SR 3.3.7.3

SR 3.3.7.3 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 Loss of Voltage and Degraded Voltage 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 surveillances to ensure the instrument channel remains operational. CHANNEL CALIBRATIONS must be performed consistent with the plant specific setpoint analysis. 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.

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.

REFERENCES

1. UFSAR, Section 8.3
2. UFSAR, Chapter 15.
3. Controlled Dwg. Relay Setpoint Sheets.
4. 10 CFR 50, Appendix A, GDC 21.

B 3.3 INSTRUMENTATION

B 3.3.8 Containment Purge Isolation Actuation Signal (CPIAS)

BASES

BACKGROUND

This LCO encompasses the CPIAS, which is an instrumentation channel that performs an actuation function required for plant protection but is not otherwise included in LCO 3.3.6, "Engineered Safety Features Actuation System (ESFAS) Logic and Manual Trip," or LCO 3.3.7, "Diesel Generator (DG)—Loss of Voltage Start (LOVS)."

The CPIAS provides protection from radioactive contamination in the containment in the event a fuel assembly should be severely damaged during handling. It also closes the purge valves during plant operation in response to a Reactor Coolant System (RCS) leak.

The CPIAS will detect any abnormal amounts of radioactive material in the power access and refueling purge exhaust ducts and will initiate purge valve closure to limit the release of radioactivity to the environment. Both the power access purge and refueling purge supply and exhaust valves are closed on a CPIAS when a high radiation level in the power access and refueling purge exhaust ducts is detected.

The CPIAS includes two independent, redundant logic subsystems, including actuation trains. Each train employs a Gamma (area) sensor.

If either sensor exceeds the trip setpoint, both of the CPIAS trains will be actuated (one-out-of-two logic).

Each train actuates a separate series valve in the containment purge supply and return lines. Either train controls sufficient equipment to perform the isolation function. These valves are also isolated on a Containment Isolation Actuation Signal (CIAS).

(continued)

BASES

BACKGROUND (continued)

Trip Setpoints and Allowable Values

Trip setpoints used in the bistables are based on the analytical limits (Ref. 1). The selection of these trip setpoints is such that adequate protection is provided when all sensor and processing time delays are taken into account. The trip setpoints are digitally generated by the radiation monitors. These trips values are not subject to drifts common to trips generated by analog type equipment. The allowable value for this trip is therefore the same as the Trip Setpoints.

Setpoints in accordance with the Allowable Value will ensure that 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 CPIAS is a backup to the CIAS Systems in MODES 1, 2, 3, and 4 and will close the containment purge valves in the event of high radiation levels resulting from a primary leak in the containment.

The CPIAS is also required to close the containment purge valves in the event of the fuel handling accident in containment, as described in Reference 1. This accident is a limiting case representing a class of accidents that might involve radiation release in containment without CIAS actuation. This minimizes the offsite consequences of radiation accidents in containment. The CPIAS however, is not required to function to ensure the offsite consequences of radiation accidents in containment are within 10 CFR 100 limits (Ref. 2) as described in the Safety Analysis (Ref. 1).

The CPIAS satisfies the requirements of Criterion 3 of 10 CFR 50.36 (c)(2)(ii).

(continued)

BASES

LCO

LCO 3.3.8 requires one CPIAS channel to be OPERABLE. The required channel consists of an area radiation monitor; Actuation Logic; and Manual Trip. The specific trip setpoints for the CPIAS are listed in the SRs.

Each trip setpoint specified is more conservative than the analytical limit assumed in the transient and accident analysis in order to account for instrument uncertainties appropriate to the trip function.

The Bases for the LCO on CPIAS are discussed below for each Function:

a. Manual Trip

The LCO on Manual Trip backs up the automatic trip and ensures operators have the capability to rapidly initiate the CPIAS Function if any parameter is trending toward its setpoint. One manual channel of CPIAS is required in MODES 1, 2, 3, and 4, since the CPIAS is redundant with the CIAS and there are additional means of closing the containment purge valves. Only one manual channel of CPIAS is required during CORE ALTERATIONS and movement of irradiated fuel assemblies, since there are additional means of closing the containment purge valves in the event of a channel failure.

b. Power Access and Refueling Purge Exhaust Duct Radiation

One channel of radiation monitoring is required during in MODES 1, 2, 3, and 4 or during CORE ALTERATIONS or movement of irradiated fuel assemblies within containment.

(continued)

BASES

LCO (continued)

c. Actuation Logic

One channel of Actuation Logic is required since the valves can be shut independently of the CPIAS signal either manually from the control room or using the CIAS pushbutton.

APPLICABILITY

In MODES 1, 2, 3, and 4, the power access purge valves may be open. In these MODES, it is necessary to ensure the valves will shut in the event of a primary leak in containment whenever any of the containment purge valves are open.

With the purge valves open during CORE ALTERATIONS or movement of irradiated fuel assemblies within containment, there is the possibility of a fuel handling accident requiring CPIAS on high radiation in the power access purge and refueling purge exhaust ducts.

The Applicability is modified by a Note, which states that the CPIAS specification is only required when the penetration is not isolated by at least one closed automatic valve, closed manual valve, or blind flange.

ACTIONS

A CPIAS channel is inoperable when it does not satisfy the OPERABILITY criteria for the channel's function. The most common cause of channel inoperability is outright failure.

A.1

Condition A applies to the failure of CPIAS Manual Trip, Actuation Logic, and area radiation monitor in MODES 1, 2, 3, and 4. The Required Action is to place and maintain containment purge and exhaust valves in closed position. The Completion Time accounts for the condition that the capability to isolate containment on valid high radiation levels in the power access and refueling purge exhaust ducts or manual signals is degraded during power operation or shutdown modes.

(continued)

BASES

ACTIONS (continued)

B.1

Condition B applies when the Required Action and associated Completion Time of Condition A are not met in MODES 1, 2, 3, or 4. If Required Action A cannot be met within the required Completion Time, entry into LCO 3.6.3 "Containment Isolation Valves" is required. The Completion Time accounts for the fact that the inability to close and maintain the purge and exhaust valves closed may affect the ability of the valves to automatically close on a Containment Isolation Actuation Signal (CIAS)

C.1, C.2.1, and C.2.2.

Condition C applies to two channels of radiation monitor, Manual Trip, or Actuation Logic inoperable, the applicability is during CORE ALTERATIONS or during the movement of irradiated fuel assemblies within containment. Required Action C.1 is to place the containment purge and exhaust isolation valves in the closed position. The Required Action immediately performs the isolation function of the CPIAS. Required Actions C.2.1 and C.2.2 may be performed in lieu of Required Action C.1. Required Action C.2.1 requires the suspension of CORE ALTERATIONS and Required Action C.2.2 requires suspension of movement of irradiated fuel in containment immediately. The Completion Time accounts for the fact that the automatic capability to isolate containment on valid power access and refueling purge exhaust duct high radiation signals is degraded during conditions in which a fuel handling accident is possible and CPIAS provides the only automatic mitigation of radiation release.

BASES

SURVEILLANCE REQUIREMENTS

SR 3.3.8.1

Performance of the CHANNEL CHECK once every 12 hours ensures that a gross failure of instrumentation has not occurred on the required radiation monitor channels used in the CPIAS. 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 limit.

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 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 3.3.8.2

A CHANNEL FUNCTIONAL TEST is performed on the required containment radiation monitoring channel to ensure the entire channel will perform its intended function. 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.

(continued)

BASES

SURVEILLANCE REQUIREMENTS (continued)

SR 3.3.8.3

Proper operation of the individual actuation relays is verified by actuating these relays during the CHANNEL FUNCTIONAL TEST of the Actuation Logic every 18 months. This will actuate the Function, operating all associated equipment. Proper operation of the equipment actuated by each train is thus verified. The Frequency of 18 months 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 during any 18 month interval is a rare event. A Note to the SR indicates that this Surveillance includes verification of operation for each actuation relay.

SR 3.3.8.4

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 operational between successive surveillances. CHANNEL CALIBRATIONS must be performed consistent with the plant specific setpoint analysis.

The 18 month Frequency is based on plant operating experience with regard to channel OPERABILITY and drift.

(continued)

BASES

SURVEILLANCE REQUIREMENTS (continued)

SR 3.3.8.5

Every 18 months, a CHANNEL FUNCTIONAL TEST is performed on the CPIAS Manual Trip channel.

This test verifies that the trip handswitches are capable of opening contacts in the Actuation Logic as designed, de-energizing the initiation relays and providing manual actuation of the Function. The 18 month Frequency is based on operating experience that has shown these components usually pass the Surveillance when performed at a Frequency of once every 18 months.

REFERENCES

1. UFSAR, Chapter 15.

2. 10 CFR 100.

B 3.3 INSTRUMENTATION

B 3.3.9 Control Room Essential Filtration Actuation Signal (CREFAS)

BASES

BACKGROUND

This LCO encompasses CREFAS actuation, which is an instrumentation channel that performs an actuation Function required for plant protection but is not otherwise included in LCO 3.3.6, "Engineered Safety Features Actuation System (ESFAS) Logic and Manual Trip," or LCO 3.3.7, "Diesel Generator (DG) - Loss of Voltage Start (LOVS)." This is a BOP ESFAS Function that, because of differences in purpose, design, and operating requirements, is not included in LCO 3.3.6 and LCO 3.3.7.

The CREFAS initiates actuation of the Control Room Essential Filtration System to minimize operator radiation exposure. The CREFAS includes two independent, redundant subsystems, including actuation trains. Each train has a gaseous activity radiation monitor for the control room air intake activity. If either train radiation monitor indicates an unsafe condition, both CREFAS trains will be actuated (one-out-of-two logic). The two trains actuate separate equipment. Actuating either train will perform the intended function. A CREFAS is also initiated by a Containment Purge Isolation Actuation Signal (CPIAS) from either of the two CPIAS channels or by a Fuel Building Essential Ventilation Actuation Signal (FBEVAS) from either of the two FBEVAS channels. Control room filtration also occurs on a Safety Injection Actuation Signal (SIAS).

Trip Setpoints and Allowable Values

Trip setpoints used in the bistables are based on the analytical limits (Ref. 1). The selection of these trip setpoints is such that adequate protection is provided when all sensor and processing time delays are taken into account. The trip setpoints are digitally generated by the radiation monitors. These trip values are not subject to drifts common to analog type equipment. The allowable value for this trip is therefore the same as the trip setpoint.

(continued)

BASES (continued)

BACKGROUND

Trip Setpoints and Allowable Values (continued)

Setpoints in accordance with the Allowable Value will ensure that 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 CREFAS maintains the control room atmosphere within conditions suitable for prolonged occupancy throughout the duration of any one of the accidents discussed in Reference 1. The radiation exposure of control room personnel, through the duration of any one of the postulated accidents discussed in "Accident Analysis," FSAR, Chapter 15 (Ref. 1), does not exceed the limits set by 10 CFR 50, Appendix A, GDC 19 (Ref. 2).

The CREFAS satisfies the requirements of Criterion 3 of 10 CFR 50.36 (c)(2)(ii).

LCO

LCO 3.3.9 requires one channel of CREFAS to be OPERABLE. The required channel consists of Actuation Logic, Manual Trip, and a gaseous radiation monitor. The specific trip setpoint for the CREFAS is listed in the SR.

Each trip setpoint specified is more conservative than the analytical limit assumed in the transient and accident analysis in order to account for instrument uncertainties appropriate to the trip Function. A channel is inoperable if its actual trip setpoint is not set to the value specified in SR 3.3.9.2.

The Bases for the LCO on the CREFAS are discussed below for each Function:

(continued)

BASES

LCO (continued)

a. Manual Trip

The LCO on Manual Trip backs up the automatic trips and ensures operators have the capability to rapidly initiate the CREFAS Function if any parameter is trending toward its setpoint. One channel must be OPERABLE. This considers that the Manual Trip capability is a backup and that other means are available to actuate the redundant train if required, including manual SIAS, FBEVAS, or CPIAS.

b. Radiation Monitors

One channel of radiation monitor is required to be OPERABLE to ensure the control room filtration actuates on high gaseous activity.

c. Actuation Logic

One train of Actuation Logic must be OPERABLE, since there are alternate means available to actuate the redundant train, including SIAS.

APPLICABILITY

The CREFAS Functions must be OPERABLE in MODES 1, 2, 3, 4, 5, and 6 and during movement of irradiated fuel assemblies in either the fuel building or the containment building, to ensure a habitable environment for the control room operators.

The CREFAS must be OPERABLE in MODES 5 and 6 to provide protection for a Waste Gas Decay Tank rupture accident.

ACTIONS

A CREFAS channel is inoperable when it does not satisfy the OPERABILITY criteria for the channel's function. The most common cause of channel inoperability is outright failure.

(continued)

BASES

ACTIONS (continued)

A.1, B.1, B.2, C.1, C.2.1, C.2.2, and C.2.3

Conditions A, B, and C are applicable to manual and automatic actuation of the CREFAS. Condition A applies to the failure of two channels of the CREFAS Manual Trip, Actuation Logic, and radiation monitor channel in MODE 1, 2, 3, or 4. Entry into this Condition requires action to either restore the failed channel or manually perform the CREFS safety function (Required Action A.1). The Completion Time of 1 hour is sufficient to complete the Required Actions and accounts for the fact that CREFAS supplements control room filtration by other Functions (e.g., SIAS) in MODES 1, 2, 3, and 4. If Required Action A.1 and the associated completion time 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 (Required Action B.1) and to MODE 5 within 36 hours (Required Action B.2). The Completion Times of 6 hours and 36 hours for reaching MODES 3 and 5 from MODE 1 are reasonable, based on operating experience and normal cooldown rates, for reaching the required MODE from full power conditions in an orderly manner and without challenging plant safety systems or operators.

Condition C applies to the failure of two channels of CREFAS Manual Trip, Actuation Logic, and radiation monitor channel in MODE 5 or 6, or when moving irradiated fuel assemblies. The Required Actions are immediately taken to place one OPERABLE CREFS train in operation or to suspend CORE ALTERATIONS, positive reactivity additions, and movement of irradiated fuel assemblies. The Completion Time recognizes the fact that FBEVAS, or CPIAS are available to initiate control room filtration in the event of a fuel handling accident.

BASES

SURVEILLANCE REQUIREMENTS

SR 3.3.9.1

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 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 limit.

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 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 3.3.9.2

A CHANNEL FUNCTIONAL TEST is performed on the required control room radiation monitoring channel to ensure the entire channel will perform its intended function.

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 interval is a rare event.

(continued)

BASES

SURVEILLANCE REQUIREMENTS (continued)

SR 3.3.9.3

Proper operation of the individual actuation relays is verified by de-energizing these relays during the CHANNEL FUNCTIONAL TEST of the Actuation Logic every 18 months. This will actuate the Function, operating all associated equipment. Proper operation of the equipment actuated by each train is thus verified.

The Frequency of 18 months is based on plant operating experience with regard to channel OPERABILITY, which demonstrates that failure of more than one channel of a given Function in any 18 month interval is a rare event.

Note 1 indicates this Surveillance includes verification of operation for each actuation relay.

Note 2 indicates that relays that cannot be tested at power are excepted from the Surveillance Requirement while at power. These relays must, however, be tested during each entry into MODE 5 exceeding 24 hours unless they have been tested within the previous 6 months. At PVNGS all of the actuation relays can be tested at power.

SR 3.3.9.4

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 operational between successive surveillances. CHANNEL CALIBRATIONS must be performed consistent with the plant specific 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.

(continued)

BASES

SURVEILLANCE REQUIREMENTS (continued)

SR 3.3.9.5

Every 18 months, a CHANNEL FUNCTIONAL TEST is performed on the manual CREFAS actuation circuitry. This test verifies that the trip handswitches are capable of opening contacts in the Actuation Logic as designed, de-energizing the actuation relays and providing Manual Trip of the function. The 18 month Frequency is based on the operating experience that has shown these components usually pass the Surveillance when performed at a Frequency of once every 18 months.

SR 3.3.9.6

This Surveillance ensures that the train actuation response times are less than the maximum times assumed in the analyses. Response time testing criteria are included in Reference 3. ESF Response Time tests are conducted on a Staggered Test Basis of once per 18 months. The 18 month 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. Testing of the final actuating devices, which make up the bulk of the response time, is included in the Surveillance testing.

REFERENCES

1. UFSAR, Chapter 15.
2. 10 CFR 50, Appendix A, GDC 19.
3. UFSAR, Chapter 7.

B 3.3 INSTRUMENTATION

B 3.3.10 Post Accident Monitoring (PAM) Instrumentation

BASES

BACKGROUND

The primary purpose of the 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 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 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 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).

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

(continued)

BASES

BACKGROUND (continued)

- Provide information regarding the release of radioactive materials to allow for early indication of the need to initiate action necessary to protect the public as well as to obtain an estimate of the magnitude of any impending threat.

These key variables are identified by plant specific Regulatory Guide 1.97 analyses (Ref. 1). These analyses identified the plant specific Type A variables and provided justification for deviating from the NRC proposed list of Category I variables.

APPLICABLE SAFETY ANALYSES

The 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.

The 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
- Initiate action necessary to protect the public as well as to obtain an estimate of the magnitude of any impending threat.

(continued)

BASES

APPLICABLE SAFETY ANALYSES (continued)

PAM instrumentation that meets the definition of Type A in Regulatory Guide 1.97 satisfies Criterion 3 of 10 CFR 50.36 (c)(2)(ii).

Category I, non-Type A PAM instruments are retained in the Specification because they are intended to assist operators in minimizing the consequences of accidents. Therefore, these Category I, non-Type A variables are important in reducing public risk.

LCO

LCO 3.3.10 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 the specified instrument Functions listed in Table 3.3.10-1.

1. Logarithmic Neutron Flux

Logarithmic Neutron Flux indication is provided to verify reactor shutdown.

(continued)

BASES

LCO

1. Logarithmic Neutron Flux (continued)

At PVNGS, the Logarithmic Neutron Flux PAM channels consist of the following:

SEA-NE-001A
SEB-NE-001B

2, 3. Reactor Coolant System (RCS) Hot and Cold Leg Temperature

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. Cold Legs 1A and 1B make up one loop and Cold Legs 2A and 2B make up one loop. The channels provide indication over a range of 50°F to 750°F.

At PVNGS the Hot Leg Temperature indication consists of:

RCA-TT-112H1
RCB-TT-112H2
RCA-TT-122H1
RCB-TT-122H2

The Cold Leg Temperature indication consists of:

RCA-TT-112C1
RCB-TT-112C2
RCA-TT-122C1
RCB-TT-122C2

4. Reactor Coolant System Pressure (wide range)

RCS Pressure (wide range) is a Category I variable, provided for verification of core cooling and RCS integrity long term surveillance.

(continued)

BASES

LCO

4. Reactor Coolant System Pressure (wide range) (continued)

Wide range RCS loop pressure is measured by pressure transmitters with a span of 0 psig to 4000 psig. Redundant monitoring capability is provided by two trains of instrumentation. Control room indications are provided through the Qualified Safety Parameter Display System (QSPDS) plasma display. The QSPDS plasma display is the primary indication used by the operator during an accident. Therefore, the PAM instrumentation Specification deals specifically with this portion of the instrument channel.

RCS pressure is also 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.

At PVNGS the RCS Pressure (wide range) consists of:

RCA-PT-190A
RCB-PT-190B

5. Reactor Vessel Water Level

Reactor Vessel Water Level 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.

(continued)

BASES

LCO

5. Reactor Vessel Water Level (continued)

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. 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.

At PVNGS the Reactor Vessel Water Level is displayed on QSPDS A and QSPDS B.

6. Containment Sump Water Level (wide range)

Containment Sump Water Level is provided for verification and long term surveillance of RCS integrity.

At PVNGS, Containment Sump Water Level instrumentation consists of the following:

SIA-LT-706
SIB-LT-707

7. Containment Pressure (wide range)

Containment Pressure is provided for verification of RCS and containment OPERABILITY.

At PVNGS, Containment Pressure instrumentation consists of the following:

HCA-PT-353A
HCB-PT-353B

(continued)

BASES

LCO (continued)

8. Containment Isolation Valve Position

Containment Isolation Valve Position 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, i.e., two total channels of CIV position indication for a penetration flow path with two active valves. For containment penetrations with only one active CIV 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.

The PVNGS design uses three indications for each valve that receives an automatic close signal from the ESFAS. Each of these indications use a different contact on the position switch. One contact provides an open/close indication on the valve control handswitch in the main control room. This indication uses the same Class 1E power that is used by the valve control circuit. A second contact is used by the Safety Equipment Status System (SESS). This system receives inputs from each valve and the ESFAS system. After an ESFAS actuation any valve that does not reposition to the fully closed position is indicated and annunciated in the main control room. There are two channels of SESS, one channel receives power from the A Train Class 1E DC Bus and indicates the status of the A Train actuated equipment, and one channel receives power from the B Train Class 1E DC Bus and indicates the status of the B Train actuated equipment.

(continued)

BASES

LCO

8. Containment Isolation Valve Position (continued)

The third contact provides an indication of valve position to the Emergency Response Facility Data Acquisition and Display System (ERFDADS). This signal is Class 1E until it goes through a qualified isolator.

The ERFDADS computer and displays are non-Class 1E. For the purpose of this Specification either the SESS indication or the handswitch indication in the main control room may be used.

At PVNGS the Containment Isolation Valve position instrumentation consists of:

CPA-UV-2A	Containment Refueling Purge Supply
CPA-UV-2B	Containment Refueling Purge Exhaust
CPB-UV-3A	Containment Refueling Purge Supply
CPB-UV-3B	Containment Refueling Purge Exhaust
CPA-UV-4A	Containment Power Access Purge Supply
CPA-UV-4B	Containment Power Access Purge Exhaust
CPB-UV-5A	Containment Power Access Purge Supply
CPB-UV-5B	Containment Power Access Purge Exhaust
CHB-UV-505	RCP Controlled Bleedoff to VCT
CHA-UV-506	RCP Controlled Bleedoff to VCT
CHB-UV-516	Letdown to Regen HX
CHB-UV-523	Letdown from Regen HX
CHA-UV-560	Reactor Drain Tank Outlet
CHB-UV-561	Reactor Drain Tank Outlet
CHA-UV-580	Make-Up Supply to Reactor Drain Tank
CHA-UV-715	Sample Return to Reactor Drain Tank
CHB-UV-924	Letdown Line Sample PASS
GAA-UV-1	HP Nitrogen to Safety Injection Tanks
GAA-UV-2	LP Nitrogen to Containment
GRA-UV-1	Waste Gas Header
GRB-UV-2	Waste Gas Header

(continued)

BASES

LCO

8. Containment Isolation Valve Position (continued)

HCB-UV-44	Radiation Monitor RU-1 Supply
HCA-UV-45	Radiation Monitor RU-1 Supply
HCA-UV-46	Radiation Monitor RU-1 Return
HCB-UV-47	Radiation Monitor RU-1 Return
HPA-UV-1	Containment Hydrogen Control System
HPB-UV-2	Containment Hydrogen Control System
HPA-UV-3	Hydrogen Recombiner Supply
HPB-UV-4	Hydrogen Recombiner Supply
HPA-UV-5	Hydrogen Recombiner Return
HPB-UV-6	Hydrogen Recombiner Return
HPA-UV-23	Hydrogen Monitor Return
HPA-UV-24	Hydrogen Monitor Supply
IAA-UV-2	Instrument and Service Air
NCB-UV-401	Nuclear Cooling Water
NCA-UV-402	Nuclear Cooling Water
NCB-UV-403	Nuclear Cooling Water
RDA-UV-23	Containment Sumps
RDB-UV-24	Containment Sumps
RDB-UV-407	Containment Radwaste Sumps
SGB-HV-200	Steam Generator #1 Chemical Injection
SGB-HV-201	Steam Generator #2 Chemical Injection
SIA-UV-708	Containment Recirc Sump PASS
SSB-UV-200	Hot Leg Sample PASS
SSB-UV-201	Surge Line PASS
SSB-UV-202	Pressurizer Steam Space PASS
SSA-UV-203	Hot Leg Sample PASS
SSA-UV-204	Surge Line PASS
SSA-UV-205	Pressurizer Steam Space PASS
WCB-UV-61	Normal Chilled Water Return Header
WCA-UV-62	Normal Chilled Water Return Header
WCB-UV-63	Normal Chilled Water Supply Header

(continued)

BASES

LCO (continued)

9. Containment Area Radiation (high range)

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.

At PVNGS, Containment Area Radiation instrumentation consists of the following:

SQA-RU-148
SQB-RU-149

10. Containment Hydrogen Monitors

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.

At PVNGS, Containment Hydrogen instrumentation consists of the following:

HPA-AI-9
HPB-AI-10

11. Pressurizer Level

Pressurizer Level is 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 RCS and to verify that the plant is maintained in a safe shutdown condition.

At PVNGS, Pressurizer Level instrumentation consists of the following:

RCA-LT-110X
RCB-LT-110Y

(continued)

BASES

LCO (continued)

12. Steam Generator Water Level

Steam Generator Water Level is provided to monitor operation of decay heat removal via the steam generators. The Category I indication of steam generator level is the wide range level instrumentation. The wide range level covers a span of 143 inches above the lower tubesheet to 55.5 inches above the steam separator deck.

Wide Range Steam Generator Level is a Type A variable because the operator must manually control steam generator level during a Steam Generator Tube Rupture (STGR) event to ensure steam generator tube coverage. At PVNGS wide range Steam Generator Level Instrumentation consists of:

SGA-LT-1113A
SGB-LT-1113B
SGC-LT-1113C
SGD-LT-1113D

SGA-LT-1123A
SGB-LT-1123B
SGC-LT-1123C
SGD-LT-1123D

13. Condensate Storage Tank (CST) Level

CST Level is provided to ensure water supply for 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.

At PVNGS CST Level Instrumentation consists of:

CTA-LT-35
CTB-LT-36

(continued)

BASES

LCO
(continued)

14, 15, 16, 17. Core Exit Temperature

Core Exit Temperature is provided for verification and long term surveillance of core cooling.

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 61 incore instrument detector assemblies.

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.

The core exit thermocouples have a usable temperature range from 32°F to 2300°F, although accuracy is reduced at temperatures above 1800°F.

(continued)

BASES

LCO (continued)

18. Steam Generator Pressure

Steam Generator pressure indication is provided for Steam Generator pressure verification. At PVNGS Steam Generator Pressure Instrumentation consists of:

SGA-PT-1013A
SGB-PT-1013B
SGC-PT-1013C
SGD-PT-1013D

SGA-PT-1023A
SGB-PT-1023B
SGC-PT-1023C
SGD-PT-1023D

19. Reactor Coolant System-Subcooling Margin Monitoring

The RCS Subcooling Margin Monitor is a portion of the Inadequate Core Cooling (ICC) Instrumentation required by Item II.F.2 in NUREG-0737, the post-TMI Action Plan. The ICC instrumentation enhances the ability of the Operator to anticipate the approach to, and recovery from, ICC. At PVNGS RCS subcooling Margin Monitoring Instrumentation consists of:

QSPDS A
QSPDS B

20. Reactor Coolant System Activity

The RCS Activity provides an indication of fuel cladding failure. This indicates degradation of the first of three barriers to fission product release to the environment. The three barriers to fission product release are (1) fuel cladding, (2) primary coolant pressure boundary, and (3) containment. At PVNGS the RCS Activity Instrumentation consists of:

SQA-RU-150
SQB-RU-151

(continued)

BASES

LCO (continued)

Two channels are required to be OPERABLE for all but one Function. Two OPERABLE channels ensure that no single failure within the PAM instrumentation or its auxiliary supporting features or power sources, concurrent with 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 3.3.10-1 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. Plant specific evaluations in response to Item II.F.2 of NUREG-0737 (Ref. 3) have determined that any two thermocouple pairings per quadrant, 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.

(continued)

BASES

LCO (continued)

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 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 the likelihood of an event occurring that would require PAM instrumentation is low; therefore, 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 3.3.10-1. 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)

BASES

ACTIONS (continued)

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 30 days. The 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 PAM instrumentation during this interval.

B.1

This Required Action specifies initiation of actions in accordance with Specification 5.6.6, 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.

C.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 7 days. The Completion Time of 7 days is based on the relatively low probability of an event requiring PAM 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 PAM instrumentation.

(continued)

BASES

ACTIONS

C.1 (continued)

Therefore, requiring restoration of one inoperable channel of the Function limits the risk that the PAM Function will be in a degraded condition should an accident occur.

D.1

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 3.3.10-1. 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 3.3.10-1 directs entry into Condition 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 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.

(continued)

BASES

ACTIONS (continued)

G.1

Alternate means of monitoring Reactor Vessel Water Level, RCS Activity, 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 shut down the plant, but rather to follow the directions of Specification 5.6.6. The report provided to the NRC should discuss whether 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.

SURVEILLANCE REQUIREMENTS

A Note at the beginning of the SR table specifies that the following SRs apply to each PAM instrumentation Function found in Table 3.3.10-1.

SR 3.3.10.1

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. 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.

(continued)

BASES

SURVEILLANCE REQUIREMENTS

SR 3.3.10.1 (continued)

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. 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.

SR 3.3.10.2

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 excludes the neutron detectors from the CHANNEL CALIBRATION.

For the Containment Area Radiation instrumentation, a CHANNEL CALIBRATION as described in UFSAR Sections 18.II.F.1.3 and 11.5.2.1.6.2 will be performed.

The calibration of the Containment Isolation Valve (CIV) position indication channels will consist of verification that the position indication changes from not-closed to closed when the valve is actuated to its isolation position by SR 3.6.3.7. The position switch is the sensor for the CIV position indication channels.

The calibration of the containment hydrogen monitor will use sample gases containing a nominal one volume percent hydrogen, balance nitrogen, and four volume percent hydrogen, balance nitrogen.

The Frequency is based upon operating experience and consistency with the typical industry refueling cycle and is justified by the assumption of an 18 month calibration interval for the determination of the magnitude of equipment drift.

BASES

REFERENCES

1. UFSAR Section 1.8, Table 1.8-1.
2. Regulatory Guide 1.97, Revision 2.
3. NUREG-0737, Supplement 1.

B 3.3 INSTRUMENTATION

B 3.3.11 Remote Shutdown System

BASES

BACKGROUND

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 Reactor Coolant System (RCS) from outside the control room allow extended operation 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 bring the plant to, and maintain it in, MODE 3 should the control room become inaccessible.

APPLICABLE SAFETY ANALYSES

The Remote Shutdown System is required to provide equipment at appropriate locations outside the control room with a capability to promptly shut down the plant and maintain it 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

(continued)

BASES

APPLICABLE SAFETY ANALYSES (continued)

10 CFR 50, Appendix A, GDC 19 (Ref. 1) and Appendix R (Ref. 2).

The Remote Shutdown System has been identified as an important contributor to the reduction of plant accident risk and, therefore, has been retained in the Technical Specifications, as indicated in 10 CFR 50.36 (c)(2)(ii).

LCO

The Remote Shutdown System LCO provides the requirements for the OPERABILITY of the instrumentation and controls necessary to place and maintain the plant in MODE 3 from a location other than the control room. The instrumentation required is listed in Table 3.3.11-1 in the accompanying LCO. The disconnect switches and control circuits are listed in PVNGS controlled documents.

The controls, instrumentation, and transfer switches are those required for:

- Reactivity Control (initial and long term);
- RCS Pressure Control;
- Decay Heat Removal;
- RCS Inventory Control; and
- Safety support systems for the above Functions, as well as the essential spray pond system, essential cooling water system, 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.

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.

(continued)

BASES

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 RCS 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 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.

A Remote Shutdown System division is inoperable when each Function listed in Table 3.3.11-1 is not accomplished by the required number of channels in Table 3.3.11-1 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 3.3.11-1. The Completion Time(s) of the inoperable channel(s)/train(s) of a Function will be racked separately for each Function starting from the time the Condition was entered for that Function.

A.1

Condition A addresses the situation where one or more instrumentation channels of the Remote Shutdown System are inoperable. This includes any Function listed in Table 3.3.11-1.

(continued)

BASES

ACTIONS

A.1 (continued)

The Required Action is to restore the channels 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.

B.1 and B.2

Condition B addresses the situation where one or more disconnect or control circuits of the Remote Shutdown System are inoperable. The required disconnect and control circuits are listed in PVNGS controlled documents.

The required Action is to restore the required switch(s)/circuit(s) to OPERABLE status or issue procedure changes that identify alternate disconnect methods or control circuits. The Completion Time for either of the two Actions is 30 days.

C.1 and C.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 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.

(continued)

BASES

SURVEILLANCE REQUIREMENTS

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. 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. As specified in the Surveillance, a CHANNEL CHECK is only required for those channels that are normally energized.

If the channels are normally off scale during times when surveillance is required, the CHANNEL CHECK will only verify that they are offscale in the same direction. 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 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.

(continued)

BASES

SURVEILLANCE REQUIREMENTS (continued)

SR 3.3.11.2

SR 3.3.11.2 verifies that each required Remote Shutdown System transfer switch and control circuit performs its intended function. This verification is performed from the remote 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, the plant can be brought to and maintained in MODE 3 from the remote 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 3.3.11.3

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 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.

REFERENCES

1. 10 CFR 50, Appendix A, GDC 19.
2. 10 CFR 50, Appendix R.

B 3.3 INSTRUMENTATION

B 3.3.12 Boron Dilution Alarm System (BDAS)

BASES

BACKGROUND	The Boron Dilution Alarm System (BDAS) alerts the operator of a boron dilution event in MODES 3, 4 and 5. The boron dilution alarm is received at least 15 minutes prior to criticality to allow the operator to terminate the boron dilution. In MODES 1 and 2 protection for a boron dilution event is addressed by LCO 3.3.1, "Reactor Protective System (RPS) Instrumentation-Operating." In MODES 3 and 4 with the CEAs withdrawn, LCO 3.3.2, " Reactor Protective System (RPS) Instrumentation-Shutdown," provides protection. In MODE 6 protection for a boron dilution event is addressed by LCO 3.9.2, "Refueling Operations - Nuclear Instrumentation." The BDAS utilizes two channels that monitor the startup channel neutron flux indications. If the neutron flux signals increase to the calculated alarm setpoint a control room annunciation is received. The setpoint is automatically lowered to a fixed amount above the current flux level signal. The alarm setpoint will only follow decreasing or constant flux levels, not increasing levels. Two channels of BDAS must be OPERABLE to provide single failure protection and to facilitate detection of channel failure by providing CHANNEL CHECK capability.
APPLICABLE SAFETY ANALYSES	The BDAS channels are necessary to monitor core reactivity changes. They are the primary means for detecting and triggering operator actions to respond to boron dilution events initiated from conditions in which the RPS is not required to be OPERABLE. The OPERABILITY of BDAS channels is necessary to meet the assumptions of the safety analyses to mitigate the consequences of an inadvertent boron dilution event as described in the UFSAR, Chapter 15 (Ref. 1). The BDAS channels satisfy Criterion 3 of 10 CFR 50.36 (c)(2)(ii).

(continued)

BASES (continued)

LCO

The LCO on the BDAS channels ensures that adequate information is available to mitigate the consequences of a boron dilution event.

A minimum of two BDAS channels are required to be OPERABLE. Because the BDAS utilizes the excore startup channel instrumentation as its detection system the OPERABILITY of the excore startup channel is also part of the OPERABILITY of the BDAS.

APPLICABILITY

The BDAS must be OPERABLE in MODES 3, 4, and 5 because the safety analysis assumes this alarm will be available in these MODES to alert the operator to take action to terminate the boron dilution. In MODES 1 and 2, and in MODES 3, 4, 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" and LCO 3.3.2, "Reactor Protective System (RPS) Instrumentation-Shutdown".

The requirements for source range neutron flux monitoring in MODE 6 are addressed in LCO 3.9.2, "Nuclear Instrumentation." The excore startup channels provide neutron flux coverage extending an additional one to two decades below the logarithmic channels for use during shutdown and refueling, when neutron flux may be extremely low.

The Applicability is modified by a Note that the BDAS is required in MODE 3 within 1 hour after the neutron flux is within the startup range following a reactor shutdown. This allows the neutron flux level to decay to a level within the range of the excore startup channels and for the operator to initialize the BDAS.

(continued)

BASES (continued)

ACTIONS

A channel is inoperable when it does not satisfy the OPERABILITY criteria for the channel's function. These criteria are outlined in the LCO section of the Bases.

A.1, and A.2

With one required channel inoperable, Required Action A.1 requires the RCS boron concentration to be determined immediately and at the applicable monitoring Frequency specified in the COLR. The RCS boron concentration may be determined by the boronometer reading or by RCS sampling. The RCS sample should be from the hot leg if one or more Reactor Coolant Pumps (RCPs) are running or from the discharge of the operating pump providing shutdown cooling flow with no RCPs running. The monitoring Frequency specified in the COLR ensures that a decrease in the boron concentration during a boron dilution event will be detected. The boron concentration measurement and the OPERABLE BDAS channel provide alternate methods of detection of boron dilution with sufficient time for termination of the event before complete loss of SHUTDOWN MARGIN and return to criticality.

As an alternate to using RCS boron concentration and the OPERABLE BDAS channel to alert the operator to a boron dilution event Required Action A.2 requires that all positive reactivity additons that are under operator control, such as boron dilution, or Reactor Coolant System temperature changes, be halted immediately, preserving SDM.

(continued)

BASES (continued)

ACTIONS (continued)

B.1, and B.2

With two required channels inoperable Required Action B.1 requires the RCS boron concentration to be determined by redundant methods immediately and at the monitoring Frequency specified in the COLR. The redundant methods may use the boronometer and RCS sampling or independent collection and analysis of two RCS samples. The RCS sample should be from the hot leg if one or more Reactor Coolant Pumps (RCPs) are running or from the discharge of the operating pump providing shutdown cooling flow with no RCPs running. The simultaneous use of the boronometer and RCS sampling or independent collection and analysis of two RCS samples to monitor the RCS boron concentration provides alternate indications of inadvertent boron dilution. This will allow detection with sufficient time for termination of boron dilution before complete loss of SHUTDOWN MARGIN and return to criticality.

As an alternative to using RCS boron concentration to alert the operator to a boron dilution event, Required Action B.2 requires that all positive reactivity additions that are under operator control, such as boron dilution, or RCS temperature changes, be halted immediately, preserving SDM.

(continued)

BASES (continued)

SURVEILLANCE REQUIREMENTS

SR 3.3.12.1

SR 3.3.12.1 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.

Agreement criteria are determined by the plant staff and should be based on a combination of the channel instrument uncertainties. If a channel is outside of the criteria, it may be an indication that the transmitter or the signal processing equipment has drifted outside of its limits. If the channels are within the criteria, it is an indication that the channels are OPERABLE.

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.

This SR is modified by a Note that states the CHANNEL CHECK is not required to be performed until 1 hour after neutron flux is within the startup range.

(continued)

BASES (continued)

SURVEILLANCE REQUIREMENTS (continued)

SR 3.3.12.2

A CHANNEL FUNCTIONAL TEST is performed every 92 days to ensure that the BDAS is capable of properly alerting the operator to a boron dilution event. Internal excore startup channel test circuitry is used to feed preadjusted test signals into the excore startup channel to verify the proper neutron flux indication is received at the BDAS.

The Frequency is based on operating experience with regard to channel OPERABILITY and drift, which demonstrates that failure of more than one channel in any 92 day Frequency is a rare event. This SR is modified by a Note that states the CHANNEL FUNCTIONAL TEST is not required to be performed until 72 hours after neutron flux is within the startup range. The 72 hours is based on the time required to perform the testing.

The CHANNEL FUNCTIONAL TEST of the BDAS consists of online tests including verification of the control room alarm.

SR 3.3.12.3

SR 3.3.12.3 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 excore startup channel from the input through to the BDAS. 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.

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 a change in channel output.

REFERENCES

1. UFSAR, Chapter 7 and Chapter 15.

CE STS
NUREG-1432 REV. 1
SPECIFICATION 3.3.1
MARK UP

<DOC>
<CTS>

3.3 INSTRUMENTATION

<3.3.1>

3.3.1 Reactor Protective System (RPS) Instrumentation—Operating ~~(Digital)~~ 15

LCO 3.3.1 Four RPS trip and bypass removal channels for each Function in Table 3.3.1-1 shall be OPERABLE.

APPLICABILITY: According to Table 3.3.1-1.

ACTIONS

<DOC A.5>

------------------------------------NOTE~~S~~------------------------------------ 15

~~1.~~ Separate Condition entry is allowed for each RPS Function.

~~2. If a channel is placed in bypass, continued operation with the channel in the bypassed condition for the Completion Time specified by Required Action A.2 or C.2.2 shall be reviewed in accordance with Specification 5.5.1.2.e.~~ 1

<Table 3.3-1 ACT 2>

<Table 3.3-1 ACT 3>

CONDITION	REQUIRED ACTION	COMPLETION TIME
A. One or more Functions with one automatic RPS trip channel inoperable.	A.1 Place channel in bypass or trip.	1 hour
	AND	
	A.2 Restore channel to OPERABLE status.	Prior to entering MODE 2 following next MODE 5 entry
B. One or more Functions with two automatic RPS trip channels inoperable.	B.1 ---------NOTE--------- LCO 3.0.4 is not applicable. ----------------------	
	Place one channel in bypass and the other in trip.	1 hour

(continued)

<DOC>

<CTS>

ACTIONS (continued)

CONDITION	REQUIRED ACTION		COMPLETION TIME
C. One or more Functions with one automatic bypass removal channel inoperable.	C.1	Disable bypass channel.	1 hour
	OR		
	C.2.1	Place affected automatic trip channel in bypass or trip.	1 hour
	AND		
	C.2.2	Restore bypass removal channel and associated automatic trip channel to OPERABLE status.	Prior to entering MODE 2 following next MODE 5 entry
D. One or more Functions with two automatic bypass removal channels inoperable.	-----NOTE----- LCO 3.0.4 is not applicable.		
	D.1	Disable bypass channels.	1 hour
	OR		
	D.2	Place one affected automatic trip channel in bypass and place the other in trip.	1 hour
E. One or more core protection calculator (CPC) channels with a cabinet high temperature alarm.	E.1	Perform CHANNEL FUNCTIONAL TEST on affected CPC.	12 hours

<Table 3.3-1 ACT 2>

<DOC L.8>

<Table 3.3-1 ACT 3>

<DOC L.8>

<4.3.1.6>

(continued)

<DOC>
<CTS>

<Table 3.3-1 ACT 7>
<4.3.1.5>
<DOC A.11>

ACTIONS (continued)

CONDITION	REQUIRED ACTION	COMPLETION TIME
F. One or more CPC channels with three or more autorestarts during a 12 hour period.	F.1 Perform CHANNEL FUNCTIONAL TEST on affected CPC.	24 hours
G. Required Action and associated Completion Time not met.	G.1 Be in MODE 3.	6 hours

SURVEILLANCE REQUIREMENTS

-----NOTE-----
Refer to Table 3.3.1-1 to determine which SR shall be performed for each RPS Function.

<Table 4.3-1 Item 1A,1B,1C2>
<4.3.1.1>

SURVEILLANCE	FREQUENCY
SR 3.3.1.1 Perform a CHANNEL CHECK of each RPS instrument channel, ~~except Loss of Load.~~	12 hours

2

(continued)

<DOC>
<CTS>

SURVEILLANCE REQUIREMENTS (continued)

	SURVEILLANCE		FREQUENCY
<4.3.1.1> <Table 4.3-1 Note (7)>	SR 3.3.1.2	-------------------NOTE------------------- Not required to be performed until 12 hours after THERMAL POWER ≥ 70% RTP. -- Verify total Reactor Coolant System (RCS) flow rate as indicated by each CPC is less than or equal to the RCS total flow rate. If necessary, adjust the CPC addressable constant flow coefficients such that each CPC indicated flow is less than or equal to the RCS flow rate.	12 hours --
<4.3.1.5>	SR 3.3.1.3	Check the CPC autorestart count.	12 hours
<4.3.1.1> <Table 4.3-1 Note (2)>	SR 3.3.1.4	-------------------NOTES------------------- 1. Not required to be performed until 12 hours after THERMAL POWER ≥ 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 linear power level signals and the CPC addressable constant multipliers to make the CPC ΔT power and CPC nuclear power calculations agree with the calorimetric, if the absolute difference is ≥ ~~1~~2~~%~~.,	24 hours

(continued) 12

when THERMAL POWER is ≥ 80% RTP.
Between 20% and 80% RTP the maximum difference is -0.5% to 10%

9

either using the reactor coolant pump differential pressure instrumentation and the ultrasonic flow meter adjusted pump curves or

<DOC>
<CTS>

SURVEILLANCE REQUIREMENTS (continued)

	SURVEILLANCE		FREQUENCY
<4.3.1.1> <Table 4.3-1 Note (8)>	SR 3.3.1.5	---NOTE--- Not required to be performed until 12 hours after THERMAL POWER ≥ 70% RTP. --- Verify total RCS flow rate indicated by each CPC is less than or equal to the RCS flow determined by calorimetric calculations.	31 days
<4.3.1.1> <Table 4.3-1 Note (3)>	SR 3.3.1.6	---NOTE--- Not required to be performed until 12 hours after THERMAL POWER ≥ 15% RTP. --- Verify linear power subchannel gains of the excore detectors are consistent with the values used to establish the shape annealing matrix elements in the CPCs.	31 days
<4.3.1.1> <Table 4.3-1 Item 1 Note 9>	SR 3.3.1.7	---NOTES--- 1. The CPC CHANNEL FUNCTIONAL TEST shall include verification that the correct values of addressable constants are installed in each OPERABLE CPC. 2. Not required to be performed for logarithmic power level channels until 2 hours after reducing THERMAL POWER below 1E-4% RTP and only if reactor trip circuit breakers (RTCBs) are closed. --- Perform CHANNEL FUNCTIONAL TEST on each channel ~~except Loss of Load and power range neutron flux.~~	92 days 2 6

(continued)

<DOC>
<CTS>

SURVEILLANCE REQUIREMENTS (continued)

	SURVEILLANCE	FREQUENCY
<4.3.1.1> <Table 4.3-1 Note 3> SR 3.3.1.8	-------------------NOTE------------------- Neutron detectors are excluded from the CHANNEL CALIBRATION. -- Perform CHANNEL CALIBRATION of the power range neutron flux channels.	92 days
~~[SR 3.3.1.9~~	~~-------------------NOTE------------------- Not required to be performed until 2 hours after THERMAL POWER ≥ 55% RTP. -- Perform CHANNEL FUNCTIONAL TEST for Loss of Load Function.]~~	~~92 days~~ 2
<4.3.1.1> <Table 4.3-1 Item 1 Note 3> SR 3.3.1.~~10~~ 9 15	-------------------NOTE------------------- Neutron detectors are excluded from CHANNEL CALIBRATION. -- Perform CHANNEL CALIBRATION on each channel, including bypass removal functions.	~~[~~18~~]~~ months
<4.3.1.1> <Table 4.3-1 Note (6)> SR 3.3.1.~~11~~ 10 15	Perform a CHANNEL FUNCTIONAL TEST on each CPC channel.	~~[~~18~~]~~ months
<4.3.1.1> <Table 4.3-1 Note (5)> SR 3.3.1.~~12~~ 11 15	Using the incore detectors, ~~determine~~ verify the shape annealing matrix elements to be used by the CPCs.	Once after each refueling prior to exceeding 70% RTP 3

(continued)

<DOC>
<CTS>

SURVEILLANCE REQUIREMENTS (continued)

SURVEILLANCE		FREQUENCY
<4.3.1.2> SR 3.3.1.~~13~~ 12 15	Perform a CHANNEL FUNCTIONAL TEST on each automatic bypass removal function.	Once within 92 days prior to each reactor startup
<4.3.1.3> SR 3.3.1.~~14~~ 13 15	-------------------NOTE------------------- Neutron detectors are excluded. -- Verify RPS RESPONSE TIME is within limits.	~~[~~18~~]~~ months on a STAGGERED TEST BASIS

<DOC>
<CTS>
<Table 3.3-1>
<Table 4.3-1>

Table 3.3.1-1 (page 1 of 3)
Reactor Protective System Instrumentation

16

FUNCTION	APPLICABLE MODES OR OTHER SPECIFIED CONDITIONS	SURVEILLANCE REQUIREMENTS	ALLOWABLE VALUE
4 1. ~~Linear Power Level~~ Variable over Power – High	1,2	15 SR 3.3.1.1 SR 3.3.1.4 SR 3.3.1.6 SR 3.3.1.7 SR 3.3.1.8 SR 3.3.1.~~10~~ 9 SR 3.3.1.~~14~~ 13	~~≤ [111.3]% RTP~~ Ceiling ≤ 111.0% RTP band ≤ 9.9% RTP Increasing rate ≤ 11.0%/min RTP decreasing rate > 5%/min RTP
2. Logarithmic Power Level – High[a]	2~~(b)~~ 13	SR 3.3.1.1 SR 3.3.1.7 SR 3.3.1.~~10~~ 9 SR 3.3.1.~~13~~ 12 SR 3.3.1.~~14~~ 13	≤ ~~[.96]~~ 0.011% RTP
3. Pressurizer Pressure – High	1,2	SR 3.3.1.1 SR 3.3.1.7 SR 3.3.1.~~10~~ 9 SR 3.3.1.~~14~~ 13	≤ ~~[2380]~~ 2388 psia
4. Pressurizer Pressure – Low~~(c)~~	1,2	SR 3.3.1.1 SR 3.3.1.7 SR 3.3.1.~~10~~ 9 SR 3.3.1.~~13~~ 12 SR 3.3.1.~~14~~ 13	≥ ~~[1763] psig~~ 1821 psia
5. Containment Pressure – High	1,2	SR 3.3.1.1 SR 3.3.1.7 SR 3.3.1.~~10~~ 9 SR 3.3.1.~~14~~ 13	≤ ~~[3.14]~~ 3.2 psig
6. Steam Generator #1 Pressure – Low	1,2	SR 3.3.1.1 SR 3.3.1.7 SR 3.3.1.~~10~~ 9 SR 3.3.1.~~14~~ 13	≥ ~~[711]~~ 890 psia
7. Steam Generator #2 Pressure – Low	1,2	SR 3.3.1.1 SR 3.3.1.7 SR 3.3.1.~~10~~ 9 SR 3.3.1.~~14~~ 13	≥ ~~[711]~~ 890 psia

(continued)

<Table 3.3-1 Footnote a>

(a) Trip may be bypassed when THERMAL POWER is > ~~[~~1E-4~~]~~% RTP. Bypass shall be automatically removed when THERMAL POWER is ≤ ~~[~~1E-4~~]~~% RTP. ~~Trip may be manually bypassed during physics testing pursuant to LCO 3.4.17, "RCS Loops – Test Exceptions."~~ 8

13 ~~(b) When any RTCB is closed.~~

14 ~~(c) The setpoint may be decreased to a minimum value of [300] psia, as pressurizer pressure is reduced, provided the margin between pressurizer pressure and the setpoint is maintained ≤ [400] psi. Trips may be bypassed when pressurizer pressure is < [400] psia. Bypass shall be automatically removed when pressurizer pressure is ≥ [500] psia. The setpoint shall be automatically increased to the normal setpoint as pressurizer pressure is increased.~~

<DOC>
<CTS>

Table 3.3.1-1 (page 2 of 3)
Reactor Protective System Instrumentation

FUNCTION	APPLICABLE MODES OR OTHER SPECIFIED CONDITIONS	SURVEILLANCE REQUIREMENTS 15	ALLOWABLE VALUE 16
8. Steam Generator #1 Level - Low	1,2	SR 3.3.1.1 SR 3.3.1.7 SR 3.3.1.~~10~~ 9 SR 3.3.1.~~14~~ 13	≥ ~~[24.23]~~% 43.7
9. Steam Generator #2 Level - Low	1,2	SR 3.3.1.1 SR 3.3.1.7 SR 3.3.1.~~10~~ 9 SR 3.3.1.~~14~~ 13	≥ ~~[24.23]~~% 43.7
10. Steam Generator #1 Level - High	1,2	SR 3.3.1.1 SR 3.3.1.7 SR 3.3.1.~~10~~ 9 SR 3.3.1.~~14~~ 13	≤ ~~[90.74]~~% 91.5
11. Steam Generator #2 Level - High	1,2	SR 3.3.1.1 SR 3.3.1.7 SR 3.3.1.~~10~~ 9 SR 3.3.1.~~14~~ 13	≤ ~~[90.74]~~% 91.5
5 [12. Reactor Coolant Flow, 10 Steam Generator #1 - Low~~(d)~~	1,2	SR 3.3.1.1 SR 3.3.1.7 SR 3.3.1.~~10~~ 9 ~~[SR 3.3.1.13]~~ SR 3.3.1.~~14~~ 13	Ramp: ≤ ~~[0.231]~~ 0.118 psid/sec Floor: ≥ ~~[12.1]~~ 11.7 psid Step: ≤ ~~[7.231]~~ 10.2 psid 11
2 ~~[13. Loss of Load (turbine stop valve control oil pressure)(e)~~	~~1~~	~~SR 3.3.1.9 SR 3.3.1.10 [SR 3.3.1.13]~~	~~≥ [100] psig~~

(continued)

5 ~~(d) Trip may be bypassed when THERMAL POWER is < [1E-4]% RTP. Bypass shall be automatically removed when THERMAL POWER is ≥ [1E-4]% RTP. During testing pursuant to LCO 3.4.17, trip may be bypassed below 5% RTP. Bypass shall be automatically removed when THERMAL POWER is > 5% RTP.~~

2 ~~(e) Trip may be bypassed when THERMAL POWER is < [55]% RTP. Bypass shall be automatically removed when THERMAL POWER is ≥ [55]% RTP.~~

10 13. Reactor Coolant Flow, Steam Generator #2 - Low	1, 2	SR 3.3.1.1 SR 3.3.1.7 SR 3.3.1.9 SR 3.3.1.13	Ramp ≤ 0.118 psid/sec Floor ≥ 11.7 psid Step ≤ 10.2 psid

<DOC>
<CTS>

Table 3.3.1-1 (page 3 of 3)
Reactor Protective System Instrumentation

FUNCTION	APPLICABLE MODES OR OTHER SPECIFIED CONDITIONS	SURVEILLANCE REQUIREMENTS	ALLOWABLE VALUE
14. Local Power Density—High(b) ~~(d)~~	1,2	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 7 ~~SR 3.3.1.6~~ 15 SR 3.3.1.7 SR 3.3.1.~~10~~9 SR 3.3.1.~~11~~10 SR 3.3.1.~~12~~11 SR 3.3.1.~~13~~12 SR 3.3.1.~~14~~13	≤ ~~[~~21.0~~]~~ kW/ft 16
15. Departure From Nucleate Boiling Ratio (DNBR)—Low ~~(d)~~ (b)	1,2	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 7 ~~SR 3.3.1.6~~ SR 3.3.1.7 SR 3.3.1.~~10~~9 SR 3.3.1.~~11~~10 SR 3.3.1.~~12~~11 SR 3.3.1.~~13~~12 SR 3.3.1.~~14~~13	≥ ~~[1.31]~~ 1.30

(b) ~~(d)~~ Trip may be bypassed when THERMAL POWER is < ~~[~~1E-4~~]~~% RTP. Bypass shall be automatically removed when THERMAL POWER is ≥ ~~[~~1E-4~~]~~% RTP. ~~During testing pursuant to LCO 3.4.17, trip may be bypassed below 5% RTP. Bypass shall be automatically removed when THERMAL POWER is ≥ 5% RTP.~~ 8

CE STS
NUREG-1432 REV. 1
SPECIFICATION 3.3.1
BASES MARK UP

B 3.3 INSTRUMENTATION

B 3.3.1 Reactor Protective System (RPS) Instrumentation—Operating ~~(Digital)~~ 15

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 (RCPB) 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 (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 (DNB);
- Fuel centerline melting shall not occur; and
- The Reactor Coolant System (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

(continued)

BASES

BACKGROUND (continued)

occurrence. Meeting the acceptable dose limit for an accident category is considered having acceptable consequences for that event.

The RPS is segmented into four interconnected modules. These modules are:

- Measurement channels;
- Bistable trip units;
- 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 and RTCBs are addressed in LCO 3.3.4, "Reactor Protective System (RPS) Logic and Trip Initiation." The CEACs are addressed in LCO 3.3.3, "Control Element Assembly Calculators (CEACs)."

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, the core protection calculators (CPCs), and the CEACs, though complex, are considered components in the measurement channels of the 16 Variable Over Power ~~Linear Power Level~~—High, Logarithmic Power Level—High, DNBR—Low, and Local Power Density (LPD)—High trips.

Four identical measurement channels, designated channels A through D, with electrical and physical separation, are provided for each parameter used in the generation of trip signals, with the exception of the control element assembly (CEA) position indication used in the CPCs. Each measurement channel provides input to one or more RPS bistables within the same RPS channel. In addition, some measurement channels may also be used as inputs to Engineered Safety Features Actuation System (ESFAS)

(continued)

BASES

BACKGROUND

Measurement Channels (continued)

bistables, and most provide indication in the control room. Measurement channels used as an input to the RPS are not used for control functions.

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 bistables monitoring the same parameter in two or more channels will de-energize Matrix Logic, which in turn de-energizes the Initiation Logic. This causes all ~~eight~~ four RTCBs to open, interrupting power to the CEAs, allowing them to fall into the core. 16

Three of the four measurement and bistable channels are necessary to meet the redundancy and testability of 10 CFR 50, Appendix A, GDC 21 (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.

16 ~~[Reviewer's Note: 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 so as to credit four channel independence and that desire this capability must have approval of the NRC staff documented by an NRC Safety Evaluation Report (SER) (Ref. 3).]~~

Adequate channel to channel independence includes physical and electrical independence of each channel from the others. This allows operation in two-out-of-three logic with one channel removed from service until following the next MODE 5 entry. Since no single failure will either cause or prevent a protective system actuation, and no protective channel feeds a control, this arrangement meets the requirements of IEEE Standard 279-1971 (Ref. 4).

The CPCs perform the calculations required to derive the DNBR and LPD parameters and their associated RPS trips. Four separate CPCs perform the calculations independently,

(continued)

BASES

BACKGROUND

Measurement Channels (continued)

one for each of the four RPS channels. The CPCs provide outputs to drive display indications (DNBR margin, LPD margin, and calibrated neutron flux power levels) and provide DNBR—Low and LPD—High pretrip and trip signals. The CPC channel outputs for the DNBR—Low and LPD—High trips operate contacts in the Matrix Logic in a manner identical to the other RPS trips.

Each CPC receives the following inputs:

- Hot leg and cold leg temperatures;
- Pressurizer pressure;
- Reactor coolant pump speed;
- Excore neutron flux levels;
- Target CEA positions; and
- CEAC penalty factors.

Each CPC is programmed with "addressable constants." These are various alignment values, correction factors, etc., that are required for the CPC computations. They can be accessed for display or for the purpose of changing them as necessary.

The CPCs use this constant and variable information to perform a number of calculations. These include the calculation of CEA group and subgroup deviations (and the assignment of conservative penalty factors), correction and calculation of average axial power distribution (APD) (based on excore flux levels and CEA positions), calculation of coolant flow (based on pump speed), and calculation of calibrated average power level (based on excore flux levels and ΔT power).

The DNBR calculation considers primary pressure, inlet temperature, coolant flow, average power, APD, radial peaking factors, and CEA deviation penalty factors from the CEACs to calculate the state of the limiting (hot) coolant channel in the core. A DNBR—Low trip occurs when the calculated value reaches the minimum DNBR trip setpoint.

(continued)

BASES

BACKGROUND

Measurement Channels (continued)

The LPD calculation considers APD, average power, radial peaking factors (based upon target CEA position), and CEAC penalty factors to calculate the current value of compensated peak power density. An LPD—High trip occurs when the calculated value reaches the trip setpoint. The four CPC channels provide input to the four DNBR—Low and four LPD—High RPS trip channels. They effectively act as the sensor (using many inputs) for these trips.

The CEACs perform the calculations required to determine the position of CEAs within their subgroups for the CPCs. Two independent CEACs compare the position of each CEA to its subgroup position. If a deviation is detected by either CEAC, an annunciator sounds and appropriate "penalty factors" are transmitted to all CPCs. These penalty factors conservatively adjust the effective operating margins to the DNBR—Low and LPD—High trips. Each CEAC also drives a single cathode ray tube (CRT), which is switchable between CEACs. The CRT displays individual CEA positions ~~and current values of the penalty factors~~ from the selected CEAC.

16

Each CEA has two separate reed switch assemblies mounted outside the RCPB. Each of the two CEACs receives CEA position input from one of the two reed switch position transmitters on each CEA, so that the position of all CEAs is independently monitored by both CEACs.

CEACs are addressed in LCO 3.3.3.

Bistable Trip Units

Bistable trip units, mounted in the Plant Protection System (PPS) cabinet, receive an analog input from the measurement channels. They 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 bistables, designated A, B, C, and D, for each RPS parameter, one for each measurement channel. Bistables de-energize when a trip occurs, in turn de-energizing bistable relays mounted in the PPS relay card racks.

(continued)

BASES

BACKGROUND

Bistable Trip Units (continued)

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).

Some measurement channels provide contact outputs to the PPS. In these cases, there is no bistable card, and opening the contact input directly de-energizes the associated bistable relays. These include ~~the Loss of Load trip and~~ 2 the CPC generated DNBR—Low and LPD—High trips.

The trip setpoints used in the bistables are based on the analytical limits derived from the accident analysis (Ref. 5). 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, instrument drift, and severe environment errors for those RPS channels that must function in harsh environments as defined by 10 CFR 50.49 (Ref. 6), 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 "Plant Protection System Selection of Trip Setpoint Values" (Ref. 7). 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 Allowable Value.

16

To maintain the margins of safety assumed in the safety analyses, the calculations of the trip variables for the DNBR - Low and Local Power Density - High trips include the measurement, calculational and processor uncertainties and dynamic allowances as defined in the latest applicable revision of CEN-PSO-335-P, "Functional Design Requirements for a Core Protection Calculator" (Ref. 10) and CEN-PSO-336-P, "Functional Design Requirements for a Control Element Assembly Calculator". (Ref. 11)

Setpoints in accordance with the Allowable Value will ensure that SLs of Chapter 2.0, "SAFETY LIMITS (SLs)," 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 LCO 3.3.1, the Allowable Values of Table 3.3.1-1 are the LSSS.

(continued)

BASES

BACKGROUND

Bistable Trip Units (continued) (16)

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. Nuclear instrumentation, the CPCs, and the CEACs can be similarly tested. ~~FSAR,~~ (15) UFSAR Section 7.2 (Ref. 8), provides more detail on RPS testing. (15) Processing transmitter calibration is normally performed on a refueling basis.

RPS Logic

The RPS Logic, addressed in LCO 3.3.4, consists of both Matrix and Initiation Logic and employs a scheme that provides a reactor trip when bistables in any two of the four channels sense the same input parameter trip. This is called a two-out-of-four trip logic.

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.

(16)

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 RTCB Initiation ~~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, opening the RTCBs if any one or more of the six logic matrices indicate a coincidence condition.

Each trip path is responsible Initiation for opening one ~~set of two~~ of (16) four ~~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

(continued)

BASES

BACKGROUND

RPS Logic (continued)

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 initiation channels, all four matrix relays in the affected matrix de-energize. 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~~ four RTCBs, tripping them open. 16

Matrix Logic refers to the matrix power supplies, trip channel bypass contacts, and interconnecting matrix wiring between bistable relay cards, up to but not including the matrix relays. Matrix contacts on the bistable relay cards are excluded from the Matrix Logic definition, since they are addressed as part of the measurement channel.

16

The Initiation Logic consists of the trip path power source, matrix relays and their associated contacts, all interconnecting wiring, ~~and solid state (auxiliary) relays through the K-relay~~ initiation relays, and the initiation 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. 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.

Two-out-of-three logic also prevents inadvertent trips caused by any single channel failure in a trip condition.

(continued)

BASES

BACKGROUND

RPS Logic (continued)

In addition to the trip channel bypasses, there are also operating bypasses on select RPS trips. These bypasses are enabled manually 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. Operating bypasses are normally implemented in the bistable, so that normal trip indication is also disabled. Trips with operating bypasses include Pressurizer Pressure—Low, Logarithmic Power Level—High, ~~Reactor Coolant Flow—Low,~~ and CPC (DNBR—Low and LPD—High).

2 ~~The Loss of Load trip bypass is automatically enabled and disabled.~~

Reactor Trip Circuit Breakers (RTCBs)

16 The reactor trip switchgear, addressed in LCO 3.3.4, consists of ~~eight~~ four 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.~~ 1 Power is supplied from the MG sets to ~~each bus~~ the CEDMs 3 via two redundant paths (trip legs). Trip legs ~~1A~~ and ~~1B supply power to CEDM bus 1.~~ 4 are in parallel with 2 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~~ two trip legs consists of two RTCBs in series. The two RTCBs within a trip leg are actuated by separate initiation circuits.

16 ~~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 CEAs (a half trip). Any one inoperable breaker in a channel will make the entire channel inoperable.~~

(continued)

each pushbutton operates one of the four RTCBs.

BASES

BACKGROUND

Reactor Trip Circuit Breakers (RTCBs) (continued)

Each ~~set of~~ RTCB~~s~~ is operated by either a manual reactor trip push button, a Supplementary Protection System (SPS) Trip relay, or an RPS actuated ~~K-relay~~ initiation relay. There are four Manual Trip push buttons, ~~arranged in two sets of two.~~ each pushbutton operates one of the four RTCBs. Depressing ~~both~~ either of the push buttons in ~~either set~~ both trip legs 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~~ initiation relays are ~~bypassed~~ not utilized, 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~~ the RTCBs necessary to actuate both the undervoltage and shunt trip attachments but excludes the ~~K-relay~~ initiation 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~~ UFSAR Section ~~7.2~~ (Ref. 8), explains RPS testing in more detail. 15

APPLICABLE SAFETY ANALYSES

Design Basis Definition

The RPS is designed to ensure that the following operational criteria are met:

- The associated actuation will occur when the parameter monitored by each channel reaches its setpoint and the specific coincidence logic is satisfied;
- Separation and redundancy are maintained to permit a channel to be out of service for testing or maintenance while still maintaining redundancy within the RPS instrumentation network.

Each of the analyzed accidents and transients can be detected by one or more RPS Functions. The accident analysis takes credit for most of the RPS trip Functions. Those functions for which no credit is taken, termed

(continued)

BASES

APPLICABLE SAFETY ANALYSES

Design Basis Definition (continued)

equipment protective functions, are not needed from a safety perspective.

Each RPS setpoint is chosen to be consistent with the function of the respective trip. The basis for each trip setpoint falls into one of three general categories:

Category 1: To ensure that the SLs are not exceeded during AOOs;

Category 2: To assist the ESFAS during accidents; and

Category 3: To prevent material damage to major plant components (equipment protective).

The RPS maintains the SLs during AOOs and mitigates the consequences of DBAs in all MODES in which the RTCBs are closed.

Each of the analyzed transients and accidents can be detected by one or more RPS Functions. Functions not specifically credited in the accident analysis are part of the NRC staff approved licensing basis for the plant. Noncredited Functions include the Steam Generator #1 Level—High, and the Steam Generator #2 Level—High~~, and the Loss of Load~~. These trips ~~are purely equipment protective, and their use~~ minimizes the potential for equipment damage. 2

The specific safety analysis applicable to each protective function are identified below:

1. Variable Over Power ~~Linear Power Level~~—High 4

The VOPT ~~Linear Power Level—High~~ trip provides protection against core damage during the following events:

- Uncontrolled CEA Withdrawal From Low Power (AOO);
- Uncontrolled CEA Withdrawal at Power (AOO); and
- CEA Ejection (Accident).

The Variable OverPower-High Trip (VOPT) is provided to protect the reactor core during positive reactivity addition excursions. Under steady state conditions the trip setpoint will stay above the neutron power level signal by a preset value called Band. When the power level increases the setpoint will increase to attempt to maintain the separation defined by the Band function, however the rate of the setpoint change is limited by the Rate function. If the power level signal increases faster than the setpoint, a trip will occur when the power level eventually equals the trip setpoint. The maximum value the setpoint can have is determined by the Ceiling function.

(continued)

15

BASES

APPLICABLE SAFETY ANALYSES (continued)

2. Logarithmic Power Level—High

The Logarithmic Power Level—High trip protects the integrity of the fuel cladding and helps protect the RCPB in the event of an unplanned criticality from a shutdown condition.

In MODES 2, 3, 4, and 5, with the RTCBs closed and the CEA Drive System capable of CEA withdrawal, protection is required for CEA withdrawal events originating when THERMAL POWER is < 1E-4% RTP. For events originating above this power level, other trips provide adequate protection.

MODES 3, 4, and 5, with the RTCBs closed, are addressed in LCO 3.3.2, "Reactor Protective System (RPS) Instrumentation—Shutdown."

In MODES 3, 4, or 5, with the RTCBs open or the CEAs not capable of withdrawal, the Logarithmic Power Level—High trip does not have to be OPERABLE. ~~[However, the indication and alarm portion of two logarithmic channels must be OPERABLE to ensure proper indication of neutron population and to indicate a boron dilution event.]~~ The indication and alarm functions are addressed in LCO 3.3. ~~13~~ 12, ~~"[Logarithmic] Power Monitoring Channels."~~

16

required to indicate a boron dilution event

"Boron Dilution Alarm System (BDAS)"

3. Pressurizer Pressure—High

The Pressurizer Pressure—High trip provides protection for the high RCS pressure SL. In conjunction with the pressurizer safety valves and the main steam safety valves (MSSVs), it provides protection against overpressurization of the RCPB during the following events:

- ~~Loss of Electrical Load Without a Reactor Trip Being Generated by the Turbine Trip (AOO);~~ 2
- Loss of Condenser Vacuum (AOO);
- CEA Withdrawal From Low Power Conditions (AOO);
- Chemical and Volume Control System Malfunction (AOO); and

(continued)

BASES

APPLICABLE SAFETY ANALYSES

3. Pressurizer Pressure—High (continued)

- Main Feedwater System Pipe Break (Accident).

4. Pressurizer Pressure—Low

The Pressurizer Pressure—Low trip is provided to trip the reactor to assist the ESF System in the event of loss of coolant accidents (LOCAs). During a LOCA, the SLs may be exceeded; however, the consequences of the accident will be acceptable. A Safety Injection Actuation Signal (SIAS) and a Containment Isolation Actuation Signal (CIAS) are initiated simultaneously.

5. Containment Pressure—High

The Containment Pressure—High trip prevents exceeding the containment design pressure psig during a design basis LOCA or main steam line break (MSLB) accident. During a LOCA or MSLB the SLs may be exceeded; however, the consequences of the accident will be acceptable. An SIAS~~ and~~ , CIAS and MSIS are initiated simultaneously. 16

6, 7. Steam Generator Pressure—Low

The Steam Generator #1 Pressure—Low and Steam Generator #2 Pressure—Low trips provide protection against an excessive rate of heat extraction from the steam generators and resulting rapid, uncontrolled cooldown of the RCS. This trip is needed to shut down the reactor and assist the ESF System in the event of an MSLB or main feedwater line break accident. A main steam isolation signal (MSIS) is initiated simultaneously.

8, 9. Steam Generator Level—Low

The Steam Generator #1 Level—Low and Steam Generator #2 Level—Low trips ensure that a reactor trip signal is generated for the following events to help prevent exceeding the design pressure of the RCS due to the loss of the heat sink:

- Inadvertent Opening of a Steam Generator Atmospheric Dump Valve (AOO);
- Loss of Condenser Vacuum (AOO) 16

(continued)

BASES

APPLICABLE SAFETY ANALYSES

8, 9. Steam Generator Level—Low (continued)

- Loss of Normal Feedwater Event (AOO); ~~and~~
- Feedwater System Pipe Break (Accident)~~.~~ and (16)
- Single RCP rotor Seizure (AOO).

10, 11. ~~Steam Generator Level—High~~ (10) The Reactor Coolant Flow Steam Generator #1 - Low and Reactor Coolant Flow Steam Generator #2 - Low

The Steam Generator #1 Level—High and Steam Generator #2 Level—High trips are provided to protect the turbine from excessive moisture ~~carryover in case of a steam generator overfill event.~~ (16) A Main Steam Isolation Signal (MSIS) is initiated simultaneously.

~~12~~ 13. ~~Reactor Coolant Flow—Low~~

~~The Reactor Coolant Flow—Low~~ trips ~~provides~~ provide protection against an RCP Sheared Shaft Event~~.~~ (16) and a large Steam Line break with concurent Loss of Offsite AC Power. A trip is initiated when the pressure differential across the primary side of either steam generator decreases below a variable setpoint. This variable setpoint stays below the pressure differential by a preset value called the step function unless limited by a preset maximum decreasing rate determined by the ramp function or a preset minimum value determined by the floor function. The setpoints insure that a reactor trip occurs to prevent violation of the Peak Linear Heat Rate or DNBR safety limits.

~~The DNBR limit may be exceeded during this event; however, the trip ensures the consequences are acceptable.~~

~~13. Loss of Load~~

~~The Loss of Load (turbine stop valve control oil pressure) is anticipatory for the loss of heat removal capabilities for the secondary system following a turbine trip. The Loss of Load trip prevents lifting the pressurizer safety valves and the main steam line safety valves in the event of a turbine generator trip. Thus, the trip minimizes the pressure or temperature transient on the reactor by initiating a trip well before the Pressurizer Pressure—High and safety valve setpoints are reached.~~

~~The RPS Loss of Load reactor trip channels receive their input from sensors mounted on high pressure turbine stop valve (TSV) actuators. Since there are four TSVs, one actuator per TSV and one sensor per actuator, each sensor sends its signal to a different RPS channel. When the control oil pressure drops to the appropriate setpoint, a reactor trip signal is generated.~~

14. Local Power Density—High

The CPCs perform the calculations required to derive the DNBR and LPD parameters and their associated RPS

(continued)

BASES

APPLICABLE SAFETY ANALYSES

14. Local Power Density—High (continued)

trips. The DNBR—Low and LPD—High trips provide plant protection during the following AOOs and assist the ESF systems in the mitigation of the following accidents.

The LPD—High trip provides protection against fuel centerline melting due to the occurrence of excessive local power density peaks during the following AOOs:

- Decrease in Feedwater Temperature;
- Increase in Feedwater Flow;
- Increased Main Steam Flow (not due to the steam line rupture) Without Turbine Trip;
- Uncontrolled CEA Withdrawal From Low Power;
- Uncontrolled CEA Withdrawal at Power; and
- CEA Misoperation; Single Part Length CEA Drop.

For the events listed above (except CEA Misoperation; Single Part Length CEA Drop), DNBR—Low will trip the reactor first, since DNB would occur before fuel centerline melting would occur.

15. Departure from Nucleate Boiling Ratio (DNBR)—Low

The CPCs perform the calculations required to derive the DNBR and LPD parameters and their associated RPS trips. The DNBR—Low and LPD—High trips provide plant protection during the following AOOs and assist the ESF systems in the mitigation of the following accidents.

The DNBR—Low trip provides protection against core damage due to the occurrence of locally saturated conditions in the limiting (hot) channel during the following events and is the primary reactor trip (trips the reactor first) for these events:

- Decrease in Feedwater Temperature;

(continued)

BASES

APPLICABLE SAFETY ANALYSES

15. Departure from Nucleate Boiling Ratio (DNBR)—Low (continued)

- Increase in Feedwater Flow;
- Increased Main Steam Flow (not due to steam line rupture) Without Turbine Trip;
- Increased Main Steam Flow (not due to steam line rupture) With a Concurrent Single Failure of an Active Component;
- Steam Line Break With Concurrent Loss of Offsite AC Power;
- Loss of Normal AC Power;
- Partial Loss of Forced Reactor Coolant Flow;
- Total Loss of Forced Reactor Coolant Flow;
- Single Reactor Coolant Pump (RCP) Shaft Seizure;
- Uncontrolled CEA Withdrawal From Low Power;
- Uncontrolled CEA Withdrawal at Power;
- CEA Misoperation; Full Length CEA Drop;
- CEA Misoperation; Part Length CEA Subgroup Drop;
- Primary Sample or Instrument Line Break; and
- Steam Generator Tube Rupture.

In the above list, only the steam generator tube rupture, the RCP shaft seizure, and the sample or instrument line break are accidents. The rest are AOOs.

INSERT 1

Interlocks/Bypasses

15 Operating

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.

(continued)

INSERT FOR BASES 3.3.1
APPLICABLE SAFETY ANALYSIS SECTION

INSERT 1

The DNBR algorithm used in the CPC is valid only within the limits indicated below and operation outside of these limits will result in a CPC initiated trip.

Parameter	Limiting Value
RCS Cold Leg Temperature - Low	≥ 505 °F
RCS Cold Leg Temperature - High	≤ 590 °F
Axial Shape Index - Positive	Not more positive than +0.5
Axial Shape Index - Negative	Not more negative than -0.5
Pressurizer Pressure - Low	≥ 1860 psia
Pressurizer Pressure - High	≤ 2388 psia
Integrated Radial Peaking Factor - Low	≥ 1.28
Integrated Radial Peaking Factor - High	≤ 7.00
Quality Margin - Low	> 0

BASES

APPLICABLE SAFETY ANALYSES

~~Interlocks/Bypasses~~ Operating (continued) 15

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 basis for each of the operating bypasses is discussed under individual trips in the LCO section:

~~a. Loss of Load;~~ 2

a ~~b.~~ Logarithmic Power Level—High;

~~c. Reactor Coolant Flow—Low;~~ 5

15 b ~~d.~~ DNBR—Low and LPD—High; and

14 ~~e. Pressurizer Pressure—Low.~~

15 The RPS satisfies Criterion 3 of ~~the NRC Policy Statement.~~ 10CFR 50.36 (c)(2)(ii)

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.

Actions allow maintenance (trip channel) bypass of individual channels, but the bypass activates interlocks that prevent operation with a second channel in the same Function bypassed. With one channel in each Function trip channel bypassed, this effectively places the plant in a two-out-of-three logic configuration in those Functions.

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. A

(continued)

BASES

LCO (continued)

channel is inoperable if its actual trip setpoint is not within its required Allowable Value. 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. 7).

The Bases for the individual Function requirements are as follows:

4

1. Variable Over Power ~~Linear Power Level~~—High

This LCO requires all four channels of Variable Over ~~Linear~~ Power ~~Level~~—High to be OPERABLE in MODES 1 and 2.

The Allowable Value is high enough to provide an operating envelope that prevents unnecessary Variable Over ~~Linear~~ Power ~~Level~~—High reactor 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.

2. Logarithmic Power Level—High

This LCO requires all four channels of Logarithmic Power Level—High to be OPERABLE in MODE 2~~, and~~ in MODE 3, 4, or 5 when the RTCBs are shut and the CEA Drive System is capable of CEA withdrawal.

15

~~The MODES 3, 4, and 5~~ Conditions are ~~is~~ addressed in LCO 3.3.2.

The Allowable Value is high enough to provide an operating envelope that prevents unnecessary Logarithmic Power Level—High reactor 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 withdrawal event occur.

The Logarithmic Power Level—High trip may be bypassed when THERMAL POWER is above 1E-4% RTP to allow the reactor to be brought to power during a reactor startup. This operating bypass is automatically removed when THERMAL POWER decreases below 1E-4% RTP. Above

15

(continued)

BASES

LCO

2. Logarithmic Power Level—High (continued)

4

Variable Over Power

1E-4% RTP, the ~~Linear Power Level~~—High and Pressurizer Pressure—High trips provide protection for reactivity transients.

8

~~The trip may be manually bypassed during physics testing pursuant to LCO 3.4.17, "RCS Loops—Test Exceptions." During this testing, the Linear Power Level—High trip and administrative controls provide the required protection.~~

3. Pressurizer Pressure—High

This LCO requires four channels of Pressurizer Pressure—High to be OPERABLE in MODES 1 and 2.

2

loss of condenser vacuum at

The Allowable Value is set below the nominal lift setting of the pressurizer code safety valves, and its operation avoids the undesirable operation of these valves during normal plant operation. In the event of ~~a complete loss of electrical load from~~ 100% power, this setpoint ensures the reactor trip will take place, thereby limiting further heat input to the RCS and consequent pressure rise. The pressurizer safety valves may lift to prevent overpressurization of the RCS.

4. Pressurizer Pressure—Low

This LCO requires four channels of Pressurizer Pressure—Low to be OPERABLE in MODES 1 and 2.

The Allowable Value is set low enough to prevent a reactor trip during normal plant operation and pressurizer pressure transients. However, the setpoint is high enough that with a LOCA, the reactor trip will occur soon enough to allow the ESF systems to perform as expected in the analyses and mitigate the consequences of the accident.

14

~~The trip setpoint may be manually decreased to a minimum value of 300 psia as pressurizer pressure is reduced during controlled plant shutdowns, provided the margin between the pressurizer pressure and the setpoint is maintained < 400 psia. This allows for~~

(continued)

BASES

LCO

4. Pressurizer Pressure—Low (continued)

~~controlled depressurization of the RCS while still maintaining an active trip setpoint until the time is reached when the trip is no longer needed to protect the plant. Since the same Pressurizer Pressure—Low bistable is also shared with the SIAS, an inadvertent SIAS actuation is also prevented. The setpoint increases automatically as pressurizer pressure increases, until the trip setpoint is reached.~~

14

~~The Pressurizer Pressure—Low trip and the SIAS Function may be simultaneously bypassed when RCS pressure is below 400 psia, when neither the reactor trip nor an inadvertent SIAS actuation are desirable and these Functions are no longer needed to protect the plant. The bypass is automatically removed as RCS pressure increases above 500 psia. The difference between the bypass enable and removal features allows for bypass permissive bistable hysteresis and allows setting the bypass setpoint close enough to the limit so as to avoid inadvertent actuation at the 300 psia trip setpoint minimum value.~~

5. Containment Pressure—High

The LCO requires four channels of Containment Pressure—High to be OPERABLE in MODES 1 and 2.

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 abnormal condition. It is set low enough to initiate a reactor trip when an abnormal condition is indicated.

6, 7. Steam Generator Pressure—Low

This LCO requires four channels of Steam Generator #1 Pressure—Low and Steam Generator #2 Pressure—Low to be OPERABLE in MODES 1 and 2.

This Allowable Value is sufficiently below the full load operating value for steam pressure so as not to interfere with normal plant operation, but still high enough to provide the required protection in the event

(continued)

BASES

LCO 6, 7. Steam Generator Pressure—Low (continued)

of excessive steam demand. Since excessive steam demand causes the RCS to cool down, resulting in positive reactivity addition to the core, a reactor trip is required to offset that effect.

15 if the moderator temperature coefficient is negative

The trip setpoint may be manually decreased as steam generator pressure is reduced during controlled plant cooldown, provided the margin between steam generator pressure and the setpoint is maintained ≤ 200 psia. This allows for controlled depressurization of the secondary system while still maintaining an active reactor trip setpoint and MSIS setpoint, until the time is reached when the setpoints are no longer needed to protect the plant. The setpoint increases automatically as steam generator pressure increases until the specified trip setpoint is reached.

8, 9. Steam Generator Level—Low

This LCO requires four channels of Steam Generator #1 Level—Low and Steam Generator #2 Level—Low for each 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 ~~same bistable~~ Input signal providing the reactor trip input also provides an input to a bistable that initiates ~~emergency~~ Auxiliary feedwater to the affected generator via the ~~Emergency~~ Feedwater Actuation Signals ~~(EFAS)~~ AFAS. ~~The minimum setpoint is governed by EFAS requirements.~~ The reactor trip will remove the heat source (except decay heat), thereby conserving the reactor heat sink.

16 The trip setpoint insures that there will be sufficient water inventory in the steam generator at the time of the trip to provide a margin of at least 10 minutes before auxiliary feedwater is required to prevent degraded core cooling.

~~This trip and the Steam Generator (#1 and #2) Level—High trip may be manually bypassed simultaneously when cold leg temperature is below the specified limit to allow for CEA withdrawal during testing. The bypass is automatically removed when cold leg temperature reaches 200°F.~~

(continued)

BASES

LCO (continued)

10, 11. Steam Generator Level—High

This LCO requires four channels of Steam Generator #1 Level—High and Steam Generator #2 Level—High to be OPERABLE in MODES 1 and 2.

The Allowable Value is high enough to allow for normal plant operation and transients without causing a reactor trip. It is set low enough to ensure a reactor trip occurs before the level reaches the steam dryers. Having steam generator water level at the trip value is indicative of the plant not being operated in a controlled manner.

16 ~~This trip and the Steam Generator Level—Low trip may be manually bypassed simultaneously when cold leg temperature is below the specified limit to allow for CEA withdrawal during testing with the steam generators in wet layup. The bypass is automatically removed when cold leg temperature reaches 200°F. Below 200°F the plant is in shutdown cooling; therefore, the steam generators are not required for heat removal.~~

12,13 Reactor Coolant Flow—Low

10 Steam Generator #1 and Reactor Coolant Flow Steam Generator #2—Low

This LCO requires four channels of Reactor Coolant Flow—Low to be OPERABLE in MODES 1 and 2. The Allowable Value is set low enough to allow for slight variations in reactor coolant flow during normal plant operations while providing the required protection. Tripping the reactor ensures that the resultant power to flow ratio provides adequate core cooling to maintain DNBR under the expected pressure conditions for this event.

5 ~~The Reactor Coolant Flow—Low trip may be manually bypassed when reactor power is less than 1E-4% RTP. This allows for de-energization of one or more RCPs (e.g., for plant cooldown), while maintaining the ability to keep the shutdown CEA banks withdrawn from the core if desired.~~

LCO 3.4.5, "RCS Loops—MODE 3," LCO 3.4.6, "RCS Loops—MODE 4," and LCO 3.4.7, "RCS Loops—MODE 5, Loops Filled," ensure adequate RCS flow rate is

(continued)

BASES

LCO

12,13 Reactor Coolant Flow—Low (continued)

maintained. The bypass is automatically removed when THERMAL POWER increases above 1E-4% RTP, as sensed by the wide range (logarithmic) nuclear instrumentation. When below the power range, the Reactor Coolant Flow—Low is not required for plant protection.

5

13. Loss of Load

This LCO requires four channels of Loss of Load trip to be OPERABLE in MODES 1 and 2.

The Steam Bypass Control System is capable of passing 45% of the full power main steam flow (45% RTP bypass capability) directly to the condenser without causing the MSSVs to lift. The Nuclear Steam Supply System is capable of absorbing a 10% step change in power when a primary to secondary system energy mismatch occurs, without causing the pressurizer safety valves to lift. This means that the plant can sustain a turbine trip without causing the pressurizer safety valves or the MSSV to lift, provided power is ≤ 55% RTP. Therefore, the Loss of Load trip may be bypassed when reactor power is ≤ 55% RTP, as sensed by the power range nuclear instrumentation. Both the bypass and bypass removal, when above 55% power, are automatically performed.

2

Loss of Load trip is equipment protective and not credited in the accident analysis. As such, the 55% bypass power permissive is a nominal value and does not include any instrument uncertainties.

14. Local Power Density—High

This LCO requires four channels of LPD—High to be OPERABLE.

The LCO on the CPCs ensures that the SLs are maintained during all AOOs and the consequences of accidents are acceptable.

A CPC is not considered inoperable if CEAC inputs to the CPC are inoperable. The Required Actions required

(continued)

BASES

LCO

14. Local Power Density—High (continued)

in the event of CEAC channel failures ensure the CPCs are capable of performing their safety Function.

The CPC channels may be manually bypassed below 1E-4% RTP, as sensed by the logarithmic nuclear instrumentation. This bypass is enabled manually in all four CPC channels when plant conditions do not warrant the trip protection. The bypass effectively removes the DNBR—Low and LPD—High trips from the RPS Logic circuitry. The operating bypass is automatically removed when enabling bypass conditions are no longer satisfied.

This operating bypass is required to perform a plant startup, since both CPC generated trips will be in effect whenever shutdown CEAs are inserted. It also allows system tests at low power with Pressurizer Pressure—Low or RCPs off.

8 ~~During special testing pursuant to LCO 3.4.17, the CPC channels may be manually bypassed when THERMAL POWER is below 5% RTP to allow special testing without generating a reactor trip. The Linear Power Level—High trip setpoint is reduced, so as to provide protection during testing.~~

15. Departure from Nucleate Boiling Ratio (DNBR)—Low

This LCO requires four channels of DNBR—Low to be OPERABLE.

The LCO on the CPCs ensures that the SLs are maintained during all AOOs and the consequences of accidents are acceptable.

A CPC is not considered inoperable if CEAC inputs to the CPC are inoperable. The Required Actions required in the event of CEAC channel failures ensure the CPCs are capable of performing their safety Function.

The CPC channels may be manually bypassed below 1E-4% RTP, as sensed by the logarithmic nuclear instrumentation. This bypass is enabled manually in all four CPC channels when plant conditions do not

(continued)

BASES

LCO

15. Departure from Nucleate Boiling Ratio (DNBR)—Low (continued)

warrant the trip protection. The bypass effectively removes the DNBR—Low and LPD—High trips from the RPS logic circuitry. The operating bypass is automatically removed when enabling bypass conditions are no longer satisfied.

This operating bypass is required to perform a plant startup, since both CPC generated trips will be in effect whenever shutdown CEAs are inserted. It also allows system tests at low power with Pressurizer Pressure—Low or RCPs off.

8 ~~During special testing pursuant to LCO 3.4.17, the CPC channels may be manually bypassed when THERMAL POWER is below 5% RTP to allow special testing without generating a reactor trip. The Linear Power Level—High trip setpoint is reduced, so as to provide protection during testing.~~

Interlocks/Bypasses

15 operating

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.

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. In the case of the Logarithmic Power Level—High trip (Function 2), the absence of a bypass will limit maximum power to below the trip setpoint.

The interlock function Allowable Values are based upon analysis of functional requirements for the bypassed Functions. These are discussed above as part of the LCO discussion for the affected Functions.

(continued)

This LCO is applicable to the RPS Instrumentation in MODES 1 and 2. LCO 3.3.2 is applicable to the RPS Instrumentation in MODES 3, 4, and 5 with any RTCB closed and any CEA capable of withdrawal. The requirements for the CEACs in MODES 1 and 2 are addressed in LCO 3.3.3. The RPS Matrix Logic, Initiation Logic, RTCBs and Manual Trips in MODES 1, 2, 3, 4, and 5 is addressed in LCO 3.3.4.

BASES (continued)

15

APPLICABILITY

Most RPS trips are required to be OPERABLE in MODES 1 and 2 because the reactor is critical in these MODES. The reactor trips are designed to take the reactor subcritical, which maintains the SLs during AOOs and assists the ESFAS in providing acceptable consequences during accidents. Most trips are not required to be OPERABLE in MODES 3, 4, and 5. In MODES 3, 4, and 5, the emphasis is placed on return to power events. The reactor is protected in these MODES by ensuring adequate SDM. Exceptions to this are:

16

- The Logarithmic Power Level—High trip, RPS Logic RTCBs, and Manual Trip are required in MODES 3, 4, and 5, with the RTCBs closed, to provide protection for boron dilution and CEA withdrawal events.

16

- Steam Generator Pressure-Low trip is required in MODE 3, with the RTCBs closed to provide protection for steam line break events in MODE 3.

The Logarithmic Power Level—High trip and the Steam Generator Pressure-Low trip ~~in these lower MODES~~ ~~is~~ are addressed in LCO 3.3.2. The Logarithmic Power Level—High trip is bypassed prior to MODE 1 entry and is not required in MODE 1. ~~The RPS Logic in MODES 1, 2, 3, 4, and 5 is addressed in LCO 3.3.4.~~

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 unit must enter the Condition for the particular protection Function affected.

When the number of inoperable channels in a trip Function exceeds that specified in any related Condition associated

(continued)

BASES

ACTIONS (continued)

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.

7 One Note has ~~Two Notes have~~ been added to the ACTIONS. Note 1 has been added 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 for that Function. ~~Note 2 was added to ensure review by the onsite review committee (per Specification 5.5.1.2.e) is performed to discuss the desirability of maintaining the channel in the bypassed condition.~~ 1

insert

A.1 and A.2

Condition A applies to the failure of a single trip channel or associated instrument channel inoperable in any RPS automatic trip Function. RPS coincidence logic is two-out-of-four.

If one RPS channel is inoperable, startup or power operation is allowed to continue, providing the inoperable channel is placed in bypass or trip in 1 hour (Required Action A.1). The 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. The failed channel must be restored to OPERABLE status prior to entering MODE 2 following the next MODE 5 entry. With a channel in bypass, the coincidence logic is now in a two-out-of-three configuration.

The Completion Time of prior to entering MODE 2 following the next MODE 5 entry is based on adequate channel to channel independence, which allows a two-out-of-three channel operation since no single failure will cause or prevent a reactor trip.

B.1

Condition B applies to the failure of two channels in any RPS automatic trip Function.

(continued)

16

INSERT FOR ITS 3.3.1 BASES

ACTION STATEMENT

INSERT 1

With a channel process measurement circuit that affects multiple functional units inoperable or in test, bypass or trip all associated functional units as listed below:

Process Measurement Circuit	Functional Unit (Bypassed or Tripped)
1. Linear Power (Subchannel or Linear)	Variable Overpower (RPS) Local Power Density - High (RPS) DNBR - Low (RPS)
2. Pressurizer Pressure - High (Narrow Range)	Pressurizer Pressure - High (RPS) Local Power Density - High (RPS) DNBR - Low (RPS)
3. Steam Generator Pressure - Low	Steam Generator Pressure - Low (RPS) Steam Generator #1 Level - Low (ESF) Steam Generator #2 Level - Low (ESF)
4. Steam Generator Level - Low (Wide Range)	Steam Generator Level - Low (RPS) Steam Generator #1 Level - Low (ESF) Steam Generator #2 Level - Low (ESF)
5. Core Protection Calculator	Local Power Density - High (RPS) DNBR - Low (RPS)

BASES

ACTIONS

B.1 (continued)

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.

Required Action B.1 provides for placing one inoperable channel in bypass and the other channel in trip within the Completion Time of 1 hour. This Completion Time is sufficient to allow the operator to take all appropriate actions for the failed channels while ensuring the risk involved in operating with the failed channels is acceptable. With one channel of protective instrumentation bypassed, 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 of the two inoperable channels will need to be restored to operable status prior to the next required CHANNEL FUNCTIONAL TEST, because channel surveillance testing on an OPERABLE channel requires that the OPERABLE channel be placed in bypass. However, it is not possible to bypass more than one RPS channel, and placing a second channel in trip will result in a reactor trip. Therefore, if one RPS channel is in trip and a second channel is in bypass, a third inoperable channel would place the unit in LCO 3.0.3.

15

C.1, C.2.1, and C.2.2

Operating

Condition C applies to one automatic bypass removal channel inoperable. If the inoperable bypass removal channel for any bypass channel cannot be restored to OPERABLE status within 1 hour, 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 affected automatic trip channel placed

(continued)

BASES

ACTIONS

C.1, C.2.1, and C.2.2 (continued) operating

maintenance (trip channel)

in bypass or trip. The bypass removal channel and the automatic trip channel must be repaired prior to entering MODE 2 following the next MODE 5 entry. The Bases for the Required Actions and required Completion Times are consistent with Condition A. 15

D.1 and D.2

Operating 15

maintenance (trip channel)

Condition D applies to two inoperable automatic bypass removal channels. If the bypass removal channels for two operating bypasses cannot be restored to OPERABLE status within 1 hour, the associated RPS channel may be considered OPERABLE only if the bypass is not in effect. Otherwise, the affected RPS channels must be declared inoperable, as in Condition B, and the bypass either removed or one automatic trip channel placed in bypass and the other in trip within 1 hour. The restoration of one affected bypassed automatic trip channel must be completed prior to the next CHANNEL FUNCTIONAL TEST, or the plant must shut down per LCO 3.0.3 as explained in Condition B.

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.

E.1

are redundant 15 sensors

Condition E applies if any CPC cabinet receives a high temperature alarm. There ~~is one~~ temperature ~~sensor~~ in each of the four CPC bays. Since CPC bays B and C also house CEAC calculators 1 and 2, respectively, a high temperature in either of these bays ~~may also indicate a problem with the associated CEAC. CEAC OPERABILITY is addressed in LCO 3.3.3.~~

15 requires entry into LCO 3.3.3, Condition C.

If a CPC cabinet high temperature alarm is received, it is possible for ~~the~~ CPC to be affected and not be completely reliable. Therefore, a CHANNEL FUNCTIONAL TEST must be

16 an OPERABLE

(continued)

BASES

ACTIONS

E.1 (continued)

16 on OPERABLE CPCs

performed within 12 hours. The Completion Time of 12 hours is adequate considering the low probability of undetected failure, the consequences of a single channel failure, and the time required to perform a CHANNEL FUNCTIONAL TEST.

F.1

Condition F applies if an OPERABLE CPC has three or more autorestarts in a 12 hour period.

CPCs and CEACs will attempt to autorestart if they detect a fault condition, such as a calculator malfunction or loss of power. A successful autorestart restores the calculator to operation; however, excessive autorestarts might be indicative of a calculator problem.

If a nonbypassed CPC has three or more autorestarts, it may not be completely reliable. Therefore, a CHANNEL FUNCTIONAL TEST must be performed on the CPC to ensure it is functioning properly. Based on plant operating experience, the Completion Time of 24 hours is adequate and reasonable to perform the test while still keeping the risk of operating in this condition at an acceptable level, since overt channel failure will most likely be indicated and annunciated in the control room by CPC online diagnostics.

G.1

Condition G is entered when the Required Action and associated Completion Time of Condition A, B, C, D, E, or F are not met.

If the Required Actions associated with these Conditions cannot be completed within the required Completion Time, the reactor must be brought to a MODE where the Required Actions do not apply. The allowed Completion Time of 6 hours is reasonable, based on operating experience, for reaching the required MODE from full power conditions in an orderly manner and without challenging plant systems.

(continued)

BASES (continued)

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, CHANNEL CALIBRATION, and response time testing.

15 ~~[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 unit.]~~

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 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 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, 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.

(continued)

BASES

SURVEILLANCE REQUIREMENTS

SR 3.3.1.1 (continued)

In the case of RPS trips with multiple inputs, such as the DNBR and LPD inputs to the CPCs, a CHANNEL CHECK must be performed on all inputs.

SR 3.3.1.2

9

determined by either using the reactor coolant pump differential pressure instrumentation or by calorimetric calculations,

The RCS flow rate indicated by each CPC is verified, as required by a Note, to be less than or equal to the actual RCS total flow rate every 12 hours when THERMAL POWER is ≥ 70% RTP. The 12 hours after reaching 70% RTP is for plant stabilization, data taking, and flow verification. This check (and if necessary, the adjustment of the CPC addressable constant flow coefficients) ensures that the DNBR setpoint is conservatively adjusted with respect to actual flow indications, as determined by the Core Operating Limits Supervisory System (COLSS). The flow measurement uncertainty may be included in the BERR1 Term in the CPC and is equal to or greater than 4%. 9

SR 3.3.1.3

The CPC autorestart count is checked every 12 hours to monitor the CPC and CEAC for normal operation. If three or more autorestarts of a nonbypassed CPC occur within a 12 hour period, the CPC may not be completely reliable. Therefore, the Required Action of Condition F must be performed. The Frequency is based on operating experience that demonstrates the rarity of more than one channel failing within the same 12 hour interval. The auto restart periodic tests Restart (Code 30) and Normal System Load (Code 33) are not included in this total. 16

SR 3.3.1.4

12

when THERMAL POWER is ≥ 80% RTP, and -0.5% to 10% when THERMAL POWER is between 20% and 80%

A daily calibration (heat balance) is performed when THERMAL POWER is ≥ 20%. The Linear Power Level signal and the CPC addressable constant multipliers are adjusted to make the CPC ΔT power and nuclear power calculations agree with the calorimetric calculation if the absolute difference is ≥ 2%. The value of 2% is adequate because this value is assumed in the safety analysis. These checks (and, if necessary, the adjustment of the Linear Power Level signal and the CPC addressable constant coefficients) are adequate to ensure that the accuracy of these CPC calculations is maintained within the analyzed error margins. The power level must be

(continued)

(12)

BASES

SURVEILLANCE REQUIREMENTS

SR 3.3.1.4 (continued)

> 20% RTP to obtain accurate data. At lower power levels, the accuracy of calorimetric data is questionable.

The tolerance between 20% and 80% RTP is +10% to reduce the number of adjustments required as the power level increases. The -0.5% tolerance between 20% and 80% RTP is based on the reduced accuracy of the calorimetric data inputs at low power levels. Performing a calorimetric calibration with a -0.5% tolerance at low power levels insures the difference will remain within -2.0% RTP when power is increased above 80% RTP. If a calorimetric calculation is performed above 80% RTP it will use accurate inputs to the calorimetric calculation available at higher power levels. When the power level is decreased below 80% RTP an additional performance of the SR to the -0.5% to +10% tolerance is not required if the SR has been performed above 80% RTP.

(9)

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 need only be performed within 12 hours after reaching 20% RTP. The 12 hours after reaching 20% RTP is required for plant stabilization, data taking, and flow verification. The secondary calorimetric is inaccurate at lower power levels. A second Note in the SR indicates the SR may be suspended during PHYSICS TESTS. The conditional suspension of the daily calibrations under strict administrative control is necessary to allow special testing to occur.

SR 3.3.1.5

The RCS flow rate indicated by each CPC is verified to be less than or equal to the RCS total flow rate every 31 days. The Note indicates the Surveillance is performed within 12 hours after THERMAL POWER is ≥ 70% RTP. This check (and, if necessary, the adjustment of the CPC addressable flow constant coefficients) ensures that the DNBR setpoint is conservatively adjusted with respect to actual flow indications as determined either using the reactor coolant pump differential pressure instrumentation and the ultrasonic flow meter adjusted pump curves or by a calorimetric calculation. Operating experience has shown the specified Frequency is adequate, as instrument drift is minimal and changes in actual flow rate are minimal over core life.

SR 3.3.1.6

The three vertically mounted excore nuclear instrumentation detectors in each channel are used to determine APD for use in the DNBR and LPD calculations. Because the detectors are mounted outside the reactor vessel, a portion of the signal from each detector is from core sections not adjacent to the detector. This is termed shape annealing and is compensated for after every refueling by performing SR 3.3.1.~~12~~, which adjusts the gains of the three detector amplifiers for shape annealing. SR 3.3.1.6 ensures that the preassigned gains (15) (11)

(continued)

BASES

SURVEILLANCE REQUIREMENTS

SR 3.3.1.6 (continued) 16

when power is <

are still proper. ~~Power must be >~~ 15% ~~because~~ the CPCs do not use the excore generated signals for axial flux shape information ~~at low power levels.~~ The Note allowing 12 hours after reaching 15% RTP is required for plant stabilization and testing.

The 31 day Frequency is adequate because the demonstrated long term drift of the instrument channels is minimal.

SR 3.3.1.7

2 A CHANNEL FUNCTIONAL TEST on each channel ~~except Loss of Load, power range neutron flux, and logarithmic power level channels~~ is performed every 92 days to ensure the entire channel will perform its intended function when needed. The SR is modified by two Notes. Note 1 is a requirement to verify the correct CPC addressable constant values are installed in the CPCs when the CPC CHANNEL FUNCTIONAL TEST is performed. Note 2 allows the CHANNEL FUNCTIONAL TEST for the Logarithmic Power Level—High channels to be performed 2 hours after power drops below 1E-4% RTP and is required to be performed only if the RTCBs are closed.

16 ~~In addition to power supply tests~~, the RPS CHANNEL FUNCTIONAL TEST consists of three overlapping tests as described in Reference 8. These tests verify that the RPS is capable of performing its intended function, from bistable input through the RTCBs. They include:

Bistable Tests

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 interval between surveillance interval extension analysis. The requirements for this review are outlined in 15 Reference ~~9~~.

(continued)

BASES

SURVEILLANCE REQUIREMENTS (continued)

Matrix Logic Tests

Matrix Logic tests are addressed in LCO 3.3.4. 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 3.3.4. 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, thereby opening the affected ~~set of~~ RTCB~~s~~. The RTCB~~s~~ 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. 9), and

The CPC and CEAC channels and excore nuclear instrumentation channels are tested separately.

The excore channels use preassigned test signals to verify proper channel alignment. The excore logarithmic channel test signal is inserted into the preamplifier input, so as to test the first active element downstream of the detector.

The power range excore test signal is inserted at the drawer input, since there is no preamplifier.

The quarterly CPC CHANNEL FUNCTIONAL TEST is performed using software. This software includes preassigned addressable constant values that may differ from the current values. Provisions are made to store the addressable constant values on a computer disk prior to testing and to reload them after testing. A Note is added to the Surveillance Requirements to verify that the CPC CHANNEL FUNCTIONAL TEST includes the correct values of addressable constants.

(continued)

BASES

SURVEILLANCE REQUIREMENTS (continued)

SR 3.3.1.8

A Note indicates that neutron detectors are excluded from CHANNEL CALIBRATION. A CHANNEL CALIBRATION of the power range neutron flux channels every 92 days ensures that the channels are reading accurately and within tolerance (Ref. 9). 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 interval between surveillance interval extension analysis. The requirements for this review are outlined in Reference ~~(9)~~. Operating experience has shown this Frequency to be satisfactory. The 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 3.3.1.4) and the monthly linear subchannel gain check (SR 3.3.1.6). In addition, the associated control room indications are monitored by the operators.

~~SR 3.3.1.9~~

2

~~[The characteristics and Bases for this Surveillance are as described for SR 3.3.1.7. This Surveillance differs from SR 3.3.1.7 only in that the CHANNEL FUNCTIONAL TEST on the Loss of Load functional unit is only required above 55% RTP. When above 55% and the trip is in effect, the CHANNEL FUNCTIONAL TEST will ensure the channel will perform its equipment protective function if needed. The Note allowing 2 hours after reaching 55% RTP is necessary for Surveillance performance. This Surveillance cannot be performed below 55% RTP, since the trip is bypassed.]~~

(continued)

BASES

SURVEILLANCE REQUIREMENTS (continued)

SR 3.3.1.~~10~~ 9

SR 3.3.1.~~10~~ 9 is the performance of a CHANNEL CALIBRATION every ~~[~~18~~]~~ months. 16

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 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 ~~[~~9~~]~~.

16 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 as well as operating experience and consistency with the typical 16 ~~[~~18~~]~~ month fuel cycle.

The Surveillance is modified by a Note to indicate that 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 3.3.1.4) and the monthly linear subchannel gain check (SR 3.3.1.6).

SR 3.3.1.~~11~~ 10

16 Every ~~[~~18~~]~~ months, a CHANNEL FUNCTIONAL TEST is performed on the CPCs. The CHANNEL FUNCTIONAL TEST shall include the injection of a signal as close to the sensors as practicable to verify OPERABILITY including alarm and trip Functions.

16 The basis for the ~~[~~18~~]~~ month Frequency is that the CPCs perform a continuous self monitoring function that eliminates the need for frequent CHANNEL FUNCTIONAL TESTS. This CHANNEL FUNCTIONAL TEST essentially validates the self

(continued)

BASES

SURVEILLANCE REQUIREMENTS

SR 3.3.1.~~11~~ 10 (continued)

monitoring function and checks for a small set of failure modes that are undetectable by the self monitoring function. Operating experience has shown that undetected CPC or CEAC failures do not occur in any given 18 month interval.

SR 3.3.1.~~12~~ 11

The three excore detectors used by each CPC channel for axial flux distribution information are far enough from the core to be exposed to flux from all heights in the core, although it is desired that they only read their particular level. The CPCs adjust for this flux overlap by using the predetermined shape annealing matrix elements in the CPC software.

After refueling, it is necessary to re-establish or verify the shape annealing matrix elements for the excore detectors based on more accurate incore detector readings. This is necessary because refueling could possibly produce a significant change in the shape annealing matrix coefficients. 3

Incore detectors are inaccurate at low power levels. THERMAL POWER should be significant but < 70% to perform an accurate axial shape calculation used to derive the shape annealing matrix elements.

By restricting power to ≤ 70% until shape annealing matrix elements are verified, excessive local power peaks within the fuel are avoided. Operating experience has shown this Frequency to be acceptable.

SR 3.3.1.~~13~~ 12

SR 3.3.1.~~13~~ 12 is a CHANNEL FUNCTIONAL TEST similar to SR 3.3.1.7, except SR 3.3.1.~~13~~ 12 ~~is applicable only to~~ Operating bypass ~~functions and is performed once within 92 days prior to each startup.~~ Proper operation of Operating bypass permissives is critical during plant startup because the Operating 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 Operating bypass removal function OPERABILITY is just prior to

(continued)

BASES

SURVEILLANCE REQUIREMENTS

SR 3.3.1.~~13~~ 12 (continued)

startup. The allowance to conduct this Surveillance 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.~~7~~ 6 ~~or SR 3.3.1.9.~~ Therefore, further testing of the bypass function after startup is unnecessary.

SR 3.3.1.~~14~~ 13

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 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. (16)

A Note is added to indicate that the neutron detectors are excluded from RPS RESPONSE TIME testing 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 3.3.1.4).

(continued)

BASES (continued)

REFERENCES

1. 10 CFR 50, Appendix A, GDC 21.
2. 10 CFR 100.
3. NRC Safety Evaluation Report, July 15, 1994 16
4. IEEE Standard 279-1971, April 5, 1972.
5. ~~FSAR~~ UFSAR, Chapters ~~[14]~~. 6 and 15 15
6. 10 CFR 50.49.
7. "~~Plant Protection System Selection~~ Calculation of Trip Setpoint Values," "Plant Protection System," CEN-286(V) or calculation 13-JC-SG-203 for the Low Steam Generator Pressure trip function 16
8. ~~FSAR~~ UFSAR, Section ~~[7.2]~~. 15
9. CEN-327, June 2, 1986, including Supplement 1, March 3, 1989.

---

10. CEN-PSD-335-P, "Functional Design Requirements for a Core Protection Calculator". 16
11. CEN-PSD-336-P, "Functional Design Requirements for a Control Element Assembly Calculator". 16

NUREG-1432 EXCEPTIONS
SPECIFICATION 3.3.1

1. NUREG-1432 states that continued operation will be reviewed in accordance with Specification 5.5.1.2.e. There is no section 5.5.1.2.e in NUREG-1432. CTS Table 3.3-1, Action 2 states the desirability of maintaining this channel in the bypassed condition shall be reviewed in accordance with Specification 6.5.1.6.g. In CTS 6.5 DOC, LA.1 states that PVNGS CTS 6.5 Review and Audit requirements are being moved to the UFSAR or QA plan. Because the CTS Section 6.5 functions are relocated to the UFSAR or QA plan this requirement will also be relocated to the UFSAR or QA plan as part of the same program. ITS will not specify that continued operation with a RPS channel bypassed requires review by the Plant Review Board (PRB). This will provide consistency with other sections of NUREG-1432. The Bases have been revised to be consistent with the LCO/Surveillance.

2. NUREG-1432 SR 3.3.1.1 refers to a loss of load RPS trip function. ITS will remove the references to a loss of load RPS trip. PVNGS does not have a loss of load RPS trip. On a loss of load, the Steam Bypass Control System in conjunction with the Reactor Power Cutback System maintain the Reactor in Mode 1 at reduced power. The Bases have been revised to be consistent with the LCO/Surveillance. This is consistent with the PVNGS licensing basis.

3. ITS SR 3.3.1.11 (NUREG-1432 SR 3.3.1.12) will state that the incore detectors will be used to verify the shape annealing matrix elements to be used by the CPC's. This will allow the use of generic shape annealing matrix (SAM) elements in the core protection calculators. The use of generic SAM elements reduces the critical path time to determine the SAM elements following refueling outages. The change from cycle-specific SAM was approved by Amendment 100 to the Unit 1 Technical Specifications, Amendment 88 to the Unit 2 Technical Specifications, and Amendment 71 to the Unit 3 Technical Specifications. The Bases have been revised to be consistent with the LCO/Surveillance. This is consistent with the PVNGS licensing basis.

4. NUREG-1432, Table 3.3.1-1 Item 1 pertains to Linear Power Level - High. ITS will replace the Linear Power Level - High function with the Variable Over Power - High trip function. PVNGS uses a variable setpoint to trip the Reactor when the neutron flux level exceeds a rate limited setpoint for a sufficient amount of time or when a preset maximum value is reached. The additional parameters ceiling, band, increasing rate, and decreasing rate, were added to the allowable value table to describe the additional parameters needed to describe the Variable Over Power trip function. This is consistent with the PVNGS licensing basis. The Bases have been revised to be consistent with the LCO/Surveillance.

5. ITS will remove Note (d) on NUREG-1432 Table 3.3.1-1. This Note allows the Reactor Coolant Flow - Low RPS trip to by bypassed when thermal power is less than 1E -4 RTP. PVNGS does not have a bypass function for the Reactor Coolant Flow trip. The ITS will also remove NUREG-1432 SR 3.3.1.13 from the SRs list for the Reactor Coolant Flow - Low function. SR 3.3.1.13 requires a CHANNEL FUNCTIONAL TEST on each automatic bypass removal function within 92 days of each Reactor start-up. This SR is not applicable because there is no automatic bypass removal function at PVNGS. The Bases have been revised to be consistent with the LCO/Surveillance. This is consistent with the PVNGS licensing basis.

6. The ITS will remove the statement in SR 3.3.1.7 "except power range neutron flux." The Table 3.3.1-1 Surveillance Requirements column requires this test for the power range neutron flux channels (referred to as Variable Over Power at PVNGS) so the statement in the SR text excluding the Function is incorrect and is removed. This is consistent with the PVNGS licensing basis.

7. ITS will remove NUREG-1432 SR 3.3.1.6 from the SRs list for Local Power Density (LPD) - High, and Departure from Nucleate Boiling Ratio (DNBR) - Low RPS functions. NUREG-1432 SR 3.3.1.6 requires verification that the linear power subchannel gains of the excore detectors are consistent with the values used to establish the shape annealing matrix elements in the CPC's. This test is applicable to the VOPT RPS function only, and it is listed as a SR for that function. The linear subchannel gain calibration for the excore detectors is not applicable to the LPD and DNBR functions. This is consistent with the PVNGS licensing basis.

8. ITS will remove the last sentence of Notes (a) and (d) on NUREG-1432 Table 3.3.1-1. The Notes state that the Logarithmic Power Level - High, DNBR - Low, and LPD-High RPS Trip functions may be bypassed when thermal power is greater than 1E -4 % RTP for Log Power, and less than 1E -4 % RTP for LPD and DNBR. It also allows the functions to be bypassed during physics testing pursuant to NUREG-1432 LCO 3.4.17, Reactor Coolant Loops Test Exceptions. This LCO was removed by the split report and it is no longer applicable for this Table. The Bases have been revised to be consistent with the LCO/Surveillance. This is consistent with the PVNGS licensing basis.

9. NUREG-1432 SR 3.3.1.5 requires the verification of the total RCS flow rate by calorimetric calculations. ITS SR 3.3.1.5 will allow the option to verify RCS flow rate by either calorimetric calculations or using the Reactor Coolant pump differential pressure instrumentation and the ultrasonic flow meter adjusted pump curves. PVNGS uses the RCP differential pressure instrumentation with ultrasonic flow adjusted curves option and will continue its use due to the additional margin it provides in the safety analysis. Use of the calorimetric method penalizes PVNGS with less margin (ANPP LTR 162-02722-PFC/PS). RCS flow verification by use of the RCP differential pressure instrumentation with ultrasonic flow adjusted curves ensures that the actual flow rate is within the bounds of the safety analysis and the PVNGS Cycle Independent Data Assumptions List (02-N001-1900-275). The Bases have been revised to be consistent with the LCO/Surveillance. This is consistent with the PVNGS licensing basis.

10. ITS will list the Reactor Coolant Flow - Low as separate functions for Steam Generator #1 and Steam Generator #2. PVNGS has independent RPS trip functions for RCS flow through each Steam Generator. If two out of the four channels monitoring each Steam Generator trip a Reactor trip results. The other RPS trip functions in the NUREG, that are specific to one Steam Generator, include separate functions for each Steam Generator. The CTS lists the total number of channels as four per Steam Generator. The Action statements specify the number of channels per Steam Generator for entry into the Action statement. This change to the ITS is needed because the Actions allow a separate condition entry for each function. If RC Low flow is not listed as separate functions in Table 3.3.1-1, bypassing of both RC low flow parameters in a single channel would not be allowed. The Bases have been revised to be consistent with the LCO/Surveillance. This change is consistent with the PVNGS licensing basis.

11. The ITS will add a less than or equal to symbol to the allowable value for the Reactor Coolant Low Flow function , step parameter. NUREG-1432 provides an allowable value for the step parameter but it does not state if the setting must be greater than, less than, or equal to this value. The CTS states the setting must be less than or equal to the allowable value. For the step parameter a lower value is conservative because the difference between the RCS flow and the setpoint would be less. This change is consistent with the PVNGS licensing basis.

12. NUREG-1432, SR 3.3.1.4 provides a tolerance for the CPC nuclear power calculations agree with the calorimetric. The ITS will provide a different tolerance band for the adjustment for the linear power signal, CPC delta T power, and CPC nuclear power to match the calorimetric calculated power. NUREG-1432 requires adjustment for an absolute difference of greater than or equal to 2%. The ITS will use this tolerance when THERMAL POWER is greater than 80% RTP. When power is between 20% and 80% power a tolerance band of -0.5% to 10% will be used. The tighter tolerance in the non-conservative direction is used to be consistent with assumptions in the safety analysis. The wider tolerance in the conservative direction is used to minimize the number of required adjustments of the indications. The Bases have been revised to be consistent with the LCO/Surveillance. This change is consistent with the PVNGS licensing basis.

13. NUREG-1432 Table 3.3.1-1 Notation (b) modifies the applicable Mode for the Logarithmic Power Level-High function to be Mode 2, when any RTCB is closed. It is not possible to be in Mode 2 with the RTCBs open without violating Shutdown Margin (SDM) specifications. The ITS will list the Mode Applicability as Mode 2 regardless of the status of the RTCBs. The Bases have been revised to be consistent with the LCO/Surveillance.

14. NUREG-1432 Table 3.3.1-1 Notation (c) lists the requirements for reducing the setpoint for the Pressurizer Pressure-Low Function and bypassing the Pressurizer Pressure-Low Function when plant conditions permit. The changes in the setpoint and bypassing the function are allowed in Modes 3 and 4 only. This Specification is applicable in Modes 1 and 2. The Note (c) is not needed and is removed from the ITS. The Note is repeated in LCO 3.3.5 ESFAS Instrumentation to insure SIAS Operability during plant cooldown. This is the correct location for the Note. This will provide consistency with the Steam Generator Pressure-Low Function that has a Note allowing setpoint change in Modes 3 and 4 in LCO 3.3.5 but not in this LCO. The Bases have been revised to be consistent with the LCO/Surveillance.

15. Grammar and/or editorial changes have been made to enhance clarity. No technical or intent changes to the Specification are made by this change.

16. The plant specific titles, nomenclature, number, parameter/value, reference, system description, system design, operating practices or analysis description was used (additions, deletions, and/or changes are included). Plant specific parameters/values were directly transferred from the CTS to the ITS.

PVNGS CTS
SPECIFICATION 3.3.1
MARK UP

Specification 3.3.1

(3.3.1/2.0)

2.2 LIMITING SAFETY SYSTEM SETTINGS

REACTOR TRIP SETPOINTS

2.2.1 ~~The reactor protective instrumentation setpoints shall be set consistent with the Trip Setpoint values shown in Table 2.2-1.~~ (LA.12)

APPLICABILITY: As shown for each channel in Table ~~3.3-1.~~ 3.3.1-1 (A.1)

ACTION:

~~With a reactor protective instrumentation setpoint less conservative than the value shown in the Allowable Values column of Table 2.2-1, declare the channel inoperable and apply the applicable ACTION statement requirement of Specification 3.3.1 until the channel is restored to OPERABLE status with its trip setpoint adjusted consistent with the Trip Setpoint value.~~ (LA.11)

Specification 3.3.1

(3.3.1/3.3.2)

TABLE ~~2.2-1~~ 3.3.1-1 A.1

REACTOR PROTECTIVE INSTRUMENTATION ~~TRIP SETPOINT LIMITS~~

FUNCTIONAL UNIT	TRIP SETPOINT	ALLOWABLE VALUES	
1. TRIP GENERATION			
A. Process			
1. Pressurizer Pressure - High	≤ 2383 psia	≤ 2388 psia	
2. Pressurizer Pressure - Low	≥ 1837 psia (2)	≥ 1821 psia (2)	
3. Steam Generator Level - Low	≥ 44.2% (4)	≥ 43.7% (4)	
4. Steam Generator Level - High	≤ 91.0% (9)	≤ 91.5% (9)	
5. Steam Generator Pressure - Low	≥ 895 psia (3)	≥ 890 psia (3)	ITS 3.3.1 ITS 3.3.2
6. Containment Pressure - High	≤ 3.0 psig	≤ 3.2 psig	
7. Reactor Coolant Flow - Low			A.14
a. Rate	≤ 0.115 psi/sec (6)(7)	≤ 0.118 ~~psi~~ psid/sec (6)(7)	
b. Floor	≥ 11.9 psid (6)(7)	≥ 11.7 psid (6)(7)	
c. Band	≤ 10.0 psid (6)(7)	≤ 10.2 psid (6)(7)	
8. Local Power Density - High	≤ 21.0 kW/ft (5)	≤ 21.0 kW/ft (5)	
9. DNBR - Low	≥ 1.30 (5)	≥ 1.30 (5)	
B. Excore Neutron Flux			
1. Variable Overpower Trip			
a. Rate	≤10.6%/min of RATED THERMAL POWER (8)	≤11.0%/min of RATED THERMAL POWER (8)	
b. Ceiling	≤110.0% of RATED THERMAL POWER (8)	≤111.0% of RATED THERMAL POWER (8)	
c. Band	≤9.7% of RATED THERMAL POWER (8)	≤9.9% of RATED THERMAL POWER (8)	

LA.12

Palo Verde - Units 1, 2, 3

Specification 3.3.1
(3.3.1/3.3.2)

TABLE ~~2.2-1~~ 3.3.1-1 (Continued)

REACTOR PROTECTIVE INSTRUMENTATION ~~TRIP SETPOINT LIMITS~~ (A.1)

FUNCTIONAL UNIT	TRIP SETPOINT	ALLOWABLE VALUES	
2. Logarithmic Power Level - High (1)			
a. Startup and Operating	< 0.010% of RATED THERMAL POWER	< 0.011% of RATED THERMAL POWER	
b. Shutdown	< 0.010% of RATED THERMAL POWER	< 0.011% of RATED THERMAL POWER	ITS 3.3.2
C. Core Protection Calculator System			
1. CEA Calculators	Not Applicable	Not Applicable	
2. Core Protection Calculators	Not Applicable	Not Applicable	
D. Supplementary Protection System			
Pressurizer Pressure - High	≤ 2409 psia	≤ 2414 psia	
II. RPS LOGIC			
A. Matrix Logic	Not Applicable	Not Applicable	
B. Initiation Logic	Not Applicable	Not Applicable	
III. RPS ACTUATION DEVICES			
A. Reactor Trip Breakers	Not Applicable	Not Applicable	
B. Manual Trip	Not Applicable	Not Applicable	
A.12	LA.12	A.12	

Specification 3.3.1

(3.3.1/3.3.2)

3.3.1-1
TABLE ~~2.2-1~~ (Continued) A.1

REACTOR PROTECTIVE INSTRUMENTATION ~~TRIP SETPOINT LIMITS~~

TABLE NOTATIONS

ITS 3.3.1
ITS 3.3.2

Table 3.3.1-1 (a) ~~(1)~~ Trip may be manually bypassed above 10^{-4}% of RATED THERMAL POWER; bypass shall be automatically removed when THERMAL POWER is less than or equal to 10^{-4}% of RATED THERMAL POWER.

ITS 3.3.1

~~(2) In MODES 3-4, the value may be decreased manually, to a minimum of 100 psia, as pressurizer pressure is reduced, provided:~~

~~(a) the margin between the pressurizer pressure and this value is maintained at less than or equal to 400 psi; and~~

~~(b) when the RCS cold leg temperature is greater than or equal to 485 degrees F; this value is maintained at least 140 psi greater than the saturation pressure corresponding to the RCS cold leg temperature.~~

~~The setpoint shall be increased automatically as pressurizer pressure is increased until the trip setpoint is reached. Trip may be manually bypassed below 400 psia; bypass shall be automatically removed whenever pressurizer pressure is greater than or equal to 500 psia.~~ A.13

ITS 3.3.1

ITS 3.3.2

(3) In MODES 3-4, value may be decreased manually as steam generator pressure is reduced, provided the margin between the steam generator pressure and this value is maintained at less than or equal to 200 psi; the setpoint shall be increased automatically as steam generator pressure is increased until the trip setpoint is reached.

ITS 3.3.1

~~(4) % of the distance between steam generator upper and lower level wide range instrument nozzles.~~ LA.13

Table 3.3.1-1(b) ~~(5)~~ ~~As stored within the Core Protection Calculator (CPC). Calculation of the trip setpoint includes measurement, calculational and processor uncertainties.~~ Trip may be manually bypassed below 10^{-4}% of RATED THERMAL POWER; bypass shall be automatically removed when THERMAL POWER is greater than or equal to 10^{-4}% of RATED THERMAL POWER. LA.14

~~(6) RATE is the maximum rate of decrease of the trip setpoint. There are no restrictions on the rate at which the setpoint can increase.~~
~~FLOOR is the minimum value of the trip setpoint.~~
~~BAND is the amount by which the trip setpoint is below the input signal unless limited by Rate or Floor.~~
~~Setpoints are based on steam generator differential pressure.~~ LA.15

~~(7) The setpoint may be altered to disable trip function during testing pursuant to Specification 3.10.3.~~ M.1

~~(8) RATE is the maximum rate of increase of the trip setpoint.~~ (The rate at which the setpoint can decrease is no slower than five percent per second.) Table 3.3-1
~~CEILING is the maximum value of the trip setpoint.~~
~~BAND is the amount by which the trip setpoint is above the steady state input signal unless limited by the rate or the ceiling.~~ LA.15

3.3.1

~~(9) % of the distance between steam generator upper and lower level narrow range instrument nozzles.~~ LA.13

SPECIFICATION 3.3.1

(3.3.2/3.3.3/3.3.4/3.3.12)

3.3

~~3/4.3~~ INSTRUMENTATION

3.3.1

~~3/4.3.1~~ REACTOR PROTECTIVE SYSTEM (RPS) INSTRUMENTATION - OPERATING A.1

~~LIMITING CONDITION FOR OPERATION~~

LCO 3.3.1 → ~~3.3.1~~ ~~As a minimum, the~~ FOUR A.4 reactor protective instrumentation A.1 trip ~~channels~~ and bypass removal channels for each function in L.7 ~~bypasses~~ of Table ~~3.3-1~~ 3.3.1-1 A.1 shall be OPERABLE.

APPLICABILITY: As shown in Table ~~3.3-1~~ 3.3.1-1 A.1

ACTION:

As shown in Table 3.3-1.

INSERT 1 →

SURVEILLANCE REQUIREMENTS

ITS 3.3.1
ITS 3.3.2
ITS 3.3.3
ITS 3.3.4
ITS 3.3.12

~~4.3.1.1~~ Each reactor protective instrumentation channel shall be demonstrated OPERABLE by the performance of the CHANNEL CHECK, CHANNEL CALIBRATION and CHANNEL FUNCTIONAL TEST operations for the MODES and at the frequencies shown in Table ~~4.3-1~~. 3.3.1-1 A.1

ITS 3.3.1
ITS 3.3.2

SR 3.3.1.9 → ~~4.3.1.2 The logic for the bypasses shall be demonstrated OPERABLE prior to each reactor startup unless performed during the preceding 92 days. The total bypass function shall be demonstrated OPERABLE at least once per 18 months~~ during CHANNEL CALIBRATION ~~testing~~ of each channel affected by bypass operation, once per 18 months A.1

ITS 3.3.1
ITS 3.3.2

SR 3.3.1.13 → ~~4.3.1.3~~ The REACTOR TRIP SYSTEM RESPONSE TIME of each reactor trip function shall be demonstrated to be within its limit at least once per 18 months on a STAGGERED TEST BASIS A.2. Neutron detectors are exempt from response time testing. ~~Each test shall include at least one channel per function such that all channels are tested at least once every N times 18 months where N is the total number of redundant channels in a specific reactor trip function as shown in the "Total No. of Channels" column of Table 3.3-1.~~

ITS 3.3.3

4.3.1.4 The isolation characteristics of each CEA isolation amplifier shall be verified at least once per 18 months during the shutdown per the following tests for the CEA position isolation amplifiers:

a. With 120 volts A.C. (60 Hz) applied for at least 30 seconds across the output, the reading on the input does not change by more than 0.015 volt D.C. with an applied input voltage of 5-10 volts D.C.

Perform a CHANNEL FUNCTIONAL TEST on each automatic bypass removal function, once within 92 days prior to each reactor startup. A.3

SR 3.3.1.12

INSERT FOR CTS 3.3.1

INSERT 1

Note 1
Separate Condition entry is allowed for each RPS function A.5

INSERT 2

Note 2
Not required to be performed for logarithmic power level channels until 2 hours after reducing THERMAL POWER below 1E -4% RTP and only if reactor trip circuit breakers (RTCBs) are closed. L.3

SPECIFICATION 3.3.1
(3.3.1/3.3.3)

SURVEILLANCE REQUIREMENTS (Continued)

ITS 3.3.3

b. With 120 volts A.C. (60 Hz) applied for at least 30 seconds across the input, the reading on the output does not exceed 15 volts D.C.

ITS 3.3.1
ITS 3.3.3
SR 3.3.1.3
ACT F

~~4.3.1.5~~ The Core Protection Calculators shall be determined OPERABLE at least once per 12 hours by verifying that less than three auto restarts have occurred on each calculator during the past 12 hours. ~~The Auto restart periodic tests, Restart (Code 30) and Normal System Load (Code 33) shall not be included in this total.~~ LA.1

ITS 3.3.1
ITS 3.3.3
ACT E

~~4.3.1.6~~ The Core Protection Calculators shall be subjected to a CHANNEL FUNCTIONAL TEST on the affected CPC to verify OPERABILITY within 12 hours of receipt of a High CPC Cabinet Temperature alarm. L.9

ADD ACTION G (A.11)

SPECIFICATION 3.1
(3.3.1/3.3.2/3.3.3/3.3.12)

Palo Verde - Units 1, 2, 3

3.3.1-1 (A.1)
TABLE ~~3.3-1~~
SYSTEM
REACTOR PROTECTIVE INSTRUMENTATION

	FUNCTIONAL UNIT	TOTAL NO. OF CHANNELS	(LA.2) CHANNELS TO TRIP	MINIMUM CHANNELS OPERABLE	APPLICABLE MODES	ACTION
	1. TRIP GENERATION					
	A. Process					
ITS 3.3.1	1. Pressurizer Pressure - High	4	~~2~~	3	1,2	2#,3#
	2. Pressurizer Pressure - Low	4	~~2~~ (b)	3	1,2	2#,3#
	3. Steam Generator Level - Low	4/SG	~~2/SG~~	3/SG	1,2	2#,3#
	4. Steam Generator Level - High	4/SG	~~2/SG~~	3/SG	1,2 ITS 3.3.2	2#,3#
	5. Steam Generator Pressure - Low	4/SG	~~2/SG~~	3/SG	1,2 $\boxed{3*,4*}$	2#,3#
	6. Containment Pressure - High	4	~~2~~	3	1,2	2#,3#
	7. Reactor Coolant Flow - Low	4/SG	~~2/SG~~	3/SG	1,2	2#,3#
	8. Local Power Density - High	4	~~2~~ (c)(~~d~~)	3	1,2	2#,3#
	9. DNBR - Low	4	~~2~~ (c)(~~d~~)	3	1,2	2#,3#
	B. Excore Neutron Flux					
	1. Variable Overpower Trip	4	~~2~~	3	1,2	2#,3#
	2. Logarithmic Power Level - High		(M.1)		(L.1)	
	a. Startup and Operating	4	~~2~~ (a)(~~d~~)	3	~~1~~,2	2#,3#
~~ITS 3.3.2~~		~~4~~	~~2~~	~~3~~	~~3*,4*,5*~~	~~9~~
ITS 3.3.12	b. Shutdown	4	0	2	3,4,5	4
ITS 3.3.3	C. Core Protection Calculator System					
	1. CEA Calculators	2	1	2 (e)	1,2	6,7
ITS 3.3.1	2. Core Protection Calculators	4	~~2~~ (c)(~~d~~) (LA.2) (M.1)	3	1,2 $\boxed{3*,4*,5*}$ ITS 3.3.2	2#,3#,7,10

3/4 3-3

SPECIFICATI
(3.3.4/Split Report)

3.3.1-1 A.1

TABLE ~~2.3-1~~ (Continued)

REACTOR PROTECTIVE SYSTEM INSTRUMENTATION

	FUNCTIONAL UNIT	TOTAL NO. OF CHANNELS	CHANNELS TO TRIP	MINIMUM CHANNELS OPERABLE	APPLICABLE MODES	ACTION
Relocated - see Split report	~~D. Supplementary Protection System Pressurizer Pressure - High~~	~~4 (f)~~	~~2~~	~~3~~	~~1, 2~~	~~8~~
ITS 3.3.4	II. RPS LOGIC					
	A. Matrix Logic	6	1	3	1, 2	1
		6	1	3	3*, 4*, 5*	9
	B. Initiation Logic	4	2	4	1, 2	5
		4	2	4	3*, 4*, 5*	8
	III. RPS ACTUATION DEVICES					
	A. Reactor Trip Breaker	4 (f)	2	4	1, 2	5
		4 (f)	2	4	3*, 4*, 5*	8
	B. Manual Trip	4 (f)	2	4	1, 2	5
		4 (f)	2	4	3*, 4*, 5*	8

SPECIFICATION 3.3.1
(3.3.1/3.3.2/3.3.3/3.3.4)

3.3.1-1 A.1
TABLE ~~3.3-1~~ (Continued)

TABLE NOTATIONS

ITS 3.3.2

*With the protective system trip breakers in the closed position, the CEA drive system capable of CEA withdrawal, and fuel in the reactor vessel.

ITS 3.3.1

COND D.1 Note
COND B.1 Note

#The provisions of Specification 3.0.4 are not applicable.

Table 3.3.1-1 (a)

~~(a)~~ Trip may be ~~manually~~ bypassed above 10^{-4}% of RATED THERMAL POWER; bypass shall be automatically removed when THERMAL POWER is less than or equal to 10^{-4}% of RATED THERMAL POWER. LA.3

~~(b) Trip may be manually bypassed below 400 psia; bypass shall be automatically removed whenever pressurizer pressure is greater than or equal to 500 psia.~~ A.13

Table 3.3.1-1 (b)

~~(c)~~ Trip may be ~~manually~~ bypassed below 10^{-4}% of RATED THERMAL POWER; bypass shall be automatically removed when THERMAL POWER is greater than or equal to 10^{-4}% of RATED THERMAL POWER. LA.3

ITS 3.3.1

~~(d) Trip may be bypassed during testing pursuant to Special Test Exception 3.10.3.~~ M.1

ITS 3.3.3

(e) See Special Test Exception 3.10.2.

ITS 3.3.4

(f) There are four channels, each of which is comprised of one of the four reactor trip breakers, arranged in a selective two-out-of-four configuration (i.e., one-out-of-two taken twice).

ITS 3.3.4

ACTION STATEMENTS

ACTION 1 - With the number of channels OPERABLE one less than required by the Minimum Channels OPERABLE requirement, restore the inoperable channel to OPERABLE status within 48 hours or be in at least HOT STANDBY within the next 6 hours and/or open the protective system trip breakers.

ITS 3.3.1
ITS 3.3.2

3.3.1 COND A

LA.10

~~ACTION 2~~ - ~~With the number of channels OPERABLE one less than the Total Number of Channels,~~ One or more functions with one automatic RPS trip channel inoperable, A.6 STARTUP and/or POWER OPERATION may continue provided the inoperable channel is placed in the bypassed or tripped condition within 1 hour. ~~If the inoperable channel is bypassed, the desirability of maintaining this channel in the bypassed condition shall be reviewed in accordance with Specification 6.5.1.6.g.~~ The channel shall be returned to OPERABLE status ~~no later than during the next COLD SHUTDOWN.~~ prior to entering MODE 2 following the next MODE 5 entry L.6

3.3.1 COND C

With one or more functions with one automatic bypass removal channel inoperable, Disable the bypass channel or place the affected automatic trip channel in bypass or trip within 1 hour L.8

SPECIFICATION 3.3.1
(3.3.1/3.3.2)

3.3.1-1 A.1

TABLE ~~3.3-1~~ (Continued)

ACTION STATEMENTS

ITS 3.3.1
ITS 3.3.2

LA.4

With a channel process measurement circuit that affects multiple functional units inoperable or in test, bypass or trip all associated functional units as listed below:

Process Measurement Circuit	Functional Unit Bypassed/Tripped
1. Linear Power (Subchannel or Linear)	Variable Overpower (RPS) Local Power Density - High (RPS) DNBR - Low (RPS)
2. Pressurizer Pressure - High (Narrow Range)	Pressurizer Pressure - High (RPS) Local Power Density - High (RPS) DNBR - Low (RPS)
3. Steam Generator Pressure - Low	Steam Generator Pressure - Low Steam Generator Level 1-Low (ESF) Steam Generator Level 2-Low (ESF)
4. Steam Generator Level - Low (Wide Range)	Steam Generator Level - Low (RPS) Steam Generator Level 1-Low (ESF) Steam Generator Level 2-Low (ESF)
5. Core Protection Calculator	Local Power Density - High (RPS) DNBR - Low (RPS)

~~ACTION 3~~ - With the number of channels OPERABLE one less than the Minimum Channels OPERABLE requirement, STARTUP and/or POWER OPERATION may continue provided ~~the following conditions are satisfied:~~

3.3.1 COND B

One or more Functions with two automatic RPS trip channels inoperable

~~a. Verify~~ that one of the inoperable channels has been bypassed and place the other channel in the tripped condition within 1 hour. ~~and~~

LA.4

b. All functional units affected by the bypassed/tripped channel shall also be placed in the bypassed/tripped condition as listed below:

Process Measurement Circuit	Functional Unit Bypassed/Tripped
1. Linear Power (Subchannel or Linear)	Variable Overpower (RPS) Local Power Density - High (RPS) DNBR - Low (RPS)
2. Pressurizer Pressure - High (Narrow Range)	Pressurizer Pressure - High (RPS) Local Power Density - High (RPS) DNBR - Low (RPS)

3.3.1 COND D

A.7

L.8

With one or more functions with two automatic bypass removal channels inoperable, Disable the bypass removal channels or place one affected automatic channel in bypass and place the other in trip within 1 hour.

SPECIFICATION 3.3.1
(3.3.1/3.3.2/3.3.3/3.3.4/3.3.12)

3.3.1-1 A.1

TABLE ~~3.3-1~~ (Continued)

ACTION STATEMENTS

LA.4

ITS 3.3.1
ITS 3.3.2

3.	Steam Generator Pressure - Low	Steam Generator Pressure - Low Steam Generator Level 1-Low (ESF) Steam Generator Level 2-Low (ESF)
4.	Steam Generator Level - Low (Wide Range)	Steam Generator Level - Low (RPS) Steam Generator Level 1-Low (ESF) Steam Generator Level 2-Low (ESF)
5.	Core Protection Calculator	Local Power Density - High (RPS) DNBR - Low (RPS)

STARTUP and/or POWER OPERATION may continue until the performance of the next required CHANNEL FUNCTIONAL TEST. Subsequent STARTUP and/or POWER OPERATION may continue if one channel is restored to OPERABLE status and the provisions of ACTION 2 are satisfied.

LA.5

ITS 3.3.12 ACTION 4 - With the number of channels OPERABLE one less than required by the Minimum Channels OPERABLE requirement, suspend all operations involving positive reactivity changes.

ITS 3.3.4 ACTION 5 - With the number of channels OPERABLE one less than required by the Minimum Channels OPERABLE requirement, STARTUP and/or POWER OPERATION may continue provided the reactor trip breaker of the inoperable channel is placed in the tripped condition within 1 hour, otherwise, be in at least HOT STANDBY within 6 hours; however, the trip breaker associated with the inoperable channel may be closed for up to 1 hour for surveillance testing per Specification 4.3.1.1.

ITS 3.3.3 ACTION 6 -

a. With one CEAC inoperable, operation may continue for up to 7 days provided that the requirements of Specification 4.1.3.1.1 are met. After 7 days, operation may continue provided that the conditions of Action Item 6.b are met.

b. With both CEACs inoperable, operation may continue provided that:

1. Within 1 hour the DNBR margin required by Specification 3.2.4.b (COLSS in service) or 3.2.4.d (COLSS out of service) is satisfied and the Reactor Power Cutback System is disabled, and

SPECIFICATION 3.3.1
(3.3.1/3.3.2/3.3.3/3.3.4/

3.3.1-1 A.1

TABLE ~~3.3-1~~ (Continued)

ACTION STATEMENTS

ITS 3.3.3 2. Within 4 hours:

a) All full-length and part-length CEA groups must be withdrawn within the limits of Specifications 3.1.3.5, 3.1.3.6b, and 3.1.3.7b except during surveillance testing pursuant to the requirements of Specification 4.1.3.1.2. Specification 3.1.3.6b allows CEA group 5 insertion to no further than 127.5 inches withdrawn.

b) The "RSPT/CEAC Inoperable" addressable constant in the CPCs is set to be indicated that both CEAC's are inoperable.

c) The Control Element Drive Mechanism Control System (CEDMCS) is placed in and subsequently maintained in the "Standby" mode except during CEA motion permitted by Specifications 3.1.3.5, 3.1.3.6b, and 3.1.3.7b when the CEDMCS may be operated in either the "Manual Group" or "Manual Individual" mode.

3. CEA position surveillance must meet the requirements of Specifications 4.1.3.1.1, 4.1.3.5, 4.1.3.6, and 4.1.3.7 except during surveillance testing pursuant to Specification 4.1.3.1.2.

ITS 3.3.1
ITS 3.3.3
ACT F → ~~ACTION 7~~ - With three or more auto restarts, ~~excluding periodic auto restarts (Code 30 and Code 33),~~ of one ~~non-bypassed~~ calculator during a 12-hour interval, demonstrate calculator OPERABILITY by performing a CHANNEL FUNCTIONAL TEST within the next 24 hours. LA.1

ITS 3.3.4 ACTION 8 - With the number of OPERABLE channels one less than the Minimum Channels OPERABLE requirement, restore an inoperable channel to OPERABLE status within 48 hours or open an affected reactor trip breaker within the next hour.

ITS 3.3.2
ITS 3.3.4 ACTION 9 - With the number of OPERABLE channels one less than the Minimum Channels OPERABLE requirement, restore the inoperable channel to OPERABLE status within 48 hours or open the reactor trip breakers within the next hour.

ITS 3.3.2 ACTION 10 - In MODES 3, 4, or 5, the Core Protection Calculator channels are not required to be OPERABLE when the Logarithmic Power Level - High trip is OPERABLE with the trip setpoint lowered to $\leq 10^{-4}$% of Rated Thermal Power.

THIS PAGE INTENTIALLY LEFT BLANK

THIS PAGE INTENTIALLY LEFT BLANK

THIS PAGE INTENTIONALLY LEFT BLANK

THIS PAGE INTENTIONALLY LEFT BLANK

THIS PAGE INTENTIALLY LEFT BLANK

SPECIFICATION 3.3.1

(3.3.1/3.3.2/3.3.12)

Palo Verde - Units 1, 2, 3

SYSTEM (A.1) TABLE ~~4.3-1~~ 3.3.1-1

REACTOR PROTECTIVE INSTRUMENTATION ~~SURVEILLANCE REQUIREMENTS~~

(A.1) SURVEILLANCE REQUIREMENTS

	FUNCTIONAL UNIT	~~CHANNEL CHECK~~	~~CHANNEL CALIBRATION~~	~~CHANNEL FUNCTIONAL TEST~~	MODES IN WHICH SURVEILLANCE REQUIRED
	I. TRIP GENERATION				
ITS 3.3.1	A. Process	SR 3.3.1.1	SR 3.3.1.9	SR 3.3.1.7	
	1. Pressurizer Pressure - High	S	R	Q	1, 2
	2. Pressurizer Pressure - Low	S	R	Q	1, 2
	3. Steam Generator Level - Low	S	R	Q	1, 2
	4. Steam Generator Level - High	S	R	Q	1, 2
	5. Steam Generator Pressure - Low	S	R	Q	1, 2, 3*, 4* ITS 3.3.2
	6. Containment Pressure - High	S	R	Q	1, 2
	7. Reactor Coolant Flow - Low	S	R	Q	1, 2
	8. Local Power Density - High	S	~~D (2, 4), R (4, 5)~~ M (8), S (7) (A.15)	Q, R (6)	1, 2
	9. DNBR - Low	S	~~D (2, 4), R (4, 5)~~ ~~M (8), S (7)~~	Q, R (6)	1, 2
	B. Excore Neutron Flux			INSERT 2	
ITS 3.3.1	1. Variable Overpower Trip	S	D (2, 4), M (3, 4) Q (4)	Q	1, 2 (L.1)
ITS 3.3.1 ITS 3.3.2 ITS 3.3.12	2. Logarithmic Power Level - High	S	R (4)	Q ~~and S/U (1)~~ (L.2)	~~1, 2,~~ (2) 3, 4, 5 and * ITS 3.3.12 ITS 3.3.2
ITS 3.3.3	C. Core Protection Calculator System				
	1. CEA Calculators	S	R	Q, R (6)	1, 2
ITS 3.3.1	~~2. Core Protection Calculators~~ Local Power Density - High DNBR - Low (A.15)	S	D (2, 4), R (4, 5) M (8), S (7)	Q (9), R (6)	1, 2

SPECIFICATION
(3.3.4/Split Report)

Palo Verde - Units 1, 2, 3

SYSTEM (A.1) 3.3.1-1

TABLE ~~4.3-1~~ (Continued)

REACTOR PROTECTIVE INSTRUMENTATION ~~SURVEILLANCE REQUIREMENTS~~

	FUNCTIONAL UNIT	CHANNEL CHECK	CHANNEL CALIBRATION	CHANNEL FUNCTIONAL TEST	MODES IN WHICH SURVEILLANCE REQUIRED
Relocated - see Split report	~~D. Supplementary Protection System~~				
	~~Pressurizer Pressure - High~~	~~S~~	~~R~~	~~Q~~	~~1, 2~~
	II. RPS LOGIC				
ITS 3.3.4	A. Matrix Logic	N.A.	N.A.	Q	1, 2, 3*, 4*, 5*
	B. Initiation Logic	N.A.	N.A.	Q	1, 2, 3*, 4*, 5*
	III. RPS ACTUATION DEVICES				
	A. Reactor Trip Breakers	N.A.	N.A.	M, R (10)	1, 2, 3*, 4*, 5*
	B. Manual Trip	N.A.	N.A.	Q	1, 2, 3*, 4*, 5*

L.4 Not required to be performed until 12 hours after THERMAL POWER ≥ 20% RTP

3.3.1-1 A.1

TABLE ~~4.3-1~~ (Continued)

TABLE NOTATIONS

L.2

ITS 3.3.1
ITS 3.3.2

* - With reactor trip breakers in the closed position and the CEA drive system capable of CEA withdrawal, and fuel in the reactor vessel.

(1) - Each STARTUP or when required with the reactor trip breakers closed and the CEA drive system capable of rod withdrawal, if not performed in the previous 7 days.

ITS 3.3.1 (2) (Heat balance only) ~~(CHANNEL FUNCTIONAL TEST not included).~~

Perform CALIBRATION A.8

20% L.4

a. Between ~~15%~~ and 80% of RATED THERMAL POWER, compare the linear power level, the CPC delta T power and the ~~CPC nuclear power signals to the calorimetric calculation.~~ and adjust to make the signals agree A.8

SR 3.3.1.4

If any signal is within -0.5% to 10% of the calorimetric then do not calibrate except as required during initial power ascension after refueling.

LA.9

If any signal is less than the calorimetric calculation by more than 0.5%, then adjust the affected signal(s) to agree with the calorimetric calculation.

If any signal is greater than the calorimetric calculation by more than 10% then adjust the affected signal(s) to agree with the calorimetric calculation within 8% to 10%.

b. At or above 80% of RATED THERMAL POWER; compare the linear power level, the CPC delta T power and the CPC nuclear power signals to the calorimetric calculation. If any signal differs from the calorimetric calculation by an absolute difference of more than (M.2 or equal to) 2%, then adjust the affected signal(s) to agree with the calorimetric calculation.

SR 3.3.1.4 NOTE 2

During PHYSICS TESTS, these daily calibrations may be suspended provided these calibrations are performed upon reaching each major test power plateau and prior to proceeding to the next major test power plateau.

SR 3.3.1.6

~~(3) Above 15% of RATED THERMAL POWER,~~ verify that the linear power subchannel gains of the excore detectors are consistent with the values used to establish the shape annealing matrix elements in the Core Protection Calculators. Not required to be performed until 12 hours after THERMAL POWER ≥ 15% RTP L.5

SR 3.3.1.8, SR 3.3.1.9 NOTE

~~(4)~~ - Neutron detectors may be excluded from CHANNEL CALIBRATION.

SR 3.3.1.11

~~(5)~~ - After each fuel loading and prior to exceeding 70% of RATED THERMAL POWER, the incore detectors shall be used to ~~determine or~~ verify the shape annealing matrix elements used in the Core Protection Calculators.

3.3.1-1

TABLE ~~4.3-1~~ (Continued)

TABLE NOTATIONS

ITS 3.3.1
ITS 3.3.3
SR 3.3.1.10

Perform a

~~(6)~~ - ~~This~~ CHANNEL FUNCTIONAL TEST ~~shall include the injection of simulated process signals into the channel as close to the sensors as practicable to verify OPERABILITY including alarm and/or trip functions.~~ LA.6

ITS 3.3.1
SR 3.3.1.2

~~(7)~~ - ~~Above 70% of RATED THERMAL POWER,~~ verify that the total ~~steady-state~~ RCS flow rate as indicated by each CPC is less than or equal to the actual RCS total flow rate ~~determined by either using the reactor coolant pump differential pressure instrumentation or by calorimetric calculations and~~ if necessary, adjust the CPC addressable constant flow coefficients such that each CPC indicated flow is less than or equal to the actual flow rate. ~~The flow measurement uncertainty may be included in the BERR1 term in the CPC and is equal to or greater than 4%.~~ A.9 LA.7 LA.8

SR 3.3.1.5

~~(8)~~ - ~~Above 70% of RATED THERMAL POWER,~~ verify that the total ~~steady-state~~ RCS flow rate as indicated by each CPC is less than or equal to the actual RCS total flow rate determined by either using the reactor coolant pump differential pressure instrumentation and the ultrasonic flow meter adjusted pump curves or calorimetric calculations. A.9

SR 3.3.1.7
Note 1

~~(9)~~ - The ~~quarterly~~ CPC CHANNEL FUNCTIONAL TEST shall include verification that the correct ~~current~~ values of addressable constants are installed in each OPERABLE CPC. A.10

ITS 3.3.4

(10) - At least once per 18 months and following maintenance or adjustment of the reactor trip breakers, the CHANNEL FUNCTIONAL TEST shall include independent verification of the undervoltage and shunt trips.

L.5

Not required to be performed until 12 hours after THERMAL POWER is ≥ 70% RTP

Not required to be performed until 12 hours after THERMAL POWER is ≥ 70% RTP

L.5

DISCUSSION OF CHANGES
SPECIFICATION 3.3.1

ADMINISTRATIVE CHANGES

A.1 All reformatting and numbering is in accordance with the Combustion Engineering Plant (CEOG) Standard Technical Specifications NUREG-1432 Rev. 1. As a result, the Palo Verde Nuclear Generating Station (PVNGS) Technical Specifications should be more readable, and therefore more understandable by plant operators, as well as others. During the reformatting and renumbering of the Improved Technical Specifications (ITS), no technical changes (either actual or interpretational) to the Current Technical Specifications (CTS) were made unless they were identified and justified.

Editorial rewording (either adding or deleting) is made consistent with NUREG-1432. During NUREG-1432 development, certain working preferences or English language conventions were adopted which resulted in no technical changes (either actual or interpretational) to the CTS.

Additional information has also been added to more fully describe each subsection. This wording is consistent with the NUREG-1432. Since the design is already approved by the NRC, adding more detail does not result in a technical change.

A.2 CTS SR 4.3.1.3 states: "the Reactor Trip response time of each reactor trip function shall be demonstrated to be within its limits at least once per 18 months. Each test shall include at least one channel per function such that all channels are tested at least once every N times 18 months where N is the total number of redundant channels in a specific reactor trip function as shown in the total number of channels column of table 3.3-1". The ITS states, verify RPS response time is within limits every 18 months on a staggered test basis.

The definition of a staggered test basis in the ITS is: A staggered test basis shall consist of the testing of one of the system, subsystems, channels, or other designated components during the interval specified by the Surveillance Frequency, so that all systems, subsystems, channels, or other designated components are tested during n surveillance intervals, where n is the number of systems, subsystems, channels, or other designated components in the associated function. These sections are equivalent in that both require one channel to be tested each 18 months. This change is consistent with NUREG-1432.

ADMINISTRATIVE CHANGES (continued)

A.3 CTS Surveillance Requirement 4.3.1.2 states; "the logic for the bypasses shall be demonstrated OPERABLE prior to each reactor startup unless performed during the preceding 92 days". ITS SR 3.3.1.12 states perform a channel functional test on each automatic bypass removal function once within 92 days prior to each reactor startup. The ITS definition of a CHANNEL FUNCTIONAL TEST states in part to verify operability, including alarms and interlocks. This is equivalent to the CTS term logic for the bypasses shall be demonstrated OPERABLE. This change is consistent with NUREG-1432.

A.4 CTS LCO 3.3.1 states; "As a minimum, the reactor protective instrumentation channels and bypasses of Table 3.3-1 shall be OPERABLE". ITS LCO 3.3.1 states that four RPS trip and bypass removal channels for each function in Table 3.3.1-1 shall be OPERABLE. The CTS refers the user to the Table because the CEACs have two channels, the RPS logic has six channels, and the remainder of the items in Table 3.2.1-1 have four channels. In the ITS these Logics/Channels are divided into separate Specifications, the CEACs are located in section 3.3.3, and the RPS logic is located in section 3.3.4, with the remaining instrumentation in ITS 3.3.1. Because all of the instrumentation in ITS 3.3.1 has four channels the LCO 3.3.1 will specify four OPERABLE channels instead of referring to a Table for the equipment required to be operable. There is no change to the OPERABILITY requirements of ITS LCO 3.3.1. This change provides additional clarity by dividing up the subject instrumentation/channels. This change is only a presentation change and is therefore considered administrative. This change is consistent with NUREG-1432.

A.5 ITS will add a Note to Specification 3.3.1 Actions that states that separate condition entries are allowed for each RPS Function. There is no similar Note in the CTS. The reason for the difference is the change in format between the CTS and the ITS. The CTS lists the RPS functions in a Table, with the total number of channels, channels required to trip, minimum channels Operable, Mode Applicability, and Actions for each Function. Because there is a separate line item for each Function with the appropriate Action statement it is clear in the CTS that each function is a separate Action entry. In the ITS there is a single Action statement that is applicable to all of the RPS Functions. Because of the difference in format it is necessary to include a Note stating that separate condition entries are allowed. There is no difference in the requirements between the CTS and the ITS. This change is consistent with NUREG-1432.

ADMINISTRATIVE CHANGES (continued)

A.6 The CTS requires entry into Action Statement 2 of Table 3.3-1 when the number of channels Operable is one less than the total number of channels. It states that the total number of channels is four for each function. ITS Condition A states that one or more Functions with one automatic RPS trip channel inoperable requires the Action statement entry. The two statements are the same requirement worded differently. In either case a single inoperable channel requires the Action entry. This change is consistent with NUREG-1432.

A.7 The CTS requires entry into Action Statement 3 of Table 3.3-1 when the number of channels Operable is one less than the minimum number of channels. It states the minimum channels Operable is three for each function. ITS Condition B states that one or more functions with two automatic RPS trip channels inoperable requires the Action statement entry. The two statements are the same requirement worded differently. In either case two inoperable channels require the Action entry. This change is consistent with NUREG-1432.

A.8 The CTS Table 4.3-1, Note (2) states: Heat balance only (CHANNEL FUNCTIONAL TEST not included), above 15% of rated thermal power adjust the linear power level, the CPC delta T power and the CPC nuclear power signals to agree with the calorimetric calculation. The ITS states: Perform calibration (heat Balance only) and adjust the linear power level signals and the CPC addressable constant multiplier to make the CPC delta T power and the CPC nuclear power calculations agree with the calorimetric. In both cases a limited calibration is performed to adjust the instrumentation to agree with the calorimetric calculation. Because the calibration required is described in the SR it is not necessary to state that a CHANNEL FUNCTIONAL TEST is not required. This change is consistent with NUREG-1432.

A.9 CTS Table 4.3-1 Notes (7) and (8) state: verify the total steady state RCS flow rate as indicated by each CPC is less than or equal to the actual RCS flowrate. This test is only performed at power level greater than 70%. The ITS will remove the words "steady state" from this statement. All Reactor Coolant Pumps must be operating in Mode 1 and the RCP's operate at a fixed speed. RCS flow is always steady state above 70% power so removing the words "steady state" does not change the requirements in this Note. This change is consistent with NUREG-1432.

ADMINISTRATIVE CHANGES (continued)

A.10 CTS Table 4.3-1 Note (9) states: The quarterly channel functional test shall include verification that the correct current values of addressable constants are installed in each operable CPC. The ITS removed the words quarterly, and current. The ITS SR 3.3.1.7 frequency for this test is 92 days and the CTS Table 4.3-1 channel functional test SR is quarterly. Adding the SR frequency to the requirements to the description of the testing required is redundant. The word current will be deleted from the phrase "correct current values". The values must be current to be the correct values, therefore the word current is not needed. This change is consistent with NUREG-1432.

A.11 ITS Specification 3.3.1 will add an Action G. This requires entry into Mode 3 within 6 hours if the Completion Time for Actions B, C, or D are not met. The CTS would require entry into LCO 3.0.3. This would require the unit to be placed in a Mode in which the Specification does not apply (in this case Mode 3) by placing the Unit in HOT STANDBY within 6 hours.

A.12 CTS Specification 3.2, Table 2.2-1, Items II and III list the RPS Logic and Actuation devices and state the trip setpoint and setpoint allowable values are not applicable to this equipment. The format of the ITS is changed making the need to explicitly state this information unnecessary. This change is consistent with NUREG-1432.

A.13 CTS Table 2.2-1, Table Notations (2) and Table 3.3.1 Table Notation (b) provide details for conditions when the low pressurizer pressure setpoints can be reduced in Modes 3 and 4 to prevent an inadvertent ESFAS actuation during cooldown. The RPS low pressurizer pressure function is required to be operable in Modes 1 and 2 by ITS Specification 3.3.1. This information is not necessary since it applies to a Mode in which the functions are not OPERABLE.

ADMINISTRATIVE CHANGES (continued)

A.14 CTS Table 2.2-1. Item 1.A.7.a. Reactor Coolant Flow-Low Rate Allowable Value is ≤ 0.118 psi/sec. The ITS Table 3.3.1-1. Functions 12 and 13 list the value as ≤ 0.118 psid/sec. The ITS Units are Pounds per Square Inch Differential pressure. The input to the reactor coolant flow-low function is the differential pressure across the primary side of the steam generator. The CTS gives the units for the reactor coolant flow-low floor and band in psid to distinguish the reference of the units from psia (absolute) or psig (gage). Since the rate setting is the change in pressure over time the reference of the pressure (differential, absolute, or gage) is not required to establish the setpoint allowable value. This change is made for consistency and clarity and does not affect the technical meaning and is therefore administrative in nature. This change is consistent with NUREG-1432.

A.15 CTS Table 4.3-1 lists the departure from Nucleate Boiling Ratio-Low, Local Power Density-High, and Core Protection Calculators as three items. The ITS lists only the DNBR-low and LPD-high functions. The Core Protection Calculator (CPC) is a computer system that monitors various inputs and generates a departure from Nucleate Boiling Ratio (DNBR), and Local Power Density (LPD) trip output based on calculated values. The CTS lists the DNBR, LPD, and CPC as separate items. The ITS lists only the trip functions DNBR and LPD, not the CPC, since it is not a trip function. The SRs for the CPC are included in both the DNBR and LPD functions. Since the test is performed only one time for the CPC this change does not change the testing required, therefore there is no impact on plant safety. This change is consistent with NUREG-1432.

TECHNICAL CHANGES - MORE RESTRICTIVE

M.1 The CTS Table 3.3-1 Note (d) and Table 2.2-1 Note (7) will be removed. This note allows the Local Power Density - High, Departure from Nucleate Boiling Ratio - Low, and Logarithmic Power Level - High RPS functions to be bypassed pursuant to special test exception 3.10.3. The special test exception was removed based on the split report. This test exception is used for initial startup and it is no longer needed. The ITS will remove this note resulting in a more restrictive change to the current PVNGS operating practice. This change is consistent with NUREG-1432.

TECHNICAL CHANGES - MORE RESTRICTIVE (continued)

M.2 The CTS Table 4.3-1 Note (2) states in part; adjust the linear power level, to the CPC delta T power and CPC nuclear power signals to agree with the calorimetric calculation if the absolute difference is greater than 2%. The ITS will require the adjustment if the absolute difference is greater than or equal to 2%. This is more restrictive change to the current operating practices because the ITS would require an adjustment if the difference was exactly 2% and the CTS would not. This change will increase the accuracy of the adjustments, making this change is an enhancement to safe operation. This change is consistent with NUREG-1432.

TECHNICAL CHANGES - RELOCATIONS

LA.1 CTS SR 4.3.1.5 states that the auto restart periodic tests restart (code 30) and normal system load (code 33) shall not be included in the autorestart total. This requirement is not required to determine the OPERABILITY of the system and therefore is being relocated to the Bases. When the autorestart count on the CPC is checked, codes 30 and 33 are not included in the count. The CPC will attempt to autorestart if they detect a fault condition, such as a calculator malfunction or loss of power. A successful autorestart restores the calculator to operation, however excessive autorestarts might be an indication of a calculator problem. The restart codes 30 and 33 are not an indication of a fault in the CPC and should not be included in the autorestart count. The information regarding how autorestart codes 30 and 33 are counted will be relocated to the ITS bases.

Any changes to the requirements of the Bases will be governed by the provisions of the PVNGS Bases Control Program. This provides an equivalent level of regulatory control and is an administrative change with no impact on the margin of safety. This requirement is not required to be in the ITS to provide adequate protection of the public health and safety. Therefore relocation of this requirement to the Bases is acceptable and consistent with NUREG-1432.

LA.2 CTS table 3.3-1 lists information for each of the RPS functions. This information includes the number of channels required to trip the Reactor. This information is used to show the relationship between the total number of channels, the minimum number of Operable channels required, and the number of channels required for a Reactor trip. This requirement is not required to determine the OPERABILITY of the system and therefore is being relocated to the ITS bases and it is also currently described in the UFSAR.

TECHNICAL CHANGES - RELOCATIONS (continued)

Any changes to the requirements of the ITS Bases will be governed by the provisions of 10 CFR 50.59 and the PVNGS Bases Control Program. This provides an equivalent level of regulatory control and is an administrative change with no impact on the margin of safety. This requirement is not required to be in the ITS to provide adequate protection of the public health and safety. Therefore relocation of this requirement is acceptable and consistent with NUREG-1432.

LA.3 CTS Table 3.3-1 Notes (a), and (c) state when the trip functions may be manually bypassed and under what conditions the bypass must be automatically removed. The ITS will remove the word "manually" from Notes (a) and (c). This requirement is not required to determine the OPERABILITY of the system and therefore is being relocated to a Licensee Controlled Document This information is provided in the ITS bases. The description of the bypass in also included in Chapter 7 of the UFSAR. The RPS is designed to meet IEEE-279-1971. This standard requires all bypasses to be manual bypasses with automatic removal function.

Any changes to the requirements of the Bases will be governed by the provisions of 10 CFR 50.59 and the PVNGS Bases Control Program. This provides an equivalent level of regulatory control and is an administrative change with no impact on the margin of safety. This requirement is not required to be in the ITS to provide adequate protection of the public health and safety. Therefore relocation of this requirement is acceptable and consistent with NUREG-1432.

LA.4 The CTS Table 3.3-1 Action Statements 2 and 3 include a list of channel process measurement circuits that affect multiple functional units. The Actions require that a bypass or trip of the process measurement circuit, bypass or trip the associated multiple functional units. This requirement is not required to determine the OPERABILITY of the system and therefore is being relocated to the ITS bases.

TECHNICAL CHANGES - RELOCATIONS (continued)

Any changes to the requirements of the Bases will be governed by the provisions of the PVNGS Bases Control Program. This provides an equivalent level of regulatory control and is an administrative change with no impact on the margin of safety. This requirement is not required to be in the ITS to provide adequate protection of the public health and safety. Therefore relocation of this requirement to the Bases is acceptable and consistent with NUREG-1432.

LA.5 CTS Table 3.3-1 Action Statement 3 states in part: "Startup and/or power operation may continue until the performance of the next required CHANNEL FUNCTIONAL TEST. Subsequent startup and /or power operation may continue if one channel is restored to OPERABLE status and the provisions of ACTION 2 are satisfied". This requirement is not required to determine the OPERABILITY of the system and therefore is being relocated to the ITS Bases. This statement clarifies that if a single channel is inoperable it can be bypassed, and if a second channel of the same function is inoperable one channel must be tripped and one channel must be bypassed. In this condition, the two remaining channels cannot be tested without entering LCO 3.0.3.

Any changes to the requirements of the Bases will be governed by the provisions of the PVNGS Bases Control Program. This provides an equivalent level of regulatory control and is an administrative change with no impact on the margin of safety. This requirement is not required to be in the ITS to provide adequate protection of the public health and safety. Therefore relocation of this requirement to the Bases is acceptable and consistent with NUREG-1432.

LA.6 CTS Table 4.3-1 Note (6) states: "This CHANNEL FUNCTIONAL TEST shall include the injection of simulated process signals into the channel as close to the sensors as practicable to verify OPERABILITY including alarm and/or trip functions". This requirement is not required to determine the OPERABILITY of the system and therefore is being relocated to the ITS bases. The information included in this Note is the definition of a CHANNEL FUNCTIONAL TEST. Since a CHANNEL FUNCTIONAL TEST is defined in Section 1.1 of the ITS it is unnecessary to repeat this definition in the Note since it does not impose additional requirements, or remove requirements present in the definition.

TECHNICAL CHANGES - RELOCATIONS (continued)

Any changes to the requirements of the Bases will be governed by the provisions of the PVNGS Bases Control Program. This provides an equivalent level of regulatory control and is an administrative change with no impact on the margin of safety. This requirement is not required to be in the ITS to provide adequate protection of the public health and safety. Therefore relocation of this requirement to the Bases is acceptable and consistent with NUREG-1432.

LA.7 CTS Table 4.3-1 Note (7) states in part: "verify the total steady state RCS flow rate as indicated by each CPC is less than or equal to the actual RCS total flow rate determined by either using the reactor coolant pump differential pressure instrumentation or by calorimetric calculations". The ITS removes the statement describing how the flow rate is determined. This requirement is not required to determine the OPERABILITY of the system and therefore is being relocated to the ITS Bases.

Any changes to the requirements will be governed by the provisions of 10CFR50.59 and the Bases Control Program. This provides an equivalent level of regulatory control and is an administrative change with no impact on the margin of safety. This requirement is not required to be in the ITS to provide adequate protection of the public health and safety. Therefore relocation of this requirement is acceptable and consistent with NUREG-1432.

LA.8 CTS Table 4.3-1 Note (7) states in part: "The flow measurement uncertainty may be included in the BERR1 term in the CPC and is equal to or greater than 4%". This requirement is not required to determine the OPERABILITY of the system and therefore is being relocated to the ITS bases.

Any changes to the requirements of the Bases will be governed by the provisions of the PVNGS Bases Control Program. This provides an equivalent level of regulatory control and is an administrative change with no impact on the margin of safety. This requirement is not required to be in the ITS to provide adequate protection of the public health and safety. Therefore relocation of this requirement to the Bases is acceptable and consistent with NUREG-1432.

TECHNICAL CHANGES - RELOCATIONS (continued)

LA.9 CTS Table 4.3.1, Note 2 provides tolerances for the difference between the calorimetric calculated power and the CPC delta T, CPC nuclear power, and linear power levels. There are instructions for calibration if the tolerance is exceeded. This detail is not required to determine the OPERABILITY of the system and therefore is being relocated to the ITS Bases.

Any changes to the requirements of the Bases will be governed by the provisions of 10CFR50.59 and the Bases Control Program. This provides an equivalent level of regulatory control and is an administrative change with no impact on the margin of safety. This requirement is not required to be in the ITS to provide adequate protection of the public health and safety. Therefore relocation of this requirement is acceptable and consistent with NUREG-1432.

LA.10 CTS Table 3.3-1, Action Statement 2 states in part; "If the inoperable channel is bypassed, the desirability of maintaining this channel in the bypassed condition shall be reviewed in accordance with Specification 6.5.1.6.g". The ITS will not specify that continued operation with a RPS channel bypassed requires review by the Plant Review Board (PRB). NUREG-1432 states that continued operation will be reviewed in accordance with Specification 5.5.1.2.e. There is no Specification 5.5.1.2.e in NUREG-1432. CTS Table 3.3-1, Action 2 states the desirability of maintaining this channel in the bypassed condition shall be reviewed in accordance with Specification 6.5.1.6.g. In section 6.5 DOC, LA.6 states that PVNGS CTS 6.5 Review and Audit requirements are being moved to the QA plan. Because the CTS section 6.5 functions are relocated to the QA plan this requirement will also be relocated to the QA plan to provide consistency with other sections of the PVNGS ITS.

Any changes to the requirements of the QA plan will be governed by the provisions of 10 CFR 50.54. This provides an equivalent level of regulatory control and is an administrative change with no impact on the margin of safety. This requirement is not required to be in the ITS to provide adequate protection of the public health and safety. Therefore relocation of this requirement is acceptable and consistent with NUREG-1432.

LA.11 CTS Specification 2.2, Action requires a RPS function to be declared inoperable if its setpoint is less conservative than the allowable valve. This detail is not required to determine the OPERABILITY of the system and is therefore being relocated to the Bases.

TECHNICAL CHANGES - RELOCATIONS (continued)

Any changes to the requirements of the Bases will be governed by the provisions of the Bases Control Program. This provides an equivalent level of regulatory control and is an administrative change with no impact on the margin of safety. This requirement is not required to be in the ITS to provide adequate protection of the public health and safety. Therefore relocation of this requirement to the Bases is acceptable and consistent with NUREG-1432.

LA.12 CTS Specification 2.2.1 states the setpoints will be set consistent with the values shown in Table 2.2-1. Table 2.2-1 shows the trip setpoints for each of the functions. This detail is not required to determine the OPERABILITY of the system and is therefore being relocated to the UFSAR.

Any changes to the requirements of the UFSAR will be governed by the provision of 10 CFR 50.59. This provides an equivalent level of regulatory control and is an administrative change with no impact on the margin of safety. This requirement is not required to be in the ITS to provide adequate protection of the public health and safety. Therefore relocation of this requirement to the UFSAR is acceptable and consistent with NUREG-1432.

LA.13 CTS Specification 2.2, Table 2.2-1, Table Notations (4) and (9) clarify that the steam generator level septoints are specified in percent of the instrument range, not percent of steam generator level. This detail is not required to determine the OPERABILITY of the system and is therefore being relocated to the UFSAR.

Any changes to the requirements of the UFSAR will be governed by the provision of 10 CFR 50.59. This provides an equivalent level of regulatory control and is an administrative change with no impact on the margin of safety. This requirement is not required to be in the ITS to provide adequate protection of the public health and safety. Therefore relocation of this requirement to the UFSAR is acceptable and consistent with NUREG-1432.

LA.14 CTS Specification 2.2, Table 2.2-1, Table Notation (5) states that the low DNBR and High LPD trip setpoints are stored in the CPC and include measurement, calculational, and processor uncertainties. This detail is not required to determine the OPERABILITY of the system and is therefore being relocated to the Bases.

TECHNICAL CHANGES - RELOCATIONS (continued)

Any changes to the requirements of the Bases will be governed by the provisions of the PVNGS Bases Control Program. This provides an equivalent level of regulatory control and is an administrative change with no impact on the margin of safety. This requirement is not required to be in the ITS to provide adequate protection of the public health and safety. Therefore relocation of this requirement to the UFSAR is acceptable and consistent with NUREG-1432.

LA.15 CTS Specification 2.2, Table 2.2-1, Table Notations (6) and (8) define the terms RATE, FLOOR, BAND, and CEILING. This detail is not required to determine the OPERABILITY of the system and therefore is being relocated to the UFSAR.

Any changes to the requirements of the UFSAR will be governed by the provisions of 10 CFR 50.59. This provides an equivalent level of regulatory control and is an administrative change with no impact on the margin of safety. This requirement is not required to be in the ITS to provide adequate protection of the public health and safety. Therefore relocation of this requirement to the UFSAR is acceptable and consistent with NUREG-1432.

TECHNICAL CHANGES - LESS RESTRICTIVE

L.1 CTS Table 3.3-1 Item B.2.a requires the Logarithmic Power Level - High function to be Operable in Modes 1 and 2. The ITS will not require the Logarithmic Power Level - High RPS trip function to be Operable in Mode 1.

The Logarithmic Power Level - High trip is designed to protect the integrity of the fuel cladding and the Reactor Coolant System pressure boundary in the event of an unplanned criticality from a shutdown condition. In Modes 2,3,4, and 5 with the RTCBs closed and the CEA drive system capable of CEA withdrawal, protection is required for CEA withdrawal events originating when Thermal Power is less than 1E -4% RTP. For events originating above this power level, other trips provide protection. As power increases a reactor trip is initiated unless the operator manually bypasses the function. The Logarithmic Power Level - High trip function is bypassed when power is above 1E -4 % RTP, prior to entering Mode 1.

This change will remove the requirement that the Logarithmic Power Level - High RPS trip function be Operable in Mode 1. The function must be bypassed prior to entering Mode 1 or a automatic reactor trip will result. This change will remove the requirement for OPERABILITY and Surveillance testing of a bypassed function.

ITS Specification 3.3.2 provides the requirements for OPERABILITY of the Logarithmic Power Level - High RPS function in Modes 3, 4, and 5 when the RTCBs are closed and any CEA capable of withdrawal. ITS Specification 3.3.13 provides the requirements for Logarithmic power Level Monitoring Channels when the trip function is not needed. This change is consistent with NUREG-1432.

L.2 CTS Table 4.3-1 Item I.B.2 requires a CHANNEL FUNCTIONAL TEST of the Logarithmic Power Level - High function quarterly and each startup or when required with the reactor trip breakers closed and the CEA drive system capable of rod withdrawal, if not performed in the previous 7 days. The ITS will require the Logarithmic Power Level - High functional test to be performed every 92 days. It will not require a functional test within 7 days of startup or prior to closing the RTCBs with the CEA drive system capable of rod withdrawal.

TECHNICAL CHANGES - LESS RESTRICTIVE (continued)

The RPS functional test frequency of 92 days is based on the reliability analysis presented in topical report CEN-327-A, "RPS/ESFAS Extended Test Interval Evaluation", CEN-327-A supplement 1, and calculation 13-JC-SB-200-Rev. 01 "Plant Protection System Bistable Drift Analysis". These evaluations show that a functional test frequency of 92 days is sufficient to provide the reliability needed to maintain the Core Damage Frequency within acceptable levels. This change is consistent with NUREG-1432.

L.3 ITS SR 3.3.1.7 will include a Note 2, CHANNEL FUNCTIONAL TEST for the Logarithmic Power Level channels. This Note states that the CHANNEL FUNCTIONAL TEST is not required until 2 hours after reducing Thermal Power below 1E -4% RTP and only if RTCBs are closed. This is related to DOC Item L.1. The Logarithmic Power Level - High function will not be required to be Operable or Surveillance tested in Mode 1. This Note states that the Logarithmic Power Level -High CHANNEL FUNCTIONAL TEST is not required to be performed until 2 hours after power is reduced below 1E -4% RTP and only if RTCBs are closed. This Note will ensure that the Functional test is performed after entry into a Mode that requires OPERABILITY of the channel (i.e. Mode 2). The two hour time limit is needed to provide sufficient time to perform the required testing. This change in consistent with NUREG-1432.

L.4 CTS Table 4.3-1 Note (2) states that above 15% RTP the linear power levels, CPC delta T power, and CPC nuclear power signals are adjusted to agree with the calorimetric calculation. The ITS requires the testing 12 hours after thermal power is greater than or equal to 20% RTP. The 12 hours after reaching 20% RTP is required for plant stabilization, data taking, and flow verification. The 20% RTP level is used to improve the accuracy of the data used in the calorimetric calculation. The accuracy of the calorimetric calculation at lower power levels is questionable. The 20% RTP power level is a much more stable power level to perform this testing. The testing ensures the Variable Over Power Trip (VOPT), Departure from Nucleate Boiling Ratio, (DNBR), and Local Power Density (LPD) functions are calibrated using the calorimetric data. AT 20% percent power there is sufficient margin to the DNBR and LPD setpoints to compensate for any small inaccuracy in the CPC delta T power and CPC nuclear power. The VOPT rate function is not affected by an offset in the power level measurement since it is monitoring the rate of change of the power level, and transients at this power level are terminated by the rate function prior to reaching the maximum power setpoint. This change is consistent with NUREG-1423.

TECHNICAL CHANGES - LESS RESTRICTIVE (continued)

L.5 CTS Table 4.3-1 Notes (3), (7), and (8) require testing to be performed above specific power levels. There is no specific time allowed after reaching that power level to perform the testing. ITS allows 12 hours after reaching the power level to allow time for plant stabilization and testing. This is less restrictive than the current practice. The testing required by Table Notes (7) and (8) is required by plant procedures within 12 hours of exceeding the power level specified in the Note. The ITS is consistent with the current operating practice. The testing required by Note (3) is performed within 12 hours of reaching 15% power.

This is based on the time required for plant stabilization for the performance of the testing.

This testing ensures the three excore linear subchannel gains are consistent with the shape annealing matrix elements calculated by SR 3.3.1.11. The shape annealing matrix elements are used to improve the accuracy of the Axial Shape Index calculation in the Core Protection Calculations (CPC). This change is consistent with NUREG-1432.

L.6 CTS Table 3.3-1, Action 2 states in part; "The channel shall be returned to OPERABLE status no later than during the next COLD SHUTDOWN." The ITS states that the channel will be restored to operable status "prior to entering MODE 2 following the next MODE 5 entry." The CTS Action states that the channel must be returned to OPERABLE status prior to leaving cold shutdown. The RPS instrumentation is not required to be OPERABLE until Mode 2 so the ITS will not require the instrumentation to be OPERABLE until that time. Since the instrumentation in this specification is not required to be OPERABLE in Modes 3, 4, and 5, the failure to restore the equipment to OPERABLE status in these Modes following a Mode 5 entry, this does not affect the OPERABILITY of the RPS. This change is consistent with NUREG-1432.

TECHNICAL CHANGES - LESS RESTRICTIVE (continued)

L.7 CTS LCO 3.3.1 states in part; "that the instrument channels and bypasses in Table 3.3-1 shall be OPERABLE". The ITS LCO 3.3.1 states the "instrument and bypass removal channels for each function in Table 3.3.1-1 shall be OPERABLE". The bypass functions are manually enabled when plant conditions allow, and are automatically removed when plant conditions change and the bypass is no longer allowed. The ITS will clarify that only the automatic bypass removal function affects the OPERABILITY of the channel. The ability to manually bypass a function is needed to prevent unnecessary trips when plant conditions are such that the protective function is not needed. If the channel cannot be manually bypassed it does not affect the ability of the channel to provide the trip function when needed therefore it does not affect the OPERABILITY of the channel. This change is consistent with NUREG-1432.

L.8 The ITS provides a new Action for inoperable channel operational bypass removal functions for channels that are equipped with operational bypasses, whereas the CTS requires the channel to be made inoperable and placed in trip channel bypass if the operational bypass removal function is inoperable. The CTS does not provide an action for an inoperable operational bypass removal. The ITS will allow an inoperable operational bypass function to be disabled, with the channel remaining OPERABLE. If the operational bypass function is not disabled the channel is placed in trip channel bypass or tripped. Only the automatic bypass removal function affects the Operability of the channel. The ability to manually bypass a function is needed to prevent unnecessary trips when plant conditions are such that the protective function is not needed. If the channel cannot be manually placed in operational bypass it does not affect the ability of the channel to provide the trip function when needed therefore it does not affect the OPERABILITY of the channel, and operation with a disabled operational bypass has no impact on plant safety. This change allows a channel with a disabled bypass channel to remain Operable. This change will maximize the channel availability by eliminating the need to make the channel inoperable due to the failure of a operating bypass function. The system logic will remain in 2 out of 4 channels required for an RPS trip vs. 2 out of 3 channels required for an RPS trip with an inoperable channel. This change is consistent with NUREG-1432.

TECHNICAL CHANGES - LESS RESTRICTIVE (continued)

L.9 CTS SR 4.3.1.6 requires the CPCs to be FUNCTIONAL TESTED within 12 hours of a cabinet high temperature alarm. The ITS 3.3.1 Action E requires a FUNCTIONAL TEST on the affected CPC. There are separate cooling systems and high temperature alarms for each channel. A high temperature alarm in a channel may indicate the CPC is less reliable and a FUNCTIONAL TEST to verify OPERABILITY is needed. The other CPC channels have not been exposed to the high temperature and therefore a FUNCTIONAL TEST is not needed for the other channels. This change is consistent with NUREG-1432.

NO SIGNIFICANT HAZARDS CONSIDERATION
SPECIFICATION 3.3.1

ADMINISTRATIVE CHANGES
(ITS 3.3.1 Discussion of Changes Labeled A.1, A.2, A.3, A.4, A.5, A.6, A.7, A.8, A.9, A.10, A.11, A.12, A.13, A.14 and A.15)

Arizona Public Service Company, Palo Verde Nuclear Generating Station (PVNGS), Units 1, 2, and 3, is converting to the ITS as outlined in NUREG-1432, "Standard Technical Specifications, Combustion Engineering Plants." The proposed changes involve the reformatting, renumbering, rewording of the Technical Specifications (TS) and Bases with no change in intent, and the incorporation of current operating practices consistent with NUREG-1432. These changes, since they do not involve technical changes to the Current TS (CTS), are administrative. Below are the No Significant Hazards Consideration (NSHC) for the conversion of this Section/Chapter to NUREG-1432.

The Commission has provided standards for determining whether a significant hazards consideration exists as stated in 10 CFR 50.92. A proposed amendment to an operating license for a facility involves a no significant hazards consideration if operation of the facility, in accordance with a proposed amendment, would not 1) involve a significant increase in the probability or consequences of an accident previously evaluated; 2) create the possibility of a new or different kind of accident from any accident previously evaluated; or 3) involve a significant reduction in a margin of safety. A discussion of these standards as they relate to this amendment request follows:

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

The proposed changes involve reformatting, renumbering, and rewording of the CTS and Bases along with incorporation of PVNGS current operating practices and other changes to the CTS as discussed in the specific Discussion of Changes listed above in order to be consistent with NUREG-1432. The reformatting, renumbering, and rewording along with the other changes listed above, involves no technical changes to the CTS. Specifically, there will be no change in the requirements imposed on PVNGS due to these changes. During development of NUREG-1432, certain wording preferences or English language conventions were adopted. The proposed changes to this Section/Chapter are administrative in nature and do not impact initiators of any analyzed events. They also do not impact the assumed mitigation of accidents or transient events. Therefore, these changes do not involve a significant increase in the probability or consequences of an accident previously evaluated.

ADMINISTRATIVE CHANGES
(ITS 3.3.1 Discussion of Changes Labeled A.1, A.2, A.3, A.4, A.5, A.6, A.7, A.8, A.9, A.10, A.11, A.12, A.13, A.14 and A.15) (continued)

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

The proposed changes involve reformatting, renumbering, and rewording of the CTS, along with the incorporation of PVNGS current operating practices and other changes, as discussed, in order to be consistent with NUREG-1432. The proposed changes do not involve a physical alteration of the plant (no new or different type of equipment will be installed) or change the methods governing normal plant operation. The proposed changes will not impose any new or different requirements or eliminate any existing requirements. Therefore, these changes do not create the possibility of a new or different kind of accident from any accident previously evaluated.

Standard 3.-- Does the proposed change involve a significant reduction in a margin of safety?

The proposed changes involve reformatting, renumbering, and rewording of the CTS, along with the incorporation of PVNGS current operating practices and other changes, as discussed, in order to be consistent with NUREG-1432. The proposed changes are administrative in nature and will not involve any technical changes. The proposed changes will not reduce a margin of safety because they have no impact on any safety analysis assumptions. Also, because these changes are administrative in nature, no question of safety is involved. Therefore, these changes do not involve a significant reduction in a margin of safety.

TECHNICAL CHANGES - MORE RESTRICTIVE
(ITS 3.3.1 Discussion of Changes Labeled M.1 and M.2)

Arizona Public Service Company, Palo Verde Nuclear Generating Station (PVNGS), Units 1, 2, and 3 is converting to the ITS as outlined in NUREG-1432. This particular NSHC is for the changes labeled "Technical Changes - More Restrictive" described in the specific Discussion of Changes listed above. The proposed changes incorporate more restrictive changes into the CTS by either making current requirements more stringent or adding new requirements which currently do not exist.

The Commission has provided standards for determining whether a significant hazards consideration exists as stated in 10 CFR 50.92. A proposed amendment to an operating license for a facility involves a no significant hazards consideration if operation of the facility, in accordance with a proposed amendment, would not 1) involve a significant increase in the probability or consequences of an accident previously evaluated; 2) create the possibility of a new or different kind of accident from any accident previously evaluated; or 3) involve a significant reduction in a margin of safety. A discussion of these standards as they relate to this amendment request follows:

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

> The proposed changes provide more stringent requirements than previously existed in the CTS. The more stringent requirements will not result in operation that will increase the probability of initiating an analyzed event. If anything, the new requirements may decrease the probability or consequences of an analyzed event by incorporating the more restrictive changes discussed in the specific Discussion of Changes listed above. These changes will not alter assumptions relative to mitigation of an accident or transient event. The more restrictive requirements will not alter the operation and will continue to ensure process variables, structures, systems, or components are maintained consistent with safety analyses and licensing basis. These changes have been reviewed to ensure that no previously evaluated accident has been adversely affected. Therefore, these changes will not involve a significant increase in the probability or consequences of an accident evaluated.

TECHNICAL CHANGES - MORE RESTRICTIVE
(ITS 3.3.1 Discussion of Changes Labeled M.1 and M.2)

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

Making existing requirements more restrictive and adding more restrictive requirements to the CTS will not alter the plant configuration (no new or different type of equipment will be installed) or change the methods governing normal plant operation. These changes do impose different requirements. However, they are consistent with the assumptions made in the safety analyses, licensing basis, and NUREG-1432. Therefore, these changes will not create the possibility of a new or different kind of accident from any accident previously evaluated.

Standard 3.-- Does the proposed change involve a significant reduction in a margin of safety?

The proposed changes provide more stringent requirements than previously existed in the CTS. An evaluation of these changes concluded that adding these more restrictive requirements either increases or has no impact on the margin of safety. The changes provide additional restrictions which may enhance plant safety. These changes maintain requirements of the safety analysis, licensing basis, and NUREG-1432. As such, no question of safety is involved. Therefore, these changes will not involve a significant reduction in a margin of safety.

TECHNICAL CHANGES - RELOCATIONS
(ITS 3.3.1 Discussion of Changes Labeled LA.1, LA.2, LA.3, LA.4, LA.5, LA.6, LA.7, LA.8, LA.9, LA.10, LA.11, LA.12, LA.13, LA.14, and LA.15)

Arizona Public Service Company, Palo Verde Nuclear Generating Station (PVNGS), Units 1, 2, and 3 is converting to the ITS as outlined in NUREG-1432. The proposed changes, since detail is being removed from the CTS to a Licensee Controlled Document, are less restrictive. The descriptions of these changes are in the Discussion of Changes listed above.

The Commission has provided standards for determining whether a significant hazards consideration exists as stated in 10 CFR 50.92. A proposed amendment to an operating license for a facility involves a no significant hazards consideration if operation of the facility, in accordance with a proposed amendment, would not 1) involve a significant increase in the probability or consequences of an accident previously evaluated; 2) create the possibility of a new or different kind of accident from any accident previously evaluated; or 3) involve a significant reduction in a margin of safety. A discussion of these standards as they relate to this amendment request follows:

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

> The proposed changes relocate requirements from the CTS to a Licensee Controlled Document. These changes do not result in any hardware changes or changes to plant operating practices. The details being relocated are not assumed to be an initiator of any analyzed event. The Licensee Controlled Document containing the relocated requirements will be maintained using the provisions of 10 CFR 50.59 or other specified control processes and is subject to the change control process in the Administrative Controls Section of the ITS. Since any changes to a Licensee Controlled Document will be evaluated, no increase in the probability or consequences of an accident previously evaluated will be allowed. Therefore, these changes will not involve a significant increase in the probability or consequences of an accident previously evaluated.

TECHNICAL CHANGES - RELOCATIONS
(ITS 3.3.1 Discussion of Changes Labeled LA.1, LA.2, LA.3, LA.4, LA.5, LA.6, LA.7, LA.8, LA.9, LA.10, LA.11, LA.12, LA.13, LA.14, and LA.15) (continued)

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

The proposed changes relocate requirements from the CTS to a Licensee Controlled Document. These changes will not alter the plant configuration (no new or different type of equipment will be installed) or change the methods governing normal plant operation. These changes will not impose different requirements and adequate control of information will still be maintained. These changes will not alter assumptions made in the safety analysis or licensing basis. Therefore, these changes will not create the possibility of a new or different kind of accident from any accident previously evaluated.

Standard 3.-- Does the proposed change involve a significant reduction in a margin of safety?

The proposed changes relocate requirements from the CTS to a Licensee Controlled Document. These changes will not reduce a margin of safety since they have no impact on any safety analysis assumptions. In addition, the requirements to be transposed from the CTS to the Licensee Controlled Document are the same as the CTS. Since any future changes to this Licensee Controlled Document will be evaluated per the requirements of 10 CFR 50.59, or other specified control processes, no reduction (significant or insignificant) in a margin of safety will be allowed. Therefore, these changes will not involve a significant reduction in a margin of safety.

The NRC review provides a certain margin of safety, and although this review will no longer be performed prior to submittal, the NRC still inspects the 10 CFR 50.59 process. The proposed changes are consistent with NUREG-1432, which was approved by the NRC Staff. The change controls for proposed relocated details and requirements provide an acceptable level of regulatory authority. Revising the CTS to reflect the approved level of detail per NUREG-1432 reinforces the conclusion that there is not a significant reduction in the margin of safety. Therefore, revising the CTS to reflect the NRC accepted level of detail and requirements ensures no reduction in a margin of safety.

TECHNICAL CHANGES - LESS RESTRICTIVE
(ITS 3.3.1 Discussion of Changes Labeled L.1)

Arizona Public Service Company, Palo Verde Nuclear Generating Station (PVNGS), Units 1, 2, and 3 is converting to the ITS as outlined in NUREG-1432. The proposed change involves making the CTS less restrictive. Below is the description of this less restrictive change and the NSHC for the conversion to NUREG 1432.

L.1 CTS Table 3.3-1 Item B.2.a requires the Logarithmic Power Level - High function to be Operable in Modes 1 and 2. The ITS will not require the Logarithmic Power Level - High RPS trip function to be Operable in Mode 1.

The Logarithmic Power Level - High trip is designed to protect the integrity of the fuel cladding and the Reactor Coolant System pressure boundary in the event of an unplanned criticality from a shutdown condition. In Modes 2,3,4, and 5 with the RTCBs closed and the CEA drive system capable of CEA withdrawal, protection is required for CEA withdrawal events originating when Thermal Power is less than 1E -4% RTP. For events originating above this power level, other trips provide protection. As power increases a reactor trip is initiated unless the operator manually bypasses the function. The Logarithmic Power Level - High trip function is bypassed when power is above 1E -4 % RTP, prior to entering Mode 1.

This change will remove the requirement that the Logarithmic Power Level - High RPS trip function be Operable in Mode 1. The function must be bypassed prior to entering Mode 1 or a automatic reactor trip will result. This change will remove the requirement for OPERABILITY and Surveillance testing of a bypassed function.

ITS Specification 3.3.2 provides the requirements for OPERABILITY of the Logarithmic Power Level - High RPS function in Modes 3, 4, and 5 when the RTCBs are closed and any CEA capable of withdrawal. ITS Specification 3.3.13 provides the requirements for Logarithmic power Level Monitoring Channels when the trip function is not needed. This change is consistent with NUREG-1432.

TECHNICAL CHANGES - LESS RESTRICTIVE
(ITS 3.3.1 Discussion of Changes Labeled L.1) (continued)

The Commission has provided standards for determining whether a significant hazards consideration exists as stated in 10 CFR 50.92. A proposed amendment to an operating license for a facility involves a no significant hazards consideration if operation of the facility, in accordance with a proposed amendment, would not 1) involve a significant increase in the probability or consequences of an accident previously evaluated; 2) create the possibility of a new or different kind of accident from any accident previously evaluated; or 3) involve a significant reduction in a margin of safety. A discussion of these standards as they relate to this amendment request follows:

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

The proposed change will remove the CTS requirement for the Logarithmic Power Level - High function to be Operable in Modes 1 and 2. The ITS will not require the Logarithmic Power Level - High RPS trip function to be Operable in Mode 1.

The Logarithmic Power Level - High trip is designed to protect the integrity of the fuel cladding and the Reactor Coolant System pressure boundary in the event of an unplanned criticality from a shutdown condition. In Modes 2, 3, 4, and 5 with the RTCBs closed and the CEA drive system capable of CEA withdrawal, protection is required for CEA withdrawal events originating when Thermal Power is less than 1E -4% RTP. For events originating above this power level, other RPS trips provide protection. As power increases a reactor trip is initiated unless the operator manually bypasses the function. The Logarithmic Power Level - High trip function is bypassed when power is above 1E -4·% RTP, prior to entering Mode 1.

This change will remove the requirement that the Logarithmic Power Level - High RPS trip function be Operable in Mode 1. The function must be bypassed prior to entering Mode 1 or a automatic reactor trip will result. This change will remove the requirement for OPERABILITY and Surveillance testing of a bypassed function.

TECHNICAL CHANGES - LESS RESTRICTIVE
(ITS 3.3.1 Discussion of Changes Labeled L.1) (continued)

This change is consistent with NUREG-1432. This change does not result in any hardware changes or changes to plant operating practices nor does it affect plant operation. Therefore this change will not involve a significant increase in the probability or consequences of an accident previously evaluated.

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

The proposed change will remove the CTS requirement for the Logarithmic Power Level - High function to be Operable in Modes 1 and 2. The ITS will not require the Logarithmic Power Level - High RPS trip function to be Operable in Mode 1.

The Logarithmic Power Level - High trip is designed to protect the integrity of the fuel cladding and the Reactor Coolant System pressure boundary in the event of an unplanned criticality from a shutdown condition. In Modes 2, 3, 4, and 5 with the RTCBs closed and the CEA drive system capable of CEA withdrawal, protection is required for CEA withdrawal events originating when Thermal Power is less than 1E -4% RTP. For events originating above this power level, other RPS trips provide protection. As power increases a reactor trip is initiated unless the operator manually bypasses the function. The Logarithmic Power Level - High trip function is bypassed when power is above 1E -4 % RTP, prior to entering Mode 1.

This change will remove the requirement that the Logarithmic Power Level - High RPS trip function be Operable in Mode 1. The function must be bypassed prior to entering Mode 1 or a automatic reactor trip will result. This change will remove the requirement for OPERABILITY and Surveillance testing of a bypassed function.

This change is consistent with NUREG-1432. This change will not alter the plant configuration (no new or different type of equipment will be installed) or change the methods of governing normal plant operation. This change will not alter assumptions made in the safety analysis or licensing basis. Therefore, this change will not create the possibility of a new or different kind of accident from any accident previously evaluated.

TECHNICAL CHANGES - LESS RESTRICTIVE
(ITS 3.3.1 Discussion of Changes Labeled L.1) (continued)

Standard 3.-- Does the proposed change involve a significant reduction in a margin of safety?

The proposed change will remove the CTS requirement for the Logarithmic Power Level - High function to be Operable in Modes 1 and 2. The ITS will not require the Logarithmic Power Level - High RPS trip function to be Operable in Mode 1.

The Logarithmic Power Level - High trip is designed to protect the integrity of the fuel cladding and the Reactor Coolant System pressure boundary in the event of an unplanned criticality from a shutdown condition. In Modes 2, 3, 4, and 5 with the RTCBs closed and the CEA drive system capable of CEA withdrawal, protection is required for CEA withdrawal events originating when Thermal Power is less than 1E -4% RTP. For events originating above this power level, other RPS trips provide protection. As power increases a reactor trip is initiated unless the operator manually bypasses the function. The Logarithmic Power Level - High trip function is bypassed when power is above 1E -4 % RTP, prior to entering Mode 1.

This change will remove the requirement that the Logarithmic Power Level - High RPS trip function be Operable in Mode 1. The function must be bypassed prior to entering Mode 1 or a automatic reactor trip will result. This change will remove the requirement for OPERABILITY and Surveillance testing of a bypassed function.

This change will not reduce a margin of safety since it has no impact on safety analysis assumptions. This change is consistent with NUREG-1432, which was approved by the NRC Staff. Therefore, this change does not result in a reduction in a margin of safety.

TECHNICAL CHANGES - LESS RESTRICTIVE
(ITS 3.3.1 Discussion of Changes Labeled L.2)

Arizona Public Service Company, Palo Verde Nuclear Generating Station (PVNGS), Units 1, 2, and 3 is converting to the ITS as outlined in NUREG-1432. The proposed change involves making the CTS less restrictive. Below is the description of this less restrictive change and the NSHC for conversion to NUREG-1432.

L.2 CTS Table 4.3-1 Item I.B.2 requires a CHANNEL FUNCTIONAL TEST of the Logarithmic Power Level - High function quarterly and each startup or when required with the reactor trip breakers closed and the CEA drive system capable of rod withdrawal, if not performed in the previous 7 days. The ITS will require the Logarithmic Power Level - High functional test to be performed every 92 days. It will not require a functional test within 7 days of startup or prior to closing the RTCBs with the CEA drive system capable of rod withdrawal.

The RPS functional test frequency of 92 days is based on the reliability analysis presented in topical report CEN-327-A, "RPS/ESFAS Extended Test Interval Evaluation", CEN-327-A supplement 1, and calculation 13-JC-SB-200-Rev. 01 "Plant Protection System Bistable Drift Analysis". These evaluations show that a functional test frequency of 92 days is sufficient to provide the reliability needed to maintain the Core Damage Frequency within acceptable levels. This change is consistent with NUREG-1432.

The Commission has provided standards for determining whether a significant hazards consideration exists as stated in 10 CFR 50.92. A proposed amendment to an operating license for a facility involves a no significant hazards consideration if operation of the facility, in accordance with a proposed amendment, would not 1) involve a significant increase in the probability or consequences of an accident previously evaluated; 2) create the possibility of a new or different kind of accident from any accident previously evaluated; or 3) involve a significant reduction in a margin of safety. A discussion of these standards as they relate to this amendment request follows:

TECHNICAL CHANGES - LESS RESTRICTIVE
(ITS 3.3.1 Discussion of Changes Labeled L.2) (continued)

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

The proposed change will remove the CTS requirement for a CHANNEL FUNCTIONAL TEST of the Logarithmic Power Level - High function quarterly and each startup or when required with the reactor trip breakers closed and the CEA drive system capable of rod withdrawal, if not performed in the previous 7 days. The ITS will require the Logarithmic Power Level - High functional test to be performed every 92 days. It will not require a functional test within 7 days of startup or prior to closing the RTCBs with the CEA drive system capable of rod withdrawal.

The RPS functional test frequency of 92 days is based on the reliability analysis presented in topical report CEN-327-A, "RPS/ESFAS Extended Test Interval Evaluation", CEN-327-A supplement 1, and calculation 13-JC-SB-200-Rev. 01 "Plant Protection System Bistable Drift Analysis". These evaluations show that a functional test frequency of 92 days is sufficient to provide the reliability needed to maintain the Core Damage Frequency within acceptable levels.

This change is consistent with NUREG-1432. This change does not result in any hardware changes or changes to plant operating practices nor does it affect plant operation. Therefore this change will not involve a significant increase in the probability or consequences of an accident previously evaluated.

TECHNICAL CHANGES - LESS RESTRICTIVE
(ITS 3.3.1 Discussion of Changes Labeled L.2) (continued)

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

The proposed change will remove the CTS requirement for a CHANNEL FUNCTIONAL TEST of the Logarithmic Power Level - High function quarterly and each startup or when required with the reactor trip breakers closed and the CEA drive system capable of rod withdrawal, if not performed in the previous 7 days. The ITS will require the Logarithmic Power Level - High functional test to be performed every 92 days. It will not require a functional test within 7 days of startup or prior to closing the RTCBs with the CEA drive system capable of rod withdrawal.

The RPS functional test frequency of 92 days is based on the reliability analysis presented in topical report CEN-327-A, "RPS/ESFAS Extended Test Interval Evaluation", CEN-327-A supplement 1, and calculation 13-JC-SB-200-Rev. 01 "Plant Protection System Bistable Drift Analysis". These evaluations show that a functional test frequency of 92 days is sufficient to provide the reliability needed to maintain the Core Damage Frequency within acceptable levels.

This change is consistent with NUREG-1432. This change will not alter the plant configuration (no new or different type of equipment will be installed) or change the methods of governing normal plant operation. This change will not alter assumptions made in the safety analysis or licensing basis. Therefore, this change will not create the possibility of a new or different kind of accident from any accident previously evaluated.

TECHNICAL CHANGES - LESS RESTRICTIVE
(ITS 3.3.1 Discussion of Changes Labeled L.2) (continued)

Standard 3.-- Does the proposed change involve a significant reduction in a margin of safety?

The proposed change will remove the CTS requirement for a CHANNEL FUNCTIONAL TEST of the Logarithmic Power Level - High function quarterly and each startup or when required with the reactor trip breakers closed and the CEA drive system capable of rod withdrawal, if not performed in the previous 7 days. The ITS will require the Logarithmic Power Level - High functional test to be performed every 92 days. It will not require a functional test within 7 days of startup or prior to closing the RTCBs with the CEA drive system capable of rod withdrawal.

The RPS functional test frequency of 92 days is based on the reliability analysis presented in topical report CEN-327-A, "RPS/ESFAS Extended Test Interval Evaluation", CEN-327-A supplement 1, and calculation 13-JC-SB-200-Rev. 01 "Plant Protection System Bistable Drift Analysis". These evaluations show that a functional test frequency of 92 days is sufficient to provide the reliability needed to maintain the Core Damage Frequency within acceptable levels.

This change will not reduce a margin of safety since it has no impact on safety analysis assumptions. This change is consistent with NUREG-1432, which was approved by the NRC Staff. Therefore, this change does not result in a reduction in a margin of safety.

TECHNICAL CHANGES - LESS RESTRICTIVE
(ITS 3.3.1 Discussion of Changes Labeled L.3)

Arizona Public Service Company, Palo Verde Nuclear Generating Station (PVNGS), Units 1, 2, and 3 is converting to the ITS as outlined in NUREG-1432. The proposed change involves making the CTS less restrictive. Below is the description of this less restrictive change and the NSHC for conversion to NUREG-1432.

L.3 ITS SR 3.3.1.7 will include a Note 2, CHANNEL FUNCTIONAL TEST for the Logarithmic Power Level channels. This Note states that the CHANNEL FUNCTIONAL TEST is not required until 2 hours after reducing Thermal Power below 1E -4% RTP and only if RTCBs are closed. This is related to DOC Item L.1. The Logarithmic Power Level - High function will not be required to be Operable or Surveillance tested in Mode 1. This Note states that the Logarithmic Power Level -High CHANNEL FUNCTIONAL TEST is not required to be performed until 2 hours after power is reduced below 1E -4% RTP and only if RTCBs are closed. This Note will ensure that the Functional test is performed after entry into a Mode that requires OPERABILITY of the channel (i.e. Mode 2). The two hour time limit is needed to provide sufficient time to perform the required testing. This change in consistent with NUREG-1432.

The Commission has provided standards for determining whether a significant hazards consideration exists as stated in 10 CFR 50.92. A proposed amendment to an operating license for a facility involves a no significant hazards consideration if operation of the facility, in accordance with a proposed amendment, would not 1) involve a significant increase in the probability or consequences of an accident previously evaluated; 2) create the possibility of a new or different kind of accident from any accident previously evaluated; or 3) involve a significant reduction in a margin of safety. A discussion of these standards as they relate to this amendment request follows:

TECHNICAL CHANGES - LESS RESTRICTIVE
(ITS 3.3.1 Discussion of Changes Labeled L.3) (continued)

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

The proposed change will add a Note to the CHANNEL FUNCTIONAL TEST for the Logarithmic Power Level channels, SR 3.3.1.7. This Note states that the CHANNEL FUNCTIONAL TEST is not required until 2 hours after reducing Thermal Power below 1E -4% RTP and only if RTCBs are closed. This is related to DOC Item L.1. The Logarithmic Power Level - High function will not be required to be Operable or Surveillance tested in Mode 1 or in Mode 2 unless RTCBs are closed. This Note states that the Logarithmic Power Level -High CHANNEL FUNCTIONAL TEST is not required to be performed until 2 hours after power is reduced below 1E -4% RTP and only if RTCBs are closed. This Note will insure that the Functional test is performed after entry into a Mode that requires OPERABILITY of the channel. The two hour time limit is needed to provide sufficient time to perform the required testing.

This change is consistent with NUREG-1432. This change does not result in any hardware changes or changes to plant operating practices nor does it affect plant operation. Therefore this change will not involve a significant increase in the probability or consequences of an accident previously evaluated.

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

The proposed change will add a Note to the CHANNEL FUNCTIONAL TEST for the Logarithmic Power Level channels, SR 3.3.1.7. This Note states that the CHANNEL FUNCTIONAL TEST is not required until 2 hours after reducing Thermal Power below 1E -4% RTP and only if RTCBs are closed. This is related to DOC Item L.1. The Logarithmic Power Level - High function will not be required to be Operable or Surveillance tested in Mode 1 or in Mode 2 unless RTCBs are closed. This Note states that the Logarithmic Power Level -High CHANNEL FUNCTIONAL TEST is not required to be performed until 2 hours after power is reduced below 1E -4% RTP and only if RTCBs are closed. This Note will insure that the Functional test is performed after entry into a Mode that requires OPERABILITY of the channel. The two hour time limit is needed to provide sufficient time to perform the required testing.

TECHNICAL CHANGES - LESS RESTRICTIVE
(ITS 3.3.1 Discussion of Changes Labeled L.3) (continued)

This change is consistent with NUREG-1432. This change will not alter the plant configuration (no new or different type of equipment will be installed) or change the methods of governing normal plant operation. This change will not alter assumptions made in the safety analysis or licensing basis. Therefore, this change will not create the possibility of a new or different kind of accident from any accident previously evaluated.

Standard 3.-- Does the proposed change involve a significant reduction in a margin of safety?

The proposed change will add a Note to the CHANNEL FUNCTIONAL TEST for the Logarithmic Power Level channels, SR 3.3.1.7. This Note states that the CHANNEL FUNCTIONAL TEST is not required until 2 hours after reducing Thermal Power below 1E -4% RTP and only if RTCBs are closed. This is related to DOC Item L.1. The Logarithmic Power Level - High function will not be required to be Operable or Surveillance tested in Mode 1 or in Mode 2 unless RTCBs are closed. This Note states that the Logarithmic Power Level -High CHANNEL FUNCTIONAL TEST is not required to be performed until 2 hours after power is reduced below 1E -4% RTP and only if RTCBs are closed. This Note will insure that the Functional test is performed after entry into a Mode that requires OPERABILITY of the channel. The two hour time limit is needed to provide sufficient time to perform the required testing.

This change will not reduce a margin of safety since it has no impact on safety analysis assumptions. This change is consistent with NUREG-1432, which was approved by the NRC Staff. Therefore, this change does not result in a reduction in a margin of safety.

TECHNICAL CHANGES - LESS RESTRICTIVE
(ITS 3.3.1 Discussion of Changes Labeled L.4)

Arizona Public Service Company, Palo Verde Nuclear Generating Station (PVNGS), Units 1, 2, and 3 is converting to the ITS as outlined in NUREG-1432. The proposed change involves making the CTS less restrictive. Below is the description of this less restrictive change and the NSHC for conversion to NUREG-1432.

L.4 CTS Table 4.3-1 Note (2) states that above 15% RTP the linear power levels, CPC delta T power, and CPC nuclear power signals are adjusted to agree with the calorimetric calculation. The ITS requires the testing 12 hours after thermal power is greater than or equal to 20% RTP. The 12 hours after reaching 20% RTP is required for plant stabilization, data taking, and flow verification. The 20% RTP level is used to improve the accuracy of the data used in the calorimetric calculation. The accuracy of the calorimetric calculation at lower power levels is questionable. The 20% RTP power level is a much more stable power level to perform this testing. The testing ensures the Variable Over Power Trip (VOPT), Departure from Nucleate Boiling Ratio, (DNBR), and Local Power Density (LPD) functions are calibrated using the calorimetric data. AT 20% percent power there is sufficient margin to the DNBR and LPD setpoints to compensate for any small inaccuracy in the CPC delta T power and CPC nuclear power. The VOPT rate function is not affected by an offset in the power level measurement since it is monitoring the rate of change of the power level, and transients at this power level are terminated by the rate function prior to reaching the maximum power setpoint. This change is consistent with NUREG-1423.

The Commission has provided standards for determining whether a significant hazards consideration exists as stated in 10 CFR 50.92. A proposed amendment to an operating license for a facility involves a no significant hazards consideration if operation of the facility, in accordance with a proposed amendment, would not 1) involve a significant increase in the probability or consequences of an accident previously evaluated; 2) create the possibility of a new or different kind of accident from any accident previously evaluated; or 3) involve a significant reduction in a margin of safety. A discussion of these standards as they relate to this amendment request follows:

TECHNICAL CHANGES - LESS RESTRICTIVE
(ITS 3.3.1 Discussion of Changes Labeled L.4) (continued)

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

The proposed change will require that above 20% RTP the linear power levels, CPC delta T power, and CPC nuclear power signals are adjusted to agree with the calorimetric calculation. The testing is required within 12 hours after thermal power is greater than or equal to 20% RTP. The 12 hours after reaching 20% RTP is required for plant stabilization, data taking, and flow verification. The CTS requires this test to be performed above 15% RTP. The 20% RTP level is used in the ITS for this testing to improve the accuracy of the data. The accuracy of the calorimetric calculation at lower power levels is questionable because of the low signal to noise ratio of the calorimetric calculation input signals.

This change is consistent with NUREG-1432. This change does not result in any hardware changes or changes to plant operating practices nor does it affect plant operation. Therefore this change will not involve a significant increase in the probability or consequences of an accident previously evaluated.

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

The proposed change will require that above 20% RTP the linear power levels, CPC delta T power, and CPC nuclear power signals are adjusted to agree with the calorimetric calculation. The testing is required within 12 hours after thermal power is greater than or equal to 20% RTP. The 12 hours after reaching 20% RTP is required for plant stabilization, data taking, and flow verification. The CTS requires this test to be performed above 15% RTP. The 20% RTP level is used in the ITS for this testing to improve the accuracy of the data. The accuracy of the calorimetric calculation at lower power levels is questionable because of the low signal to noise ratio of the calorimetric calculation input signals.

This change is consistent with NUREG-1432. This change will not alter the plant configuration (no new or different type of equipment will be installed) or change the methods of governing normal plant operation. This change will not alter assumptions made in the safety analysis or licensing basis. Therefore, this change will not create the possibility of a new or different kind of accident from any accident previously evaluated.

TECHNICAL CHANGES - LESS RESTRICTIVE
(ITS 3.3.1 Discussion of Changes Labeled L.4) (continued)

Standard 3.-- Does the proposed change involve a significant reduction in a margin of safety?

The proposed change will require that above 20% RTP the linear power levels, CPC delta T power, and CPC nuclear power signals are adjusted to agree with the calorimetric calculation. The testing is required within 12 hours after thermal power is greater than or equal to 20% RTP. The 12 hours after reaching 20% RTP is required for plant stabilization, data taking, and flow verification. The CTS requires this test to be performed above 15% RTP. The 20% RTP level is used in the ITS for this testing to improve the accuracy of the data. The accuracy of the calorimetric calculation at lower power levels is questionable because of the low signal to noise ratio of the calorimetric calculation input signals.

This change will not reduce a margin of safety since it has no impact on safety analysis assumptions. This change is consistent with NUREG-1432, which was approved by the NRC Staff. Therefore, this change does not result in a reduction in a margin of safety.

TECHNICAL CHANGES - LESS RESTRICTIVE
(ITS 3.3.1 Discussion of Changes Labeled L.5)

Arizona Public Service Company, Palo Verde Nuclear Generating Station (PVNGS), Units 1, 2, and 3 is converting to the ITS as outlined in NUREG-1432. The proposed change involves making the CTS less restrictive. Below is the description of this less restrictive change and the NSHC for conversion to NUREG-1432.

L.5 CTS Table 4.3-1 Notes (3), (7), and (8) require testing to be performed above specific power levels. There is no specific time allowed after reaching that power level to perform the testing. ITS allows 12 hours after reaching the power level to allow time for plant stabilization and testing. This is less restrictive than the current practice. The testing required by Table Notes (7) and (8) is required by plant procedures within 12 hours of exceeding the power level specified in the Note. The ITS is consistent with the current operating practice. The testing required by Note (3) is performed within 12 hours of reaching 15% power.

This is based on the time required for plant stabilization for the performance of the testing.

This testing ensures the three excore linear subchannel gains are consistent with the shape annealing matrix elements calculated by SR 3.3.1.11. The shape annealing matrix elements are used to improve the accuracy of the Axial Shape Index calculation in the Core Protection Calculations (CPC). This change is consistent with NUREG-1432.

The Commission has provided standards for determining whether a significant hazards consideration exists as stated in 10 CFR 50.92. A proposed amendment to an operating license for a facility involves a no significant hazards consideration if operation of the facility, in accordance with a proposed amendment, would not 1) involve a significant increase in the probability or consequences of an accident previously evaluated; 2) create the possibility of a new or different kind of accident from any accident previously evaluated; or 3) involve a significant reduction in a margin of safety. A discussion of these standards as they relate to this amendment request follows:

TECHNICAL CHANGES - LESS RESTRICTIVE
(ITS 3.3.1 Discussion of Changes Labeled L.5) (continued)

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

The proposed change will allow 12 hours to perform the testing required by SR 3.3.1.2, SR 3.3.1.5, and SR 3.3.1.6. The CTS Table 4.3-1 Notes (3), (7), and (8) require testing to be performed above specific power levels. There is no specific time allowed after reaching that power level to perform the testing. The 12 hours after exceeding the power level specified by the SRs is based on the time required for plant stabilization, data taking, and for flow verification. The testing is performed prior to increasing the power level above the power levels specified in the SRs to insure the operability of the functions as required by the plant safety analysis.

This change is consistent with NUREG-1432. This change does not result in any hardware changes or changes to plant operating practices nor does it affect plant operation. Therefore this change will not involve a significant increase in the probability or consequences of an accident previously evaluated.

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

The proposed change will allow 12 hours to perform the testing required by SR 3.3.1.2, SR 3.3.1.5, and SR 3.3.1.6. The CTS Table 4.3-1 Notes (3), (7), and (8) require testing to be performed above specific power levels. There is no specific time allowed after reaching that power level to perform the testing. The 12 hours after exceeding the power level specified by the SRs is based on the time required for plant stabilization, data taking, and for flow verification. The testing is performed prior to increasing the power level above the power levels specified in the SRs to insure the operability of the functions as required by the plant safety analysis.

This change is consistent with NUREG-1432. This change will not alter the plant configuration (no new or different type of equipment will be installed) or change the methods of governing normal plant operation. This change will not alter assumptions made in the safety analysis or licensing basis. Therefore, this change will not create the possibility of a new or different kind of accident from any accident previously evaluated.

TECHNICAL CHANGES - LESS RESTRICTIVE
(ITS 3.3.1 Discussion of Changes Labeled L.5) (continued)

Standard 3.-- Does the proposed change involve a significant reduction in a margin of safety?

The proposed change will allow 12 hours to perform the testing required by SR 3.3.1.2, SR 3.3.1.5, and SR 3.3.1.6. The CTS Table 4.3-1 Notes (3), (7), and (8) require testing to be performed above specific power levels. There is no specific time allowed after reaching that power level to perform the testing. The 12 hours after exceeding the power level specified by the SRs is based on the time required for plant stabilization, data taking, and for flow verification. The testing is performed prior to increasing the power level above the power levels specified in the SRs to insure the operability of the functions as required by the plant safety analysis.

This change will not reduce a margin of safety since it has no impact on safety analysis assumptions. This change is consistent with NUREG-1432, which was approved by the NRC Staff. Therefore, this change does not result in a reduction in a margin of safety.

TECHNICAL CHANGES - LESS RESTRICTIVE
(ITS 3.3.1 Discussion of Changes Labeled L.6)

Arizona Public Service Company, Palo Verde Nuclear Generating Station (PVNGS), Units 1, 2, and 3 is converting to the ITS as outlined in NUREG-1432. The proposed change involves making the CTS less restrictive. Below is the description of this less restrictive change and the NSHC for conversion to NUREG-1432.

L.6 CTS Table 3.3-1, Action 2 states in part; "The channel shall be returned to OPERABLE status no later than during the next COLD SHUTDOWN." The ITS states that the channel will be restored to operable status "prior to entering MODE 2 following the next MODE 5 entry." The CTS Action states that the channel must be returned to OPERABLE status prior to leaving cold shutdown. The RPS instrumentation is not required to be OPERABLE until Mode 2 so the ITS will not require the instrumentation to be OPERABLE until that time. Since the instrumentation in this specification is not required to be OPERABLE in Modes 3, 4, and 5, the failure to restore the equipment to OPERABLE status in these Modes following a Mode 5 entry, this does not affect the OPERABILITY of the RPS. This change is consistent with NUREG-1432.

The Commission has provided standards for determining whether a significant hazards consideration exists as stated in 10 CFR 50.92. A proposed amendment to an operating license for a facility involves a no significant hazards consideration if operation of the facility, in accordance with a proposed amendment, would not 1) involve a significant increase in the probability or consequences of an accident previously evaluated; 2) create the possibility of a new or different kind of accident from any accident previously evaluated; or 3) involve a significant reduction in a margin of safety. A discussion of these standards as they relate to this amendment request follows:

TECHNICAL CHANGES - LESS RESTRICTIVE
(ITS 3.3.1 Discussion of Changes Labeled L.6) (continued)

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

The proposed change will require than an inoperable RPS channel be restored to operable status "prior to entering MODE 2 following the next MODE 5 entry". CTS Table 3.3-1, Action 2 states in part: "The channel shall be returned to OPERABLE status no later than during the next COLD SHUTDOWN". The CTS Action implies that the channel must be returned to Operable status prior to leaving cold shutdown. The RPS instrumentation is not required to be Operable until Mode 2 so the ITS will not require the instrumentation to be Operable until that time. In some cases the equipment cannot be made Operable during the cold shutdown because of retesting that requires higher Modes to complete. The ITS will insure that a failed RPS channel is repaired prior to resumption of power operations following a Mode 5 entry.

This change is consistent with NUREG-1432. This change does not result in any hardware changes or changes to plant operating practices nor does it affect plant operation. Therefore this change will not involve a significant increase in the probability or consequences of an accident previously evaluated.

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

The proposed change will the channel will require than an inoperable RPS channel be restored to operable status "prior to entering MODE 2 following the next MODE 5 entry". CTS Table 3.3-1, Action 2 states in part: "The channel shall be returned to OPERABLE status no later than during the next COLD SHUTDOWN". The CTS Action implies that the channel must be returned to Operable status prior to leaving cold shutdown. The RPS instrumentation is not required to be Operable until Mode 2 so the ITS will not require the instrumentation to be Operable until that time. In some cases the equipment cannot be made Operable during the cold shutdown because of retesting that requires higher Modes to complete. The ITS will insure that a failed RPS channel is repaired prior to resumption of power operations following a Mode 5 entry.

TECHNICAL CHANGES - LESS RESTRICTIVE
(ITS 3.3.1 Discussion of Changes Labeled L.6) (continued)

This change is consistent with NUREG-1432. This change will not alter the plant configuration (no new or different type of equipment will be installed) or change the methods of governing normal plant operation. This change will not alter assumptions made in the safety analysis or licensing basis. Therefore, this change will not create the possibility of a new or different kind of accident from any accident previously evaluated.

Standard 3.-- Does the proposed change involve a significant reduction in a margin of safety?

The proposed change will the channel will require than an inoperable RPS channel be restored to operable status "prior to entering MODE 2 following the next MODE 5 entry". CTS Table 3.3-1, Action 2 states in part: "The channel shall be returned to OPERABLE status no later than during the next COLD SHUTDOWN". The CTS Action implies that the channel must be returned to Operable status prior to leaving cold shutdown. The RPS instrumentation is not required to be Operable until Mode 2 so the ITS will not require the instrumentation to be Operable until that time. In some cases the equipment cannot be made Operable during the cold shutdown because of retesting that requires higher Modes to complete. The ITS will insure that a failed RPS channel is repaired prior to resumption of power operations following a Mode 5 entry.

This change will not reduce a margin of safety since it has no impact on safety analysis assumptions. This change is consistent with NUREG-1432, which was approved by the NRC Staff. Therefore, this change does not result in a reduction in a margin of safety.

TECHNICAL CHANGES - LESS RESTRICTIVE
(ITS 3.3.1 Discussion of Changes Labeled L.7)

Arizona Public Service Company, Palo Verde Nuclear Generating Station (PVNGS), Units 1, 2, and 3 is converting to the ITS as outlined in NUREG-1432. The proposed change involves making the CTS less restrictive. Below is the description of this less restrictive change and the NSHC for conversion to NUREG-1432.

L.7 CTS LCO 3.3.1 states in part; "that the instrument channels and bypasses in Table 3.3-1 shall be OPERABLE". The ITS LCO 3.3.1 states the "instrument and bypass removal channels for each function in Table 3.3.1-1 shall be OPERABLE". The bypass functions are manually enabled when plant conditions allow, and are automatically removed when plant conditions change and the bypass is no longer allowed. The ITS will clarify that only the automatic bypass removal function affects the OPERABILITY of the channel. The ability to manually bypass a function is needed to prevent unnecessary trips when plant conditions are such that the protective function is not needed. If the channel cannot be manually bypassed it does not affect the ability of the channel to provide the trip function when needed therefore it does not affect the OPERABILITY of the channel. This change is consistent with NUREG-1432.

The Commission has provided standards for determining whether a significant hazards consideration exists as stated in 10 CFR 50.92. A proposed amendment to an operating license for a facility involves a no significant hazards consideration if operation of the facility, in accordance with a proposed amendment, would not 1) involve a significant increase in the probability or consequences of an accident previously evaluated; 2) create the possibility of a new or different kind of accident from any accident previously evaluated; or 3) involve a significant reduction in a margin of safety. A discussion of these standards as they relate to this amendment request follows:

TECHNICAL CHANGES - LESS RESTRICTIVE
(ITS 3.3.1 Discussion of Changes Labeled L.7) (continued)

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

The proposed change will remove the requirement for an operable RPS channel operational bypass function. The ITS LCO 3.3.1 states the "instrument and bypass removal channels for each function in Table 3.3.1-1 shall be OPERABLE". The bypass functions are manually enabled when plant conditions allow, and are automatically removed when plant conditions change and the bypass is no longer allowed. The ITS will clarify that only the automatic bypass removal function affects the OPERABILITY of the channel. The ability to manually bypass a function is needed to prevent unnecessary trips when plant conditions are such that the protective function is not needed. If the channel cannot be manually bypassed it does not affect the ability of the channel to provide the trip function when needed therefore it does not affect the OPERABILITY of the channel.

This change is consistent with NUREG-1432. This change does not result in any hardware changes or changes to plant operating practices nor does it affect plant operation. Therefore this change will not involve a significant increase in the probability or consequences of an accident previously evaluated.

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

The proposed change will remove the requirement for an operable RPS channel operational bypass function. The ITS LCO 3.3.1 states the "instrument and bypass removal channels for each function in Table 3.3.1-1 shall be OPERABLE". The bypass functions are manually enabled when plant conditions allow, and are automatically removed when plant conditions change and the bypass is no longer allowed. The ITS will clarify that only the automatic bypass removal function affects the OPERABILITY of the channel. The ability to manually bypass a function is needed to prevent unnecessary trips when plant conditions are such that the protective function is not needed. If the channel cannot be manually bypassed it does not affect the ability of the channel to provide the trip function when needed therefore it does not affect the OPERABILITY of the channel.

TECHNICAL CHANGES - LESS RESTRICTIVE
(ITS 3.3.1 Discussion of Changes Labeled L.7) (continued)

This change is consistent with NUREG-1432. This change will not alter the plant configuration (no new or different type of equipment will be installed) or change the methods of governing normal plant operation. This change will not alter assumptions made in the safety analysis or licensing basis. Therefore, this change will not create the possibility of a new or different kind of accident from any accident previously evaluated.

Standard 3.-- Does the proposed change involve a significant reduction in a margin of safety?

The proposed change will remove the requirement for an operable RPS channel operational bypass function. The ITS LCO 3.3.1 states the "instrument and bypass removal channels for each function in Table 3.3.1-1 shall be OPERABLE". The bypass functions are manually enabled when plant conditions allow, and are automatically removed when plant conditions change and the bypass is no longer allowed. The ITS will clarify that only the automatic bypass removal function affects the OPERABILITY of the channel. The ability to manually bypass a function is needed to prevent unnecessary trips when plant conditions are such that the protective function is not needed. If the channel cannot be manually bypassed it does not affect the ability of the channel to provide the trip function when needed therefore it does not affect the OPERABILITY of the channel.

This change will not reduce a margin of safety since it has no impact on safety analysis assumptions. This change is consistent with NUREG-1432, which was approved by the NRC Staff. Therefore, this change does not result in a reduction in a margin of safety.

TECHNICAL CHANGES - LESS RESTRICTIVE
(ITS 3.3.1 Discussion of Changes Labeled L.8)

Arizona Public Service Company, Palo Verde Nuclear Generating Station (PVNGS), Units 1, 2, and 3 is converting to the ITS as outlined in NUREG-1432. The proposed change involves making the CTS less restrictive. Below is the description of this less restrictive change and the NSHC for conversion to NUREG-1432.

L.8 The ITS provides a new Action for inoperable channel operational bypass removal functions for channels that are equipped with operational bypasses, whereas the CTS requires the channel to be made inoperable and placed in trip channel bypass if the operational bypass removal function is inoperable. The CTS does not provide an action for an inoperable operational bypass removal. The ITS will allow an inoperable operational bypass function to be disabled, with the channel remaining OPERABLE. If the operational bypass function is not disabled the channel is placed in trip channel bypass or tripped. Only the automatic bypass removal function affects the Operability of the channel. The ability to manually bypass a function is needed to prevent unnecessary trips when plant conditions are such that the protective function is not needed. If the channel cannot be manually placed in operational bypass it does not affect the ability of the channel to provide the trip function when needed therefore it does not affect the OPERABILITY of the channel, and operation with a disabled operational bypass has no impact on plant safety. This change allows a channel with a disabled bypass channel to remain Operable. This change will maximize the channel availability by eliminating the need to make the channel inoperable due to the failure of a operating bypass function. The system logic will remain in 2 out of 4 channels required for an RPS trip vs. 2 out of 3 channels required for an RPS trip with an inoperable channel. This change is consistent with NUREG-1432.

The Commission has provided standards for determining whether a significant hazards consideration exists as stated in 10 CFR 50.92. A proposed amendment to an operating license for a facility involves a no significant hazards consideration if operation of the facility, in accordance with a proposed amendment, would not 1) involve a significant increase in the probability or consequences of an accident previously evaluated; 2) create the possibility of a new or different kind of accident from any accident previously evaluated; or 3) involve a significant reduction in a margin of safety. A discussion of these standards as they relate to this amendment request follows:

TECHNICAL CHANGES - LESS RESTRICTIVE
(ITS 3.3.1 Discussion of Changes Labeled L.8) (continued)

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

The proposed change provides Actions for inoperable RPS channel bypass removal function, whereas the CTS provides a set of Actions for an inoperable channel, including the bypass function. This CTS Action is the same whether the trip function is inoperable or the bypass function is inoperable. The ITS will allow an inoperable bypass function to be disabled, with the channel remaining Operable. If the bypass function is not disabled the channel is bypassed or tripped. Only the automatic bypass removal function affects the safety function of the channel. The ability to manually bypass a function is needed to prevent unnecessary trips when plant conditions are such that the protective function is not needed. If the channel cannot be manually bypassed it does not affect the ability of the channel to provide the trip function when needed therefore it does not affect the OPERABILITY of the channel. This change allows a channel with a disabled bypass channel to remain Operable. This change will maximize the channel availability by eliminating the need to use the trip channel bypass on an inoperable channel due to the failure of an operational bypass function. The system logic will remain in 2 out of 4 channels required for an RPS trip vs. 2 out of 3 channels required for an RPS trip with an inoperable channel.

This change is consistent with NUREG-1432. This change does not result in any hardware changes or changes to plant operating practices nor does it affect plant operation. Therefore this change will not involve a significant increase in the probability or consequences of an accident previously evaluated.

TECHNICAL CHANGES - LESS RESTRICTIVE
(ITS 3.3.1 Discussion of Changes Labeled L.8) (continued)

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

The proposed change provides Actions for inoperable RPS channel bypass removal function, whereas the CTS provides a set of Actions for an inoperable channel, including the bypass function. This CTS Action is the same whether the trip function is inoperable or the bypass function is inoperable. The ITS will allow an inoperable bypass function to be disabled, with the channel remaining Operable. If the bypass function is not disabled the channel is bypassed or tripped. Only the automatic bypass removal function affects the safety function of the channel. The ability to manually bypass a function is needed to prevent unnecessary trips when plant conditions are such that the protective function is not needed. If the channel cannot be manually bypassed it does not affect the ability of the channel to provide the trip function when needed therefore it does not affect the OPERABILITY of the channel. This change allows a channel with a disabled bypass channel to remain Operable. This change will maximize the channel availability by eliminating the need to use the trip channel bypass on an inoperable channel due to the failure of an operational bypass function. The system logic will remain in 2 out of 4 channels required for an RPS trip vs. 2 out of 3 channels required for an RPS trip with an inoperable channel.

This change is consistent with NUREG-1432. This change will not alter the plant configuration (no new or different type of equipment will be installed) or change the methods of governing normal plant operation. This change will not alter assumptions made in the safety analysis or licensing basis. Therefore, this change will not create the possibility of a new or different kind of accident from any accident previously evaluated.

TECHNICAL CHANGES - LESS RESTRICTIVE
(ITS 3.3.1 Discussion of Changes Labeled L.8) (continued)

Standard 3.-- Does the proposed change involve a significant reduction in a margin of safety?

The proposed change provides Actions for inoperable RPS channel bypass removal function, whereas the CTS provides a set of Actions for an inoperable channel, including the bypass function. This CTS Action is the same whether the trip function is inoperable or the bypass function is inoperable. The ITS will allow an inoperable bypass function to be disabled, with the channel remaining Operable. If the bypass function is not disabled the channel is bypassed or tripped. Only the automatic bypass removal function affects the safety function of the channel. The ability to manually bypass a function is needed to prevent unnecessary trips when plant conditions are such that the protective function is not needed. If the channel cannot be manually bypassed it does not affect the ability of the channel to provide the trip function when needed therefore it does not affect the OPERABILITY of the channel. This change allows a channel with a disabled bypass channel to remain Operable. This change will maximize the channel availability by eliminating the need to use the trip channel bypass on an inoperable channel due to the failure of an operational bypass function. The system logic will remain in 2 out of 4 channels required for an RPS trip vs. 2 out of 3 channels required for an RPS trip with an inoperable channel.

This change will not reduce a margin of safety since it has no impact on safety analysis assumptions. This change is consistent with NUREG-1432, which was approved by the NRC Staff. Therefore, this change does not result in a reduction in a margin of safety.

TECHNICAL CHANGES - LESS RESTRICTIVE
(ITS 3.3.1 Discussion of Changes Labeled L.9)

Arizona Public Service Company, Palo Verde Nuclear Generating Station (PVNGS), Units 1, 2, and 3 is converting to the ITS as outlined in NUREG-1432. The proposed change involves making the CTS less restrictive. Below is the description of this less restrictive change and the NSHC for conversion to NUREG-1432.

L.9 CTS SR 4.3.1.6 requires the CPCs to be FUNCTIONAL TESTED within 12 hours of a cabinet high temperature alarm. The ITS 3.3.1 Action E requires a FUNCTIONAL TEST on the affected CPC. There are separate cooling systems and high temperature alarms for each channel. A high temperature alarm in a channel may indicate the CPC is less reliable and a FUNCTIONAL TEST to verify OPERABILITY is needed. The other CPC channels have not been exposed to the high temperature and therefore a FUNCTIONAL TEST is not needed for the other channels. This change is consistent with NUREG-1432.

The Commission has provided standards for determining whether a significant hazards consideration exists as stated in 10 CFR 50.92. A proposed amendment to an operating license for a facility involves a no significant hazards consideration if operation of the facility, in accordance with a proposed amendment, would not 1) involve a significant increase in the probability or consequences of an accident previously evaluated; 2) create the possibility of a new or different kind of accident from any accident previously evaluated; or 3) involve a significant reduction in a margin of safety. A discussion of these standards as they relate to this amendment request follows:

TECHNICAL CHANGES - LESS RESTRICTIVE
(ITS 3.3.1 Discussion of Changes Labeled L.9) (continued)

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

The proposed change will modify the requirements of CTS SR 4.3.1.6. This requires the CPCs to be FUNCTIONAL TESTED within 12 hours of a cabinet high temperature alarm. The ITS 3.3.1 Action E requires a FUNCTIONAL TEST only on the affected CPC. There are separate cooling systems and high temperature alarms for each channel. A high temperature alarm in a channel may indicate the CPC in that channel is less reliable and a FUNCTIONAL TEST is needed to verify OPERABILITY. The other CPC channels have not been exposed to the high temperature and therefore a FUNCTIONAL TEST is not needed for the unaffected channels.

This change is consistent with NUREG-1432. This change does not result in any hardware changes or changes to plant operating practices nor does it affect plant operation. Therefore this change will not involve a significant increase in the probability or consequences of an accident previously evaluated.

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

The proposed change will modify the requirements of CTS SR 4.3.1.6. This requires the CPCs to be FUNCTIONAL TESTED within 12 hours of a cabinet high temperature alarm. The ITS 3.3.1 Action E requires a FUNCTIONAL TEST only on the affected CPC. There are separate cooling systems and high temperature alarms for each channel. A high temperature alarm in a channel may indicate the CPC in that channel is less reliable and a FUNCTIONAL TEST is needed to verify OPERABILITY. The other CPC channels have not been exposed to the high temperature and therefore a FUNCTIONAL TEST is not needed for the unaffected channels.

TECHNICAL CHANGES - LESS RESTRICTIVE
(ITS 3.3.1 Discussion of Changes Labeled L.9) (continued)

This change is consistent with NUREG-1432. This change will not alter the plant configuration (no new or different type of equipment will be installed) or change the methods of governing normal plant operation. This change will not alter assumptions made in the safety analysis or licensing basis. Therefore, this change will not create the possibility of a new or different kind of accident from any accident previously evaluated.

Standard 3.-- Does the proposed change involve a significant reduction in a margin of safety?

The proposed change will modify the requirements of CTS SR 4.3.1.6. This requires the CPCs to be FUNCTIONAL TESTED within 12 hours of a cabinet high temperature alarm. The ITS 3.3.1 Action E requires a FUNCTIONAL TEST only on the affected CPC. There are separate cooling systems and high temperature alarms for each channel. A high temperature alarm in a channel may indicate the CPC in that channel is less reliable and a FUNCTIONAL TEST is needed to verify OPERABILITY. The other CPC channels have not been exposed to the high temperature and therefore a FUNCTIONAL TEST is not needed for the unaffected channels.

This change will not reduce a margin of safety since it has no impact on safety analysis assumptions. This change is consistent with NUREG-1432, which was approved by the NRC Staff. Therefore, this change does not result in a reduction in a margin of safety.

CE STS

NUREG-1432 REV. 1

SPECIFICATION 3.3.2

MARK UP

<DOC>
<CTS>

3.3 INSTRUMENTATION

3.3.2 Reactor Protective System (RPS) Instrumentation—Shutdown ~~(Digital)~~ (4)

<3.3.1>

<DOC L.5>

LCO 3.3.2 (1) Four RPS ~~Logarithmic Power Level—High~~ trip ~~channels and associated instrument~~ and bypass removal channels for each Function in Table 3.3.2-1 shall be OPERABLE. ~~Trip channels shall have an Allowable Value of ≤ [.93]% RTP.~~

APPLICABILITY: (1) ~~MODES 3, 4, and 5, with any reactor trip circuit breakers (RTCBs) closed and any control element assembly capable of being withdrawn.~~

~~-----NOTE-----~~
~~Trip may be bypassed when THERMAL POWER is > [1E-4]% RTP. Bypass shall be automatically removed when THERMAL POWER is ≤ [1E-4]% RTP.~~

<DOC A.3> According to Table 3.3.2-1

ACTIONS

~~-----NOTE-----~~
~~If a channel is placed in bypass, continued operation with the channel in the bypassed condition for the Completion Time specified by Required Action A.2 or C.2.2 shall be reviewed in accordance with Specification 5.5.1.2.e.~~ (2)

CONDITION	REQUIRED ACTION	COMPLETION TIME
A. ~~One RPS logarithmic power level trip channel inoperable.~~ (1) One or more functions with one automatic RPS trip channel inoperable	A.1 Place channel in bypass or trip. AND A.2 Restore channel to OPERABLE status.	1 hour Prior to entering MODE 2 following next MODE 5 entry

<Table 3.3-1 Table notations Action 2>

<DOC A.7>

(continued)

(1) Note
Separate condition entry is allowed for each RPS Function

ACTIONS (continued)

	CONDITION	REQUIRED ACTION	COMPLETION TIME
<DOC A8> <Table 3.3-1 Table notation ACTION 3>	B. ~~Two RPS logarithmic power level trip channels inoperable.~~ 1 One or more functions with two automatic RPS trip channels inoperable	B.1 ---------NOTE--------- LCO 3.0.4 is not applicable. --------------------- Place one channel in bypass and place the other in trip.	 1 hour
<Table 3.3-1 Table notation ACTION 2> <DOC L.5>	C. One or more functions with One automatic bypass removal channel inoperable. 1	C.1 Disable bypass channel. OR C.2.1 Place affected automatic trip channel in bypass or trip. AND C.2.2 Restore bypass removal channel and associated automatic trip channel to OPERABLE status.	1 hour 1 hour Prior to entering MODE 2 following next MODE 5 entry
<DOC L.5>	D. One or more functions with Two automatic bypass removal channels inoperable.	------------NOTE------------ LCO 3.0.4 is not applicable. --------------------------- D.1 Disable bypass channels. OR	 1 hour (continued)

ACTIONS

CONDITION	REQUIRED ACTION	COMPLETION TIME
<Table 3.3-1 table notation ACTION 3> D. (continued)	D.2 Place one affected automatic trip channel in bypass and place the other in trip.	1 hour
<DOC M.2> E. Required Action and associated Completion Time not met.	E.1 Open all RTCBs.	1 hour

SURVEILLANCE REQUIREMENTS

SURVEILLANCE (1)	FREQUENCY
SR 3.3.2.1 Perform a CHANNEL CHECK of each ~~logarithmic power~~ RPS Instrument channel. <4.3.1.1><Table 4.3-1>	12 hours
SR 3.3.2.2 Perform a CHANNEL FUNCTIONAL TEST on each ~~logarithmic power~~ (1) channel. <4.3.1.1><Table 4.3-1>	92 days
SR 3.3.2.3 Perform a CHANNEL FUNCTIONAL TEST on each automatic bypass removal function. <4.3.1.2><Table 4.3-1>	Once within 92 days prior to each reactor startup

(continued)

(1) Note

Refer to Table 3.3.2-1 to determine which SR shall be performed for each RPS function

SURVEILLANCE REQUIREMENTS (continued)

SURVEILLANCE		FREQUENCY
SR 3.3.2.4	--------------------NOTE-------------------- Neutron detectors are excluded from CHANNEL CALIBRATION. -- 1 Perform a CHANNEL CALIBRATION on each ~~logarithmic power~~ channel, including bypass removal function. <4.3.1.1 Table 4.3-1>	18 months
<4.3.1.3> SR 3.3.2.5	Verify RPS RESPONSE TIME is within limits.	18 months on a STAGGERED TEST BASIS

Note

Neutron detectors are excluded 3

<Table 3.3-1>
<Table 4.3-1>

RPS INSTRUMENTATION-SHUTDOWN
3.3.2

Table 3.3.2-1 (1)

Reactor Protective System Instrumentation - Shutdown

FUNCTION	APPLICABLE MODES OR OTHER SPECIFIED CONDITION	SURVEILLANCE REQUIREMENTS	ALLOWABLE VALUE
1. Logarithmic Power level-High$^{(d)}$	$3^{(a)}, 4^{(a)}, 5^{(a)}$	SR 3.3.2.1 SR 3.3.2.2 SR 3.3.2.3 SR 3.3.2.4 SR 3.3.2.5	≤ 0.011% RTP$^{(c)}$ (5)
2. Steam Generator #1 Pressure-Low$^{(b)}$	$3^{(a)}$	SR 3.3.2.1 SR 3.3.2.2 SR 3.3.2.4 SR 3.3.2.5	≥ 890 psia
3. Steam Generator #2 Pressure-low$^{(b)}$	$3^{(a)}$	SR 3.3.2.1 SR 3.3.2.2 SR 3.3.2.4 SR 3.3.2.5	≥ 890 psia

(a) With any Reactor Trip Circuit Breakers (RTCBs) closed and any control element assembly capable of withdrawl

(b) The setpoint may be decreased as steam pressure is reduced, provided the margin between steam pressure and the setpoint is maintained ≤ 200 psig. The setpoint shall be automatically increased to the normal setpoint as steam pressure is increased.

(c) The setpoint must be reduced to $\leq 10^{-4}$% RTP when less than 4 RCPs are running.

(d) Trip may be bypassed when THERMAL POWER is > 1E-4% RTP. Bypass shall be automatically removed when THERMAL POWER is ≤ 1E-4% RTP.

CE STS

NUREG-1432 REV. 1

SPECIFICATION 3.3.2

BASES MARK UP

B 3.3 INSTRUMENTATION

B 3.3.2 Reactor Protective System (RPS) Instrumentation—Shutdown ~~(Digital)~~ 4

BASES

BACKGROUND

The RPS initiates a reactor trip to protect against violating the core fuel design limits and reactor coolant pressure boundary (RCPB) integrity 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 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

(continued)

BASES

BACKGROUND (continued)

occurrence. Meeting the acceptable dose limit for an accident category is considered having acceptable consequences for that event.

The RPS is segmented into four interconnected modules. These modules are:

- Measurement channels;
- Bistable trip units;
- RPS Logic; and
- Reactor trip circuit breakers (RTCBs).

This LCO applies ~~only~~ to the Logarithmic Power Level—High trip in MODES 3, 4, and 5 with the RTCBs closed. In MODES 1 and 2, this trip Function is addressed in LCO 3.3.1, "Reactor Protective System ~~(RPS) Instrumentation—Operating.~~" LCO 3.3.~~13~~ 12, "~~[Logarithmic] Power Monitoring Channels,~~" Boron Dilution Alarm System (BDAS) applies when the RTCBs are open. ~~In the case of LCO 3.3.13, the logarithmic channels are required for monitoring neutron flux, although the trip Function is not required.~~ 5

INSERT

Measurement Channels and Bistable Trip Units

The measurement channels providing input to the Logarithmic Power Level—High trip consist of the four logarithmic nuclear instrumentation channels detecting neutron flux leakage from the reactor vessel. Other aspects of the Logarithmic Power Level—High trip are similar to the other measurement channels and bistables. These are addressed in the Background section of LCO 3.3.1.

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. Nuclear instrumentation can be similarly tested. ~~FSAR~~ UFSAR, Section ~~[~~7.2~~]~~ (Ref. 3), provides more detail on RPS testing. 4

(continued)

INSERT FOR ITS 3.3.2 BASES BACKGROUND SECTION

INSERT 1

This LCO applies to the Steam Generator #1 and the Steam Generator #2 Pressure - Low trip in MODE 3 with the RTCBs closed. In MODES 1 and 2, this trip function is addressed in LCO 3.3.1, "Reactor Protective System (RPS) Instrumentation - Operating."

BASES (continued)

APPLICABLE SAFETY ANALYSES

The RPS functions to maintain the SLs during AOOs and mitigates the consequence of DBAs in all MODES in which the RTCBs are closed.

Each of the analyzed transients and accidents can be detected by one or more RPS Functions. ~~Functions not specifically credited in the accident analysis were qualitatively credited in the safety analysis and the NRC staff approved licensing basis for the plant. Noncredited Functions include the Steam Generator Water Level—High and the Loss of Load. The Steam Generator Water Level—High and the Loss of Load trips are purely equipment protective, and their use minimizes the potential for equipment damage.~~ 5

The Logarithmic Power Level—High trip protects the integrity of the fuel cladding and helps protect the RCPB in the event of an unplanned criticality from a shutdown condition.

INSERT 1

1 , and excessive cooldown due to a MSLB

In MODES 2, 3, 4, and 5, with the RTCBs closed, and the Control Element Assembly (CEA) Drive System capable of CEA withdrawal, protection is required for CEA withdrawal events originating when THERMAL POWER is < 1E-4% RTP. For events originating above this power level, other trips provide adequate protection.

MODES 3, 4, and 5, with the RTCBs closed, are addressed in this LCO. MODE 2 is addressed in LCO 3.3.1.

In MODES 3, 4, or 5, with the RTCBs open or the CEAs not capable of withdrawal, the Logarithmic Power Level—High trip does not have to be OPERABLE. ~~However, the indication and alarm portion of two logarithmic channels must be OPERABLE to ensure proper indication of neutron population and to indicate a boron dilution event.~~ The indication and alarm functions required to indicate a boron dilution event are addressed in LCO 3.3.13. 5 "Boron Dilution Alarm System (BDAS)"

INSERT 2

The RPS satisfies Criterion 3 of ~~the NRC Policy Statement.~~ 10CFR 50.36(c)(2)(ii)

LCO

The LCO requires the Logarithmic Power Level—High ~~RPS Function~~ the Steam Generator #1 Pressure—Low and the Steam Generator #2 Pressure—Low RPS Functions 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 Function.

(continued)

1

INSERT FOR ITS 3.3.2 BASES APPLICABLE SAFETY ANALYSIS SECTION

INSERT 1

(1)

The Steam Generator Pressure - Low trip function provides shutdown margin to prevent or minimize the return to power, following a large Main Steam Line Break (MSLB) in MODE 3.

With less than 4 RCP running the trip setpoint for the Logarithmic power level - high trip is reduced to $\leq 10^{-4}$ %RTP. The lower setpoint is required for a bank CEA withdrawal with less than 4 RCPs running.

INSERT FOR ITS 3.3.2 BASES, APPLICABLE SAFETY ANALYSIS SECTION

INSERT 2

5

Interlocks/Bypasses

The operating bypasses and their Allowable Values are addressed in footnotes to Table 3.3.2-1. They are not otherwise addressed as specific Table entries.

The automatic operating bypass removal features must function as a backup to manual actions for all safety related trips to insure the trip Functions are not operationally bypassed when the safety analysis assumes the Functions are not bypassed. The basis for the Logarithmic Power Level - High operating bypass is discussed in the LCO section.

BASES

LCO (continued)

Actions allow maintenance (trip channel) bypass of individual channels, but the bypass activates interlocks that prevent operation with a second channel in the same Function bypassed. With one channel in each Function trip channel bypassed, this effectively places the plant in a two-out-of-three logic configuration in those Functions. ~~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).~~ 5

Only the Allowable Values are specified for this RPS trip Function in the LCO. Nominal trip setpoints are specified in the plant specific setpoint calculations. The nominal setpoint is selected to ensure 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 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. 4). A channel is inoperable if its actual trip setpoint is not within its required Allowable Value.

This LCO requires all four channels of the Logarithmic Power Level—High to be OPERABLE ~~in MODE 2, and~~ in MODE 3, 4, or 5 when the RTCBs are closed and the CEA Drive System is capable of CEA withdrawal. 4

INSERT

The Allowable Value ~~is~~ sare high enough to provide an operating envelope that prevents unnecessary Logarithmic Power Level—High reactor trips during normal plant operations. The Allowable Value ~~is~~ sare low enough for the system to maintain ~~a safety margin~~ for unacceptable fuel cladding damage should a CEA withdrawal event or MSLB ~~occur~~. 4

The Logarithmic Power Level—High trip may be bypassed when THERMAL POWER is above 1E-4% RTP to allow the reactor to be brought to power during a reactor startup. This bypass is automatically removed when THERMAL POWER decreases below 1E-4% RTP. Above 1E-4% RTP, the ~~Linear Power Level~~ Variable Over Power—High 5

(continued)

INSERT FOR ITS 3.3.2 BASES LCO SECTION

INSERT 3

(1)

This LCO requires all four channels of Steam Generator #1 Pressure-Low, and Steam Generator #2 Pressure-Low, to be OPERABLE in MODE 3, when the RTCBs are closed and the CEA Drive System is capable of CEA withdrawal. These RPS functions are not required in MODES 4 and 5 because the Steam Generator temperature is low therefore the energy release and resulting cooldown following a large MSLB in MODES 4 and 5 not significant.

(5)

A CEA is considered capable of withdrawal when power is applied to the Control Element Drive Mechanisms (CEDMs). There are several methods used to remove power from the CEDMs, such as de-energizing the CEDM MGs, opening the CEDM MG output breakers, opening the Control Element Assembly Control System (CEDMCS) CEA breakers, opening the RTCBs, or disconnecting the power cables from the CEDMs. Any method that removes power from the CEDMs may be used. The CEAs are still capable of withdrawal if the CEDMCS withdrawal circuits are disabled with power applied to the CEDMs because failures in the CEDMCS could result in CEA withdrawal.

This LCO is applicable to the RPS Instrumentation in MODES 3, 4, and 5 with any RTCB closed and any CEA capable of withdrawal. LCO 3.3.1 is applicable to the RPS Instrumentation in MODES 1 and 2. The requirements for the CEACs in MODES 1 and 2 are addressed in LCO 3.3.3. The RPS matrix Logic, Initiation Logic, RTCBs, and Manual Trips in MODES 1, 2, 3, 4, and 5 are addressed in LCO 3.3.4

BASES

LCO (continued)

and Pressurizer Pressure—High trips provide protection for reactivity transients.

(5)

~~The trip may be manually bypassed during physics testing pursuant to LCO 3.4.17, "RCS Loops—Test Exceptions." During this testing, the Linear Power Level—High trip and administrative controls provide the required protection.~~

APPLICABILITY

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, which maintains the SLs during AOOs and assists the Engineered Safety Features Actuation System (ESFAS) in providing acceptable consequences during accidents. Most trips are not required to be OPERABLE in MODES 3, 4, and 5. In MODES 3, 4, and 5, the emphasis is placed on return to power events. The reactor is protected in these MODES by ensuring adequate SDM. Exceptions to this are:

- The Logarithmic Power Level—High trip, RPS Logic RTCBs, and Manual Trip are required in MODES 3, 4, and 5, with the RTCBs closed, to provide protection for boron dilution and CEA withdrawal events. The Logarithmic Power Level—High trip in these lower MODES is addressed in this LCO. The RPS Logic in MODES 1, 2, 3, 4, and 5 is addressed in LCO 3.3.4, "Reactor Protective System (RPS) Logic and Trip Initiation."

INSERT 1

The Applicability for the Logarithmic Power Level-High Function is modified by a Note that allows the trip to be bypassed when THERMAL POWER is > 1E-4% RTP, and the bypass is automatically removed when THERMAL POWER is ≤ 1E-4% RTP.

(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

(continued)

INSERT FOR ITS 3.3.2 BASES APPLICABILITY SECTION

INSERT 1

(1)

- The Steam Generator #1 Pressure – Low, and the Steam Generator #2 Pressure – Low trips, RPS Logic, RTCBs, and Manual Trip are required in MODE 3, with the RTCBs closed, to provide protection for Large MSLB events in MODE 3. The Steam Generator Pressure – Low trip in this lower MODE is addressed in this LCO. The RPS Logic in MODES 1, 2, 3, 4, and 5 is addressed in LCO 3.3.4, Reactor Protection System (RPS) Logic and Trip Initiation.

BASES

ACTIONS (continued)

less conservative than the Allowable Value stated in the LCO, 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 excore logarithmic power channel or RPS bistable trip unit is found inoperable, then all affected Functions provided by that channel must be declared inoperable and the unit must enter the Condition for the particular protection Function affected.

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 was added to ensure review by the onsite review committee (per Specification 5.5.1.2.e) is performed to discuss the desirability of maintaining the channel in the bypassed condition.~~ 2

A.1, and A.2

Condition A applies to the failure of a single ~~Logarithmic Power Level—High trip channel or associated~~ instrument channel inoperable in any RPS function. 1

The ~~Logarithmic Power Level—High~~ RPS coincidence logic is two-out-of-four. If one channel is inoperable, operation in MODES 3, 4, and 5 is allowed to continue, providing the inoperable channel is placed in bypass or trip in 1 hour (Required Action A.1).

The 1 hour allotted to 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 must be restored to OPERABLE status prior to entering MODE 2 following the next MODE 5 entry. With a channel bypassed, the coincidence logic is now in a two-out-of-three configuration. The Completion Time is based on adequate channel to channel independence, which

(continued)

5

With a channel process measurement circuit that affects multiple functional units inoperable or in test, bypass or trip all associated functional units as listed below:

Process Measurement Circuit	Functional Unit (Bypassed or Tripped)
Steam Generator Pressure - Low	Steam Generator Pressure - Low (RPS) Steam Generator #1 Level - Low (ESF) Steam Generator #2 Level - Low (ESF)

BASES

ACTIONS

A.1, and A.2 (continued)

allows a two-out-of-three channel operation since no single failure will cause or prevent a reactor trip. 1

B.1

Condition B applies to the failure of two ~~Logarithmic Power Level—High~~ trip channels or associated instrument channels, in any RPS automatic trip function Required Action B.1 provides for placing one inoperable channel in bypass and the other channel in trip within the Completion Time of 1 hour. This Completion Time is sufficient to allow the operator to take all appropriate actions for the failed channels and still ensures the risk involved in operating with the failed channels is acceptable. With one channel of protective instrumentation bypassed, 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 of the two inoperable channels will need to be restored to OPERABLE status prior to the next required CHANNEL FUNCTIONAL TEST because channel surveillance testing on an OPERABLE channel requires that the OPERABLE channel be placed in bypass. However, it is not possible to bypass more than one RPS channel, and placing a second channel in trip will result in a reactor trip. Therefore, if one RPS channel is in trip and a second channel is in bypass, a third inoperable channel would place the unit in LCO 3.0.3.

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.

(continued)

BASES

ACTIONS (continued)

C.1, C.2.1, and C.2.2

operating

4

maintenance (trip channel)

Condition C applies to one automatic bypass removal channel inoperable. If the bypass removal channel for the high logarithmic power level operating bypass cannot be restored to OPERABLE status within 1 hour, 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 affected automatic channel placed in trip or bypass. Both the bypass removal channel and the associated automatic trip channel must be repaired prior to entering MODE 2 following the next MODE 5 entry. The Bases for the Required Actions and required Completion Times are consistent with Condition A.

D.1 and D.2

operating

4

maintenance (trip channel)

Condition D applies to two inoperable automatic bypass removal channels. If the bypass removal channels for two operating bypasses cannot be restored to OPERABLE status within 1 hour, the associated RPS channel may be considered OPERABLE only if the bypass is not in effect. Otherwise, the affected RPS channels must be declared inoperable, as in Condition B, and the bypass either removed or one automatic trip channel placed in bypass and the other in trip within 1 hour. The restoration of one affected bypassed automatic trip channel must be completed prior to the next CHANNEL FUNCTIONAL TEST or the plant must shut down per LCO 3.0.3, as explained in Condition B. Completion Times are consistent with Condition B.

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.

(continued)

BASES

ACTIONS (continued)

E.1

Condition E is entered when the Required Actions and associated Completion Times of Condition A, B, C, or D are not met.

1 RPS If Required Actions associated with these Conditions cannot be completed within the required Completion Time, all RTCBs must be opened, placing the plant in a condition where the ~~logarithmic power~~ trip channels are not required to be OPERABLE. A Completion Time of 1 hour is a reasonable time to perform the Required Action, which maintains the risk at an acceptable level while having one or two channels inoperable.

SURVEILLANCE REQUIREMENTS

The SRs ~~for the Logarithmic Power Level—High trip~~ are an extension of those listed in LCO 3.3.1, listed here because of their Applicability in these MODES.

5 ~~[Reviewer's Note: In order for a unit 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. 5).]~~

SR 3.3.2.1

1 RPS SR 3.3.2.1 is the performance of a CHANNEL CHECK of each ~~logarithmic power~~ channel. This SR is identical to SR 3.3.1.1. Only the Applicability differs.

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 another channel. 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 that the

(continued)

BASES

SURVEILLANCE REQUIREMENTS

SR 3.3.2.1 (continued)

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 limits.

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 3.3.2.2

5

A CHANNEL FUNCTIONAL TEST on each channel, except ~~Loss of Load and~~ power range neutron flux, is performed every 92 days to ensure the entire channel will perform its intended function when needed. This SR is identical to SR 3.3.1.7. Only the Applicability differs.

~~In addition to power supply tests,~~ the RPS CHANNEL FUNCTIONAL TEST consists of three overlapping tests as described in the UFSAR ~~FSAR~~, Section ~~X~~7.2~~X~~ (Ref. 3). These tests verify that the RPS is capable of performing its intended function, from bistable input through the RTCBs. They include:

Bistable Tests

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

(continued)

BASES

SURVEILLANCE REQUIREMENTS

Bistable Tests (continued)

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~~)~~. 4

Matrix Logic Tests

Matrix Logic Tests are addressed in LCO 3.3.4. 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 Test

Trip path (Initiation Logic) tests are addressed in LCO 3.3.4. 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, 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. 6). The excore channels use preassigned test signals to verify proper channel alignment. The excore logarithmic channel test signal is inserted into the preamplifier input, so as to test the first active element downstream of the detector.

SR 3.3.2.3

SR 3.3.2.3 is a CHANNEL FUNCTIONAL TEST similar to SR 3.3.2.2, except SR 3.3.2.3 is ~~applicable~~ only to operating bypass 4

(continued)

BASES

SURVEILLANCE REQUIREMENTS

SR 3.3.2.3 (continued)

functions and is performed once within 92 days prior to each startup. This SR is identical to SR 3.3.1.~~13~~ 12. Only the Applicability differs.

Proper operation of operating bypass permissives is critical during plant startup because the operating bypasses must be in place to allow startup operation and must be automatically removed at the appropriate points during power ascent to enable certain reactor trips. Consequently, the appropriate time to verify operating bypass removal function OPERABILITY is just prior to startup. The allowance to conduct this Surveillance within 92 days of startup is based on the reliability analysis presented in topical report CEN-327, "RPS/ESFAS Extended Test Interval Evaluation" (Ref. 6). 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 3.3.2.2. Therefore, further testing of the bypass function after startup is unnecessary.

SR 3.3.2.4

SR 3.3.2.4 is the performance of a CHANNEL CALIBRATION every 18 months. This SR is identical to SR 3.3.1.~~10~~ 9. Only the Applicability differs.

CHANNEL CALIBRATION is a complete check of the instrument channel including ~~excluding~~ the sensor (5) (the sensor is excluded for the Logarithmic Power Level Function). 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 surveillance interval extension analysis. The requirements for this review are outlined in Reference ~~[3]~~ 6.

The Frequency is based upon the assumption of an ~~[~~18~~]~~ month calibration interval for the determination of the magnitude (5)

(continued)

BASES

SURVEILLANCE REQUIREMENTS

SR 3.3.2.4 (continued)

of equipment drift in the setpoint analysis and includes operating experience and consistency with the typical ~~[18]~~ 18 month fuel cycle. 5

The Surveillance is modified by a Note to indicate that 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 3.3.1.4).

SR 3.3.2.5

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 5 ~~[18]~~ 18 month STAGGERED TEST BASIS. 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. The [18] month Frequency 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 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.

3 A Note is added to indicate that the neutron detectors are excluded from RPS RESPONSE TIME testing 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 3.3.1.4).

REFERENCES

1. 10 CFR 50.
2. 10 CFR 100.
3. ~~FSAR~~ UFSAR, Section ~~[7.2]~~ 7.2.
4. "~~Plant Protection System Selection~~ Calculation of Trip Setpoint Values," Plant Protection System", CEN-286(V), or Calculation 13-JC-SG-203 for the Low Steam Generator Pressure trip function. 5

~~(continued)~~

BASES

REFERENCES (continued)	5.	NRC Safety Evaluation Report.
	6.	CEN-327, June 2, 1986, including Supplement 1, March 3, 1989, and calculation 13-JC-SB-200 5

NUREG-1432 EXCEPTIONS
SPECIFICATION 3.3.2

1. The CTS requires the OPERABILITY of the Steam Generator #1 and Steam Generator #2 Pressure - Low trip Functions in Mode 3 with reactor trip breakers in the closed position and the CEA drive system capable of CEA withdrawal, and fuel in the reactor vessel. This is required by the safety analysis for a Large MSLB in Mode 3. The Low Steam Generator pressure trip function is needed to prevent a return to power as the RCS cools down following a MSLB. If the initial K_{eff} is such that criticality occurs prior to a Low Steam Generator Pressure trip the Logarithmic Power Level - High trip function provides the reactor trip as power increases to 0.011% RTP. The combination of the Steam Generator Pressure - Low and the Logarithmic Power Level - High provide the shutdown margin to prevent a return to power or to insure that fission power remains sufficiently low following the reactor trip to preclude degradation in fuel performance as a result of a post trip return to power.

   The CTS also requires the setpoint for the Logarithmic Power Level - High RPS function to be reduced to less than or equal to 1E-4% RTP, or CPCs must be Operable. This is required by the safety analysis for a bank CEA withdrawal with less than 4 Reactor Coolant Pumps (RCPs) running. With 4 RCPs running the Logarithmic Power Level - High trip at 1E-2 % RTP provides the necessary protection. With less than 4 RCPs running the setpoint must be lowered to 1E-4% RTP. The additional information that lowering the Logarithmic Power Level - High trip setpoint is only required with less than 4 RCPs running is not in the CTS. This will be included as part of this change to provide consistency with the PVNGS safety analysis.

   Including this information in the ITS results in numerous format changes to NUREG-1432 Specification 3.3.2. This Specification was changed to a format similar to Specification 3.3.1 in NUREG-1432. Since there are now three RPS Functions in Specification 3.3.2 a Note was added to allow separate condition entries for each Function. A Table 3.3.2-1 was added to the ITS to show the Functions, SR, and Mode applicability. The Bases have been revised to be consistent with the LCO/Surveillance. This is consistent with the PVNGS licensing basis.

2. ITS will not specify that continued operation with a RPS channel bypassed requires review by the Plant Review Board (PRB). NUREG-1432 states that continued operation will be reviewed in accordance with specification 5.5.1.2.e. There is no section 5.5.1.2.e in NUREG-1432. CTS Table 3.3-1, ACTION 2 states the desirability of maintaining this channel in the bypassed condition shall be reviewed in accordance with Specification 6.5.1.6.g. The PVNGS CTS 6.5 Review and Audit requirements are being moved to the UFSAR or QA plan. Because the CTS section 6.5 functions are relocated to the UFSAR or QA plan this requirement will also be relocated to the UFSAR or QA plan as part of the same program. The Bases have been revised to be consistent with the LCO/Surveillance. This will provide consistency with other sections of NUREG-1432.

3. ITS will add a note to SR 3.3.2.5 stating that neutron detectors are excluded. This SR requires verification that the RPS response time is within limits. This note is consistent with NUREG-1432 section 3.3.1, SR 3.3.1.13. The CTS SR 4.3.1.3 states that Neutron detectors are exempt from response time testing. Neutron detectors are not response time tested due to the difficulty in simulating a input to the neutron detector, and because changes in the response time characteristics of the neutron detectors, without failure of the detector, are not expected. The Bases have been revised to be consistent with the LCO/Surveillance. This is consistent with the PVNGS licensing basis.

4. Grammar and/or editorial changes have been made to enhance clarity. No technical or intent changes to the Specification are made by this change.

5. The plant specific titles, nomenclature, number, parameter/value, reference, system description, system design, operating practices or analysis description was used (additions, deletions, and/or changes are included). Plant specific parameters/values were directly transferred from the CTS to the ITS.

PVNGS CTS
SPECIFICATION 3.3.2
MARK UP

Specification 3.3.2
(3.3.1/3.3.2)

TABLE ~~2.2-1~~ 3.3.2-1

A.1

REACTOR PROTECTIVE INSTRUMENTATION ~~TRIP SETPOINT LIMITS~~

FUNCTIONAL UNIT	TRIP SETPOINT	ALLOWABLE VALUES	
1. TRIP GENERATION			
A. Process			ITS 3.3.1
1. Pressurizer Pressure - High	≤ 2383 psia	≤ 2388 psia	
2. Pressurizer Pressure - Low	≥ 1837 psia (2)	≥ 1821 psia (2)	
3. Steam Generator Level - Low	≥ 44.2% (4)	≥ 43.7% (4)	
4. Steam Generator Level - High	≤ 91.0% (9)	≤ 91.5% (9)	
5. Steam Generator Pressure - Low	≥ 895 psia (3)	≥ 890 psia ~~(3)~~	ITS 3.3.1 ITS 3.3.2
6. Containment Pressure - High	≤ 3.0 psig	≤ 3.2 psig	Table 3.3.2-1 Note (b)
7. Reactor Coolant Flow - Low			
a. Rate	≤ 0.115 psi/sec (6)(7)	≤ 0.118 psi/sec (6)(7)	
b. Floor	≥ 11.9 psid (6)(7)	≥ 11.7 psid (6)(7)	
c. Band	≤ 10.0 psid (6)(7)	≤ 10.2 psid (6)(7)	
8. Local Power Density - High	≤ 21.0 kW/ft (5)	≤ 21.0 kW/ft (5)	
9. DNBR - Low	≥ 1.30 (5)	≥ 1.30 (5)	
B. Excore Neutron Flux			ITS 3.3.1
1. Variable Overpower Trip			
a. Rate	≤10.6%/min of RATED THERMAL POWER (8)	≤11.0%/min of RATED THERMAL POWER (8)	
b. Ceiling	≤110.0% of RATED THERMAL POWER (8)	≤111.0% of RATED THERMAL POWER (8)	
c. Band	≤9.7% of RATED THERMAL POWER (8)	≤9.9% of RATED THERMAL POWER (8)	

Specification (3.3.1/3.3.2)

3.3.2-1

TABLE ~~2.2-1~~ (Continued)

A.1

REACTOR PROTECTIVE INSTRUMENTATION ~~TRIP SETPOINT LIMITS~~

FUNCTIONAL UNIT	TRIP SETPOINT	ALLOWABLE VALUES
2. Logarithmic Power Level - High (1)		
a. Startup and Operating	< 0.010% of RATED THERMAL POWER	< 0.011% of RATED THERMAL POWER
b. Shutdown	< 0.010% of RATED THERMAL POWER	< 0.011% of RATED THERMAL POWER
C. Core Protection Calculator System		
1. CEA Calculators	Not Applicable	Not Applicable
2. Core Protection Calculators	Not Applicable	Not Applicable
D. Supplementary Protection System		
Pressurizer Pressure - High	≤ 2409 psia	≤ 2414 psia
II. RPS LOGIC		
A. Matrix Logic	Not Applicable	Not Applicable
B. Initiation Logic	Not Applicable	Not Applicable
III. RPS ACTUATION DEVICES		
A. Reactor Trip Breakers	Not Applicable	Not Applicable
B. Manual Trip	Not Applicable	Not Applicable

ITS 3.3.2

ITS 3.3.1

Specification 3.3.2

(3.3.1/3.3.2)

TABLE ~~2.2-1~~ 3.3.2-1 (Continued)

(A.1)

REACTOR PROTECTIVE INSTRUMENTATION ~~TRIP SETPOINT LIMITS~~

TABLE NOTATIONS

Table 3.3.2-1 (d)

ITS 3.3.1 ~~(1)~~ ~~Trip may be manually~~ bypassed above 10^{-4}% of RATED THERMAL POWER; bypass
ITS 3.3.2 shall be automatically removed when THERMAL POWER is less than or equal to 10^{-4}% of RATED THERMAL POWER.

---

(2) In MODES 3-4, the value may be decreased manually, to a minimum of 100
ITS 3.3.1 psia, as pressurizer pressure is reduced, provided:

(a) the margin between the pressurizer pressure and this value is maintained at less than or equal to 400 psi; and

(b) when the RCS cold leg temperature is greater than or equal to 485 degrees F; this value is maintained at least 140 psi greater than the saturation pressure corresponding to the RCS cold leg temperature.

The setpoint shall be increased automatically as pressurizer pressure is increased until the trip setpoint is reached. Trip may be manually bypassed below 400 psia; bypass shall be automatically removed whenever
ITS 3.3.1 pressurizer pressure is greater than or equal to 500 psia.

~~(3)~~ ~~In MODES 3-4, value~~ may be decreased ~~manually~~ as steam generator pressure
Table 3.3.2-1 Note(b) is reduced, ~~provided the margin between the steam generator pressure and this~~ ~~value~~ setpoint is maintained at less than or equal to 200 psi; the setpoint shall be increased automatically as steam generator pressure is increased (A.9)
ITS 3.3.2 until the trip normal setpoint is reached.

---

(4) % of the distance between steam generator upper and lower level wide
ITS 3.3.1 range instrument nozzles.

(5) As stored within the Core Protection Calculator (CPC). Calculation of the trip setpoint includes measurement, calculational and processor uncertainties. Trip may be manually bypassed below 10^{-4}% of RATED THERMAL POWER; bypass shall be automatically removed when THERMAL POWER is greater than or equal to 10^{-4}% of RATED THERMAL POWER.

(6) RATE is the maximum rate of decrease of the trip setpoint. There are no restrictions on the rate at which the setpoint can increase.
FLOOR is the minimum value of the trip setpoint.
BAND is the amount by which the trip setpoint is below the input signal unless limited by Rate or Floor.
Setpoints are based on steam generator differential pressure.

(7) The setpoint may be altered to disable trip function during testing pursuant to Specification 3.10.3.

(8) RATE is the maximum rate of increase of the trip setpoint. (The rate at which the setpoint can decrease is no slower than five percent per second.)
CEILING is the maximum value of the trip setpoint.
BAND is the amount by which the trip setpoint is above the steady state
ITS 3.3.1 input signal unless limited by the rate or the ceiling.

(9) % of the distance between steam generator upper and lower level narrow range instrument nozzles.

SPECIFICATION 3.3.2

(3.3.1/3.3.3/3.3.4/3.3.12)

3.3 ~~3/4.3~~ INSTRUMENTATION SYSTEM (RPS) A.1

3.3.2 ~~3/4.3.1~~ REACTOR PROTECTIVE INSTRUMENTATION - shutdown

~~LIMITING CONDITION FOR OPERATION~~

LCO 3.3.2 Four A.2 A.1 trip

~~3.3.1~~ ~~As a minimum, the~~ reactor protective instrumentation ~~channels~~ and ~~bypasses of~~ bypass removal channels for each Function in Table ~~3.3-1~~ 3.3.2-1 shall be OPERABLE. L.5

APPLICABILITY: As shown in Table ~~3.3-1~~. A.1

ACTION:

As shown in Table ~~3.3-1.~~ 3.3.2-1

Note

Seperate condition entry is allowed for each RPS function A.3

SURVEILLANCE REQUIREMENTS

ITS 3.3.1
ITS 3.3.2
ITS 3.3.3
ITS 3.3.4
ITS 3.3.12

~~4.3.1.1~~ Each reactor protective instrumentation channel shall be demonstrated OPERABLE by the performance of the CHANNEL CHECK, CHANNEL CALIBRATION and CHANNEL FUNCTIONAL TEST operations for the MODES and at the frequencies shown in Table ~~4.3-1~~. 3.3.2-1 A.1

ITS 3.3.1
ITS 3.3.2
SR 3.3.2.4

~~4.3.1.2~~ ~~The logic for the bypasses shall be demonstrated OPERABLE prior to each reactor startup unless performed during the preceding 92 days. The total bypass function shall be demonstrated OPERABLE at least once per 18 months during~~ CHANNEL CALIBRATION ~~testing~~ of each channel affected by bypass operation, once per 18 months A.1

ITS 3.3.1
ITS 3.3.2
SR 3.3.2.5

~~4.3.1.3~~ The REACTOR TRIP SYSTEM RESPONSE TIME of each reactor trip function shall be demonstrated to be within its limit at least once per 18 months on a STAGGERED TEST BASIS. Neutron detectors are exempt from response time testing. ~~Each test shall include at least one channel per function such that all channels are tested at least once every N times 18 months where N is the total number of redundant channels in a specific reactor trip function as shown in the "Total No. of Channels" column of Table 3.3-1.~~ A.4

ITS 3.3.3

4.3.1.4 The isolation characteristics of each CEA isolation amplifier shall be verified at least once per 18 months during the shutdown per the following tests for the CEA position isolation amplifiers:

a. With 120 volts A.C. (60 Hz) applied for at least 30 seconds across the output, the reading on the input does not change by more than 0.015 volt D.C. with an applied input voltage of 5-10 volts D.C.

SR 3.3.2.3

Perform a CHANNEL FUNCTIONAL TEST on each automatic bypass removal functional, once within 92 days prior to each Reactor startup A.5

SPECIFICATION
(3.3.1/3.3.3)

SURVEILLANCE REQUIREMENTS (Continued)

b. With 120 volts A.C. (60 Hz) applied for at least 30 seconds across the input, the reading on the output does not exceed 15 volts D.C.

ITS 3.3.1
ITS 3.3.3

4.3.1.5 The Core Protection Calculators shall be determined OPERABLE at least once per 12 hours by verifying that less than three auto restarts have occurred on each calculator during the past 12 hours. The auto restart periodic tests Restart (Code 30) and Normal System Load (Code 33) shall not be included in this total.

4.3.1.6 The Core Protection Calculators shall be subjected to a CHANNEL FUNCTIONAL TEST to verify OPERABILITY within 12 hours of receipt of a High CPC Cabinet Temperature alarm.

Add Action E (M.2)

SPECIFIC[illegible]ON 3.3.2

(3.3.1/3.3.2/3.3.3/3.3.12)

3.3.2-1 (A.1)

TABLE ~~3.3-1~~

SYSTEM

REACTOR PROTECTIVE INSTRUMENTATION

	FUNCTIONAL UNIT	TOTAL NO. OF CHANNELS	CHANNELS TO TRIP	MINIMUM CHANNELS OPERABLE	APPLICABLE MODES	ACTION
	1. TRIP GENERATION					
ITS 3.3.1	A. Process					
	1. Pressurizer Pressure - High	4	2	3	1,2	2#,3#
	2. Pressurizer Pressure - Low	4	2 (b)	3	1,2	2#,3#
	3. Steam Generator Level - Low	4/SG	2/SG	3/SG	1,2	2#,3#
	4. Steam Generator Level - High	4/SG	2/SG	3/SG	1,2 ITS 3.3.2	2#,3#
	5. Steam Generator Pressure - Low	4/SG	2/SG	3/SG	1,2,$\boxed{3^*, \cancel{4^*}}$	2#,3#
	6. Containment Pressure - High	4	2	3	1,2 (L.7)	2#,3#
	7. Reactor Coolant Flow - Low	4/SG	2/SG	3/SG	1,2	2#,3#
	8. Local Power Density - High	4	2 (c)(d)	3	1,2	2#,3#
	9. DNBR - Low	4	2 (c)(d)	3	1,2	2#,3#
	B. Excore Neutron Flux					
	1. Variable Overpower Trip	4	2	3	1,2	2#,3#
	2. Logarithmic Power Level - High					
	a. Startup and Operating	4	2(a)(d)	3	1,2	2#,3#
ITS 3.3.2		4	~~2~~ (LA.1)	3	3*,4*,5*	~~9~~ 2#, 3# (L.1) 10 (M.1)
ITS 3.3.12	~~b. Shutdown~~	~~4~~	~~0~~	~~2~~	~~3,4,5~~	~~4~~
	~~C. Core Protection Calculator System~~					
ITS 3.3.3	1. CEA Calculators	2	1	2 (e)	1,2	6,7
ITS 3.3.1	2. Core Protection Calculators	4	2 (c)(d)	3	1,2,$\boxed{\cancel{3^*,4^*,5^*}}$ ITS 3.3.2	2#,3#,7,~~10~~ (M.1)

SPECIFICATION
(3.3.4/SPLIT REPORT)

TABLE 3.3-1 (Continued)

REACTOR PROTECTIVE INSTRUMENTATION

	FUNCTIONAL UNIT	TOTAL NO. OF CHANNELS	CHANNELS TO TRIP	MINIMUM CHANNELS OPERABLE	APPLICABLE MODES	ACTION
Relocated See Split report	~~D. Supplementary Protection System Pressurizer Pressure - High~~	~~4 (f)~~	~~2~~	~~3~~	~~1, 2~~	~~8~~
ITS 3.3.4	II. RPS LOGIC					
	A. Matrix Logic	6	1	3	1, 2	1
		6	1	3	3*, 4*, 5*	9
	B. Initiation Logic	4	2	4	1, 2	5
		4	2	4	3*, 4*, 5*	8
	III. RPS ACTUATION DEVICES					
	A. Reactor Trip Breaker	4 (f)	2	4	1, 2	5
		4 (f)	2	4	3*, 4*, 5*	8
	B. Manual Trip	4 (f)	2	4	1, 2	5
		4 (f)	2	4	3*, 4*, 5*	8

SPECIFICATION 3.3.2

(3.3.1/3.3.2/33.3/3.3.4)

A.1

3.3.2-1

TABLE ~~3.3-1~~ (Continued)

TABLE NOTATIONS

A.6 any any

ITS 3.3.2 *With ~~the~~ protective system trip breakers in the closed position, the CEA drive system capable of CEA withdrawal~~, and fuel in the reactor vessel.~~ A.6

#The provisions of Specification 3.0.4 are not applicable.

ITS 3.3.1 (a) Trip may be manually bypassed above 10^{-4}% of RATED THERMAL POWER; bypass shall be automatically removed when THERMAL POWER is less than or equal to 10^{-4}% of RATED THERMAL POWER.

(b) Trip may be manually bypassed below 400 psia; bypass shall be automatically removed whenever pressurizer pressure is greater than or equal to 500 psia.

(c) Trip may be manually bypassed below 10^{-4}% of RATED THERMAL POWER; bypass shall be automatically removed when THERMAL POWER is greater than or equal to 10^{-4}% of RATED THERMAL POWER.

(d) Trip may be bypassed during testing pursuant to Special Test Exception 3.10.3.

ITS 3.3.3 (e) See Special Test Exception 3.10.2.

ITS 3.3.4 (f) There are four channels, each of which is comprised of one of the four reactor trip breakers, arranged in a selective two-out-of-four configuration (i.e., one-out-of-two taken twice).

ACTION STATEMENTS

ACTION 1 - With the number of channels OPERABLE one less than required by the Minimum Channels OPERABLE requirement, restore the inoperable channel to OPERABLE status within 48 hours or be in at least HOT STANDBY within the next 6 hours and/or open the protective system trip breakers.

ITS 3.3.1
ITS 3.3.2 ~~ACTION 2~~ - COND A ~~With the number of channels OPERABLE one less than the Total Number of Channels,~~ STARTUP and/or POWER OPERATION may continue provided the inoperable channel is placed in the bypassed or tripped condition within 1 hour. ~~If the inoperable channel is bypassed, the desirability of maintaining this channel in the bypassed condition shall be reviewed in accordance with Specification 6.5.1.6.g.~~ LA.4 The channel shall be returned to OPERABLE status ~~no later than during the next COLD SHUTDOWN.~~

A.7 One or more functions with one automatic RPS trip channel inoperable,

L.5 prior to entering MODE 2 following the next MODE 5 entry

COND C

L.2 With one or more functions with one automatic bypass removal channel inoperable, Disable the bypass channel or place the affected automatic trip channel in bypass or trip within 1 hour

SPECIFICATION 3.3.2

(3.3.1/3.3.2)

A.1

TABLE ~~3.3-1~~ 3.3.2-1 (Continued)

ACTION STATEMENTS

ITS 3.3.1
ITS 3.3.2

~~With a channel process measurement circuit that affects multiple functional units inoperable or in test, bypass or trip all associated functional units as listed below:~~

~~Process Measurement Circuit~~	~~Functional Unit Bypassed/Tripped~~
~~1. Linear Power (Subchannel or Linear)~~	~~Variable Overpower (RPS) Local Power Density - High (RPS) DNBR - Low (RPS)~~
~~2. Pressurizer Pressure - High (Narrow Range)~~	~~Pressurizer Pressure - High (RPS) Local Power Density - High (RPS) DNBR - Low (RPS)~~
~~3. Steam Generator Pressure - Low~~	~~Steam Generator Pressure - Low Steam Generator Level 1-Low (ESF) Steam Generator Level 2-Low (ESF)~~
~~4. Steam Generator Level - Low (Wide Range)~~	~~Steam Generator Level - Low (RPS) Steam Generator Level 1-Low (ESF) Steam Generator Level 2-Low (ESF)~~
~~5. Core Protection Calculator~~	~~Local Power Density - High (RPS) DNBR - Low (RPS)~~

LA.2

~~ACTION 3~~ - ~~With the number of channels OPERABLE one less than the Minimum Channels OPERABLE requirement,~~ STARTUP and/or POWER OPERATION may continue provided ~~the following conditions are satisfied:~~

~~a.~~ ~~Verify~~ that one of the inoperable channels has been bypassed and place the other channel in the tripped condition within 1 hour~~, and~~

~~b. All functional units affected by the bypassed/tripped channel shall also be placed in the bypassed/tripped condition as listed below:~~

~~Process Measurement Circuit~~	~~Functional Unit Bypassed/Tripped~~
~~1. Linear Power (Subchannel or Linear)~~	~~Variable Overpower (RPS) Local Power Density - High (RPS) DNBR - Low (RPS)~~
~~2. Pressurizer Pressure - High (Narrow Range)~~	~~Pressurizer Pressure - High (RPS) Local Power Density - High (RPS) DNBR - Low (RPS)~~

LA2

COND D

L.5

With one or more functions with two automatic bypass removal channels inoperable, Disable the bypass removal channels or place one affected automatic channel in bypass and place the other in trip within 1 hour

One or more Functions with two automatic RPS trip channels inoperable

COND B

A.8

3.3.2-1 (A.1)

TABLE ~~3.3-1~~ (Continued)

ACTION STATEMENTS

ITS 3.3.1
ITS 3.3.2

LA.2

3.	Steam Generator Pressure - Low	Steam Generator Pressure - Low Steam Generator Level 1-Low (ESF) Steam Generator Level 2-Low (ESF)
4.	Steam Generator Level - Low (Wide Range)	Steam Generator Level - Low (RPS) Steam Generator Level 1-Low (ESF) Steam Generator Level 2-Low (ESF)
5.	Core Protection Calculator	Local Power Density - High (RPS) DNBR - Low (RPS)

ITS 3.3.1
ITS 3.3.2

LA.3

~~STARTUP and/or POWER OPERATION may continue until the performance of the next required CHANNEL FUNCTIONAL TEST. Subsequent STARTUP and/or POWER OPERATION may continue if one channel is restored to OPERABLE status and the provisions of ACTION 2 are satisfied.~~

ITS 3.3.12

ACTION 4 - With the number of channels OPERABLE one less than required by the Minimum Channels OPERABLE requirement, suspend all operations involving positive reactivity changes.

ITS 3.3.4

ACTION 5 - With the number of channels OPERABLE one less than required by the Minimum Channels OPERABLE requirement, STARTUP and/or POWER OPERATION may continue provided the reactor trip breaker of the inoperable channel is placed in the tripped condition within 1 hour, otherwise, be in at least HOT STANDBY within 6 hours; however, the trip breaker associated with the inoperable channel may be closed for up to 1 hour for surveillance testing per Specification 4.3.1.1.

ITS 3.3.4

ITS 3.3.3

ACTION 6 -

a. With one CEAC inoperable, operation may continue for up to 7 days provided that the requirements of Specification 4.1.3.1.1 are met. After 7 days, operation may continue provided that the conditions of Action Item 6.b are met.

b. With both CEACs inoperable, operation may continue provided that:

1. Within 1 hour the DNBR margin required by Specification 3.2.4.b (COLSS in service) or 3.2.4.d (COLSS out of service) is satisfied and the Reactor Power Cutback System is disabled, and

SPECIFICATION 3.3.2

(3.3.1/3.3.2/3.3.3/3.3.4)

3.3.2-1 A.1

TABLE ~~3.3-1~~ (Continued)

ACTION STATEMENTS

2. Within 4 hours:

ITS 3.3.3

a) All full-length and part-length CEA groups must be withdrawn within the limits of Specifications 3.1.3.5, 3.1.3.6b, and 3.1.3.7b except during surveillance testing pursuant to the requirements of Specification 4.1.3.1.2. Specification 3.1.3.6b allows CEA group 5 insertion to no further than 127.5 inches withdrawn.

b) The "RSPT/CEAC Inoperable" addressable constant in the CPCs is set to be indicated that both CEAC's are inoperable.

c) The Control Element Drive Mechanism Control System (CEDMCS) is placed in and subsequently maintained in the "Standby" mode except during CEA motion permitted by Specifications 3.1.3.5, 3.1.3.6b, and 3.1.3.7b when the CEDMCS may be operated in either the "Manual Group" or "Manual Individual" mode.

ITS 3.3.3

3. CEA position surveillance must meet the requirements of Specifications 4.1.3.1.1, 4.1.3.5, 4.1.3.6, and 4.1.3.7 except during surveillance testing pursuant to Specification 4.1.3.1.2.

ITS 3.3.1
ITS 3.3.3

ACTION 7 - With three or more auto restarts, excluding periodic auto restarts (Code 30 and Code 33), of one non-bypassed calculator during a 12-hour interval, demonstrate calculator OPERABILITY by performing a CHANNEL FUNCTIONAL TEST within the next 24 hours.

ITS 3.3.4

ACTION 8 - With the number of OPERABLE channels one less than the Minimum Channels OPERABLE requirement, restore an inoperable channel to OPERABLE status within 48 hours or open an affected reactor trip breaker within the next hour.

ITS 3.3.2
ITS 3.3.4

~~ACTION 9 - With the number of OPERABLE channels one less than the Minimum Channels OPERABLE requirement, restore the inoperable channel to OPERABLE status within 48 hours or open the reactor trip breakers within the next hour.~~ L.1

ITS 3.3.2

~~ACTION 10~~ - In MODES 3, 4, or 5, the Core Protection Calculator channels are not required to be OPERABLE when the Logarithmic Power Level - High trip is OPERABLE with the trip setpoint lowered to $\leq 10^{-4}$% of Rated Thermal Power. M.1

must be

with less than 4 RCPs running. L.6

THIS PAGE INTENTIALLY LEFT BLANK

THIS PAGE INTENTIALLY LEFT BLANK

THIS PAGE INTENTIONALLY LEFT BLANK

THIS PAGE INTENTIONALLY LEFT BLANK

THIS PAGE INTENTIALLY LEFT BLANK

SPECIFICATION 3.3.2
(3.3.1/3.3.2/3.3.3)

Palo Verde - Units 1, 2, 3

A.1

TABLE ~~4.3-1~~ 3.3.2-1

REACTOR PROTECTIVE SYSTEM INSTRUMENTATION ~~SURVEILLANCE REQUIREMENTS~~

	FUNCTIONAL UNIT	CHANNEL CHECK	CHANNEL CALIBRATION	CHANNEL FUNCTIONAL TEST	MODES IN WHICH SURVEILLANCE REQUIRED
ITS 3.3.1	I. TRIP GENERATION				
	A. Process				
	1. Pressurizer Pressure - High	S	R	Q	1, 2
	2. Pressurizer Pressure - Low	S	R	Q	1, 2
	3. Steam Generator Level - Low	S	R	Q	1, 2
	4. Steam Generator Level - High	S	R	Q	1, 2
	5. Steam Generator Pressure - Low	S SR 3.3.2.1	R SR 3.3.2.4	Q SR 3.3.2.2	1, 2, $\boxed{3^*, \cancel{4^*}}$ ITS 3.3.2 L.7
	6. Containment Pressure - High	S	R	Q	1, 2
	7. Reactor Coolant Flow - Low	S	R	Q	1, 2
	8. Local Power Density - High	S	D (2, 4), R (4, 5)	Q, R (6)	1, 2
	9. DNBR - Low	S	D (2, 4), R (4, 5) H (8), S (7)	Q, R (6)	1, 2
	B. Excore Neutron Flux				
	1. Variable Overpower Trip	S	D (2, 4), H (3, 4) Q (4)	Q	1, 2
ITS 3.3.1 ITS 3.3.2 ITS 3.3.12	2. Logarithmic Power Level - High	S SR 3.3.2.1	R (4) SR 3.3.2.4	Q ~~and S/U (1)~~ SR 3.3.2.2 L.3	ITS 3.3.1 $\boxed{1, 2}$ $\boxed{3, 4, 5}$ ITS 3.3.12 $\boxed{\text{and } *}$ ITS 3.3.2
ITS 3.3.3	C. Core Protection Calculator System				
	1. CEA Calculators	S	R	Q, R (6)	1, 2
ITS 3.3.1	2. Core Protection Calculators	S	D (2, 4), R (4, 5) H (8), S (7)	Q (9), R (6)	1, 2

SPECIFICATION
(3.3.4/Split Report)

3.3.2-1 A.1

TABLE ~~4.3-1~~ (Continued)

REACTOR PROTECTIVE INSTRUMENTATION SURVEILLANCE REQUIREMENTS

	FUNCTIONAL UNIT	CHANNEL CHECK	CHANNEL CALIBRATION	CHANNEL FUNCTIONAL TEST	MODES IN WHICH SURVEILLANCE REQUIRED
Relocated see split report	D. Supplementary Protection System				
	Pressurizer Pressure - High	S	R	Q	1, 2
	II. RPS LOGIC				
ITS 3.3.4	A. Matrix Logic	N.A.	N.A.	Q	1, 2, 3*, 4*, 5*
	B. Initiation Logic	N.A.	N.A.	Q	1, 2, 3*, 4*, 5*
	III. RPS ACTUATION DEVICES				
	A. Reactor Trip Breakers	N.A.	N.A.	M, R (10)	1, 2, 3*, 4*, 5*
	B. Manual Trip	N.A.	N.A.	Q	1, 2, 3*, 4*, 5*

SPECIFICATION 3.3.2

(3.3.1/3.3.2)

3.3.2-1 A.1

TABLE ~~4.3-1~~ 3.3.2-1 (Continued)

TABLE NOTATIONS

any A.6 any

ITS 3.3.1 * - With any reactor trip breakers in the closed position and the CEA drive system capable of any CEA withdrawal~~, and fuel in the reactor vessel.~~ A.6

ITS 3.3.2 ~~(1) - Each STARTUP or when required with the reactor trip breakers closed and the CEA drive system capable of rod withdrawal, if not performed in the previous 7 days.~~ L.3

ITS 3.3.1 (2) Heat balance only (CHANNEL FUNCTIONAL TEST not included):

a. Between 15% and 80% of RATED THERMAL POWER, compare the linear power level, the CPC delta T power and the CPC nuclear power signals to the calorimetric calculation.

If any signal is within -0.5% to 10% of the calorimetric then do not calibrate except as required during initial power ascension after refueling.

If any signal is less than the calorimetric calculation by more than 0.5%, then adjust the affected signal(s) to agree with the calorimetric calculation.

If any signal is greater than the calorimetric calculation by more than 10% then adjust the affected signal(s) to agree with the calorimetric calculation within 8% to 10%.

b. At or above 80% of RATED THERMAL POWER; compare the linear power level, the CPC delta T power and the CPC nuclear power signals to the calorimetric calculation. If any signal differs from the calorimetric calculation by an absolute difference of more than 2%, then adjust the affected signal(s) to agree with the calorimetric calculation.

During PHYSICS TESTS, these daily calibrations may be suspended provided these calibrations are performed upon reaching each major test power plateau and prior to proceeding to the next major test power plateau.

(3) - Above 15% of RATED THERMAL POWER, verify that the linear power subchannel gains of the excore detectors are consistent with the values used to establish the shape annealing matrix elements in the Core Protection Calculators.

(4) - Neutron detectors may be excluded from CHANNEL CALIBRATION.

(5) - After each fuel loading and prior to exceeding 70% of RATED THERMAL POWER, the incore detectors shall be used to determine or verify the shape annealing matrix elements used in the Core Protection Calculators.

SPECIFICATION
(3.3.1/3.3.3/3.3.4)

3.3.2-1 A.1

TABLE ~~4.3-1~~ (Continued)

TABLE NOTATIONS

ITS 3.3.1 ITS 3.3.3	(6) -	This CHANNEL FUNCTIONAL TEST shall include the injection of simulated process signals into the channel as close to the sensors as practicable to verify OPERABILITY including alarm and/or trip functions.
ITS 3.3.1	(7) -	Above 70% of RATED THERMAL POWER, verify that the total steady-state RCS flow rate as indicated by each CPC is less than or equal to the actual RCS total flow rate determined by either using the reactor coolant pump differential pressure instrumentation or by calorimetric calculations and if necessary, adjust the CPC addressable constant flow coefficients such that each CPC indicated flow is less than or equal to the actual flow rate. The flow measurement uncertainty may be included in the BERR1 team in the CPC and is equal to or greater than 4%.
	(8) -	Above 70% of RATED THERMAL POWER, verify that the total steady-state RCS flow rate as indicated by each CPC is less than or equal to the actual RCS total flow rate determined by either using the reactor coolant pump differential pressure instrumentation and the ultrasonic flow meter adjusted pump curves or calorimetric calculations.
	(9) -	The quarterly CHANNEL FUNCTIONAL TEST shall include verification that the correct current values of addressable constants are installed in each OPERABLE CPC.
ITS 3.3.4	(10) -	At least once per 18 months and following maintenance or adjustment of the reactor trip breakers, the CHANNEL FUNCTIONAL TEST shall include independent verification of the undervoltage and shunt trips.

DISCUSSION OF CHANGES
SPECIFICATION 3.3.2

ADMINISTRATIVE CHANGES

A.1 All reformatting and numbering is in accordance with the Combustion Engineering Plant (CEOG) Standard Technical Specifications NUREG-1432 Rev. 1. As a result, the Palo Verde Nuclear Generating Station (PVNGS) Technical Specifications should be more readable, and therefore more understandable by plant operators, as well as others. During the reformatting and renumbering of the Improved Technical Specifications (ITS), no technical changes (either actual or interpretational) to the Current Technical Specifications (CTS) were made unless they were identified and justified.

Editorial rewording (either adding or deleting) is made consistent with NUREG-1432. During NUREG-1432 development, certain working preferences or English language conventions were adopted which resulted in no technical changes (either actual or interpretational) to the CTS.

Additional information has also been added to more fully describe each subsection. This wording is consistent with the NUREG-1432. Since the design is already approved by the NRC, adding more detail does not result in a technical change.

A.2 CTS LCO 3.3.1 states; "As a minimum, the reactor protective instrumentation channels and bypasses of Table 3.3-1 shall be OPERABLE". ITS LCO 3.3.2 states that four RPS trip and bypass removal channels for each function in Table 3.3.2-1 shall be OPERABLE. The CTS refers the user to the Table because the CEACs have two channels, the RPS logic has six channels, and the remainder of the items on Table 3.3-1 have four channels. In the ITS these Logics/channels are divided into separate Specifications: the CEACs are located in ITS 3.3.3, and the RPS logic is in ITS 3.3.4. With the remaining instrumentation in ITS 3.3.2. Because all of the instrumentation in ITS 3.3.2 has four channels, the LCO 3.3.2 specifies four OPERABLE channels instead of referring to a Table for the equipment required to be operable. There is no change to the OPERABILITY requirements of ITS LCO 3.3.2. This change provides additional clarity by dividing up the subject instrumentation/channels. This change is only a presentation change and is therefore considered administrative. This change is consistent with NUREG-1432.

ADMINISTRATIVE CHANGES (continued)

A.3 ITS will add a Note to Specification 3.3.2 that states that separate condition entries are allowed for each RPS function. There is no similar Note in the CTS. The reason for the difference is the change in format between the CTS and the ITS. The CTS lists the RPS functions in a Table, with the total number of channels, channels required to trip, minimum channels Operable, Mode applicability, and Actions for each function. Because there is a separate line item for each function with the appropriate Action statement it is clear in the CTS that each function is a separate Action entry. In the ITS there is a single Action statement that is applicable to all of the RPS functions. Because of the difference in format it is necessary to include a Note stating that separate condition entries are allowed. There is no difference in the requirements between the CTS and the ITS. This change is consistent with NUREG-1432.

A.4 CTS SR 4.3.1.3 states that the Reactor Trip RESPONSE TIME of each reactor trip function shall be demonstrated to be within its limits at least once per 18 months. Each test shall include at least one channel per function such that all channels are tested at least once every N times 18 months where N is the total number of redundant channels in a specific reactor trip function as shown in the total number of channels column of CTS Table 3.3-1. The ITS states, verify RPS RESPONSE TIME is within limits every 18 months on a staggered test basis.

The definition of a staggered test basis in the ITS is: A staggered test basis shall consist of the testing of one of the system, subsystems, channels, or other designated components during the interval specified by the Surveillance Frequency, so that all systems, subsystems, channels, or other designated components are tested during n surveillance intervals, where n is the number of systems, subsystems, channels, or other designated components in the associated function. These sections are equivalent in that both require one channel to be tested each 18 months. This change is consistent with NUREG-1432.

ADMINISTRATIVE CHANGES (continued)

A.5 CTS SR 4.3.1.2 states the logic for the bypasses shall be demonstrated operable prior to each reactor startup unless performed during the preceding 92 days. ITS SR 3.3.2.3 states perform a CHANNEL FUNCTIONAL TEST on each automatic bypass removal function once within 92 days prior to each reactor startup. The ITS definition of a CHANNEL FUNCTIONAL TEST states in part to verify OPERABILITY, including alarms and interlocks. This is equivalent to the CTS term logic for the bypasses which shall be demonstrated Operable. This change is consistent with NUREG-1432.

A.6 CTS Table 3.3.-1 defines the (*) table notation as the following: "With the protective system trip breakers in the closed position, the CEA drive system capable of CEA withdrawal, and fuel in the reactor vessel". The ITS Table 3.3.2-1 Footnote a will replace this with a note that states the following: "With any Reactor Trip Circuit Breakers (RTCBs) closed and any Control Element Assembly capable of withdrawal". The ITS clarified the intent of the CTS Note by adding the statement, any RTCB, and any CEA capable of withdrawal. This will prevent the possible interpretation that closing some, but not all RTCBs, or some, but not all CEAs capable of withdrawal does not meet the Mode Applicability. In addition the portion of the statement "with fuel in the vessel" is removed. The definition of Mode in the ITS section 1.1 states that the Mode is not applicable with fuel in the vessel. The new definition of Mode makes the statement "with fuel in the vessel" unnecessary. This change is consistent with NUREG-1432.

A.7 The CTS requires entry into Action Statement 2 of Table 3.3-1 when the number of channels Operable is one less than the total number of channels. It states that the total number of channels is four for each function. The ITS will state that one or more functions with one automatic RPS trip channels inoperable requires the Action statement entry. The two statements are the same requirement worded differently. In either case a single inoperable channel requires the action entry. This change is consistent with NUREG-1432.

A.8 CTS Table 3.3-1 requires entry into Action Statement 3 when the number of channels Operable is one less than the minimum number of channels. It states the minimum channels Operable is three for each function. The ITS will state that one or more functions with two automatic RPS trip channels inoperable requires the Action statement entry. The two statements are the same requirement worded differently. In either case two inoperable channels require the Action entry. This change is consistent with NUREG-1432.

ADMINISTRATIVE CHANGES (continued)

A.9 The CTS Table 2.2-1, Note (3) specifies the MODES in which the setpoint may be reduced because the table does not provide MODE applicability. The ITS lists the applicable MODES in Table 3.3.2-1, therefore the ITS Table 3.3.2-1, Note (b) does not include this information. The ITS Table 3.3.2-1, Note (b) wording is changed to refer to the setpoint instead of the setpoint value, clarifies that the setpoint increases until the normal valve is reached, and does not state that the setpoint reductions are accomplished manually. These changes are format and editorial rewording changes that do not alter the technical requirement of the Note. This change is consistent with NUREG-1432.

TECHNICAL CHANGES - MORE RESTRICTIVE

M.1 The CTS requires the CPCs to be OPERABLE in MODES 3(*), 4(*) and 5(*) unless the Logarithmic Power Level - High Trip Setpoint is lowered to ≤ 1E -4% RTP. The ITS removes the option to make the CPCs OPERABLE in these MODES, and requires the Logarithmic Power Level - High Setpoints be reduced. This is a more restrictive change since it is a reduction in flexibility. The PVNGS Safety Analysis demonstrates the use of either the CPCs or the logarithimic channels, with reduced setpoints is acceptable, therefore eliminating the option to use the CPCs does not impact plant safety.

M.2 ITS Specification 3.3.2 will add an Action E. This requires opening all of the RTCBs within 1 hour placing the Unit in Mode 3, if the Required Action and Completion Time for Actions A, B, C, or D are not met. The CTS would require the unit to be placed in a Mode in which the Specification does not apply (in this case Modes 3, 4, or 5 with the RTCBs open). This change is more restrictive because the time allowed to place the unit in Mode 3 is reduced from 6 hours to 1 hour. The reduced time is acceptable because the Unit is shutdown when in this LCO so the time necessary for an orderly entry into Mode 3 is less. This change is an enhancement to plant safety because the length of time the unit is operated without meeting LCO 3.2.2 is reduced. This change is consistent with NUREG-1432.

DETAILS RELOCATED

LA.1 The CTS Table 3.3-1 lists information for each of the RPS functions. This information includes the number of channels required to trip the Reactor. This information is used to show the relationship between the total number of channels, the minimum number of operable channels required, and the number of channels required for a Reactor trip. This is not required to determine the operability of the system and therefore is being relocated to a Licensee Controlled Document. This information will be included in the bases in the ITS and it is also currently described in the UFSAR.

Any changes to the requirements of the Bases will be governed by the provisions of 10 CFR 50.59 and the PVNGS Bases Control Program. This provides an equivalent level of regulatory control and is an administrative change with no impact on the margin of safety. This requirement is not required to be in the ITS to provide adequate protection of the public health and safety. Therefore relocation of this requirement to the Bases is acceptable and consistent with NUREG-1432.

LA.2 CTS Table 3.3-1, Action Statements 2 and 3 include a list of channel process measurement circuits that affect multiple functional units. The Actions require that a bypass or trip of the process measurement circuit, bypass or trip the associated multiple functional units. This requirement is not required to determine the OPERABILITY of the system and therefore is being relocated to the Bases.

Any changes to the requirements of the Bases will be governed by the provisions of the PVNGS Bases Control Program. This provides an equivalent level of regulatory control and is an administrative change with no impact on the margin of safety. This requirement is not required to be in the ITS to provide adequate protection of the public health and safety. Therefore relocation of this requirement to the Bases is acceptable and consistent with NUREG-1432.

DETAILS RELOCATED (continued)

LA.3 CTS Table 3.3-1, Action Statement 3 states in part; Startup and/or POWER OPERATION may continue until the performance of the next required CHANNEL FUNCTIONAL TEST. Subsequent STARTUP and/or POWER OPERATION may continue if one channel is restored to OPERABLE status and the provisions of ACTION 2 are satisfied. This requirement is not required to determine the OPERABILITY of the system and therefore is being relocated to the Bases. This statement clarifies that if a single channel is inoperable it can be bypassed, and if an second channel of the same function is inoperable one channel must be tripped and one channel must be bypassed. In this condition the two remaining channels cannot be tested without entering LCO 3.0.3.

Any changes to the requirements of the Bases will be governed by the provisions of the PVNGS Bases Control Program. This provides an equivalent level of regulatory control and is an administrative change with no impact on the margin of safety. This requirement is not required to be in the ITS to provide adequate protection of the public health and safety. Therefore relocation of this requirement to the Bases is acceptable and consistent with NUREG-1432.

LA.4 CTS Table 3.3-1, Action Statement 2 states in part; "If the inoperable channel is bypassed, the desirability of maintaining this channel in the bypassed condition shall be reviewed in accordance with Specification 6.5.1.6.g". The ITS does not specify that continued operation with a RPS channel bypassed requires review by the Plant Review Board (PRB). NUREG-1432 states that continued operation will be reviewed in accordance with Specification 5.5.1.2.e. There is no Specification 5.5.1.2.e in NUREG-1432. CTS Table 3.3-1, Action 2 states the desirability of maintaining this channel in the bypassed condition shall be reviewed in accordance with Specification 6.5.1.6.g. The PVNGS CTS 6.5 Review and Audit requirements are being moved to the QA plan. Because the CTS Section 6.5 functions are relocated to the QA plan this requirement will also be relocated to the QA plan to provide consistency with other sections of NUREG-1432.

Any changes to the requirements of the QA plan will be governed by the provisions of 10 CFR 50.54. This provides an equivalent level of regulatory control and is an administrative change with no impact on the margin of safety. This requirement is not required to be in the ITS to provide adequate protection of the public health and safety. Therefore relocation of this requirement is acceptable and consistent with NUREG-1432.

DETAIL RELOCATED PER SPLIT REPORT

None

TECHNICAL CHANGES - LESS RESTRICTIVE

L.1 CTS Table 3.3-1 B.2.a requires Action 9 for inoperable Logarithmic Power Level - High channels in Modes 3, 4, and 5 with the RTCBs closed. Action 9 requires that with the number of Operable channels one less than the minimum required number of channels Operable, restore the inoperable channel to Operable status within 48 hours or open the RTCBs within the next hour. This Action would allow operation with two Operable channels for 48 hours. Action 9 does not require an inoperable channel to be tripped or bypassed so the RPS could be in a 2 out of 2 logic condition for 48 hours. A failure in either of the remaining two channels during this 48 hour period would prevent a RPS trip.

The ITS will change the requirements for Modes 3, 4, and 5 with the RTCBs closed to match the requirements for the RPS functions in an operating Mode. This will require an inoperable channel to be tripped or bypassed within one hour. A second inoperable channel requires one of the channels to be tripped and one to be bypassed within one hour. Operation with one channel tripped and one channel bypassed may continue until the next CHANNEL FUNCTIONAL TEST is required. This is less restrictive in that operation with two channels inoperable may continue longer than the 48 hours allowed in the CTS. The ITS Actions A and B also allow the plant to change Modes while in these Actions, the CTS Action 9 does not have a 3.0.4 exclusion. This is acceptable because the system will be in a 1 out of 2 logic while in this Action and the system will continue to meet the single failure criteria.

This change is more restrictive for the first 48 hours. The failed RPS channels must be tripped or bypassed within one hour. After that hour the system must be placed in a 1 out of 2 logic configuration and will meet single failure criteria. A second requirement that will be more restrictive will be imposed by the ITS. This is a requirement that an inoperable channel must be returned to Operable Status prior to entering Mode 2 following the next Mode 5 entry. After the first 48 hours, the change is less restrictive because the RTCBs are not required to be opened until the next CHANNEL FUNCTIONAL TEST is due. Allowing the RTCBs to remain closed until the next FUNCTIONAL TEST is acceptable because the system will meet the single failure criteria in this condition. This change will provide consistent requirements for the RPS in both the operating and shutdown modes. This change is consistent with NUREG-1432.

TECHNICAL CHANGES - LESS RESTRICTIVE (continued)

L.2 CTS Table 3.3-1, Action Statement 2 states in part; "The channel shall be returned to OPERABLE status no later than during the next COLD SHUTDOWN. The ITS will state that the channel will be restored to Operable status prior to entering Mode 2 following the next Mode 5 entry. The CTS Action states that the channel must be returned to Operable status prior to leaving cold shutdown. ITS Action A.1 and C.1 or C.2.1 require an inoperable channel to be placed in the trip channel bypass or tripped. This places the system in either a 2 out of 3 logic or a 1 out of 2 logic. In either case the system meets the requirement that no single random failure will prevent a reactor trip when required. This change is consistent with NUREG-1432.

L.3 CTS Table 4.3-1, Item I.B.2 requires a CHANNEL FUNCTIONAL TEST of the Logarithmic Power Level - High function quarterly and each startup or when required with the reactor trip breakers closed and the CEA drive system capable of rod withdrawal, if not performed in the previous 7 days. The ITS SR 3.3.2.2 will require the Logarithmic Power Level - HIGH FUNCTIONAL TEST to be performed every 92 days. It will not require a FUNCTIONAL TEST within 7 days of startup or prior to closing the RTCBs with the CEA drive system capable of rod withdrawal.

The RPS FUNCTIONAL TEST Frequency of 92 days is based on the reliability analysis presented in Topical Report CEN-327-A, "RPS/ESFAS Extended Test Interval Evaluation", CEN-327-A supplement 1, and calculation 13-JC-SB-200-Rev. 01 "Plant Protection System Bistable Drift Analysis". These evaluations show that a FUNCTIONAL TEST Frequency of 92 days is sufficient to provide the reliability needed to maintain the Core Damage Frequency within acceptable levels. This change is consistent with NUREG-1432.

TECHNICAL CHANGES - LESS RESTRICTIVE (continued)

L.4 CTS LCO 3.3.1 states that the instrument channels and bypasses in Table 3.3-1 shall be Operable. The ITS will state the instrument and bypass removal channels for each function in Table 3.3.2-1 shall be Operable. The bypass functions are manually enabled when plant conditions allow, and are automatically removed when plant conditions change and the bypass is no longer allowed. The ITS LCO 3.3.2 clarifies that only the automatic bypass removal function affects the OPERABILITY of the channel. The ability to manually bypass a function is needed to prevent unnecessary trips when plant conditions are such that the protective function is not needed. If the channel cannot be manually bypassed it does not affect the ability of the channel to provide the trip function when needed therefore it does not affect the OPERABILITY of the channel. This change is consistent with NUREG-1432.

L.5 The ITS provides a new Action for inoperable channel operational bypass removal functions for channels that are equipped with operational bypasses whereas the CTS requires the channel to be made inoperable and placed in trip channel bypass if the operational bypass removal function is inoperable. The CTS does not provide an action for an inoperable operational bypass removal. The ITS will allow an inoperable operational bypass function to be disabled, with the channel remaining OPERABLE. If the operational bypass function is not disabled the channel is placed in trip channel bypass or tripped. Only the automatic bypass removal function affects the Operability of the channel. The ability to manually bypass a function is needed to prevent unnecessary trips when plant conditions are such that the protective function is not needed. If the channel cannot be manually placed in operational bypass it does not affect the ability of the channel to provide the trip function when needed therefore it does not affect the OPERABILITY of the channel, and operation with a disabled operational bypass has no impact on plant safety. This change allows a channel with a disabled bypass channel to remain Operable. This change will maximize the channel availability by eliminating the need to make the channel inoperable due to the failure of a operating bypass function. The system logic will remain in 2 out of 4 channels required for an RPS trip vs. 2 out of 3 channels required for an RPS trip with an inoperable channel. This change is consistent with NUREG-1432.

TECHNICAL CHANGES - LESS RESTRICTIVE (continued)

L.6 The ITS will clarify the intent of the requirement to lower the setpoint for the Logarithmic Power Level - High RPS trip in Modes 3, 4, and 5 with the RTCBs closed and the CEDMCS capable of CEA withdrawal. This requirement was added to the CTS by amendment 98 to the Unit 1 Technical Specifications, amendment 86 to the Unit 2 Technical Specifications, and amendment 69 to the Unit 3 Technical Specifications. The requirement was added to insure assumptions in the PVNGS safety analysis are included in the Technical Specifications. If all four Reactor Coolant Pumps (RCPs) are running the Logarithmic Power Level trip setpoint of 1E -2% RTP is will provide the necessary protection. If less than four RCPs are running the trip setpoint must be lowered to 1E -4% RTP to provide the necessary protection for a bank CEA withdrawal. The CTS allows an alternate method of providing the necessary trip at 1E -4% RTP by making the Core Protection Calculators (CPCs) Operable. The CPCs will be bypassed at less than 1E -4% RTP. If power increases above 1E -4% RTP the CPCs will automatically be removed from bypass. A trip will then be generated because the CPCs will trip with less than 4 RCPs running. The ITS removes the option of using the CPCs for protection in MODES 3, 4 and 5. This change is consistent with the PVNGS safety analysis.

L.7 CTS Table 3.3-1 and Table 4.3-1 Item 1.A.5 requires the OPERABILITY of the low steam generator pressure reactor trip functions in MODES 1, 2, 3(*) and 4(*). The ITS Specification 3.3.1 requires the OPERABILITY of these functions in MODES 1 and 2, and ITS Specification 3.3.2 requires the OPERABILITY of these functions in MODE 3 with the RTCBs closed and CEAs capable of withdrawal. The ITS does not require the OPERABILITY of the low steam generator pressure RPS trip in MODE 4 with the RTCBs closed and any CEA capable of withdrawal. The purpose of the low steam generator pressure RPS trip in MODE 3(*) is to provide shutdown margin to prevent or minimize the return to power following a Main Steam Line Break (MSLB). In MODES 4(*) and 5(*) the function is not required because the steam generator temperature is lower, therefore, the energy release and resulting cooldown following a MSLB is less than in MODE 3(*). In Mode 4 the RCS temperature is less than 350°F. This saturation pressure for 350°F is approximately 135 psia. The CTS for SG Low Pressure (2.2.1 and 3.2.1) allow decreasing the steam generator low pressure trip setpoint in Mode 4 provided the margin between the actual SG pressure and the setpoint is less than or equal to 200 psi. In Mode 4 the steam generator pressure setpoint is less than zero psia, preventing an automatic MSIS in this Mode. The PVNGS Safety Analysis does not require an Automatic MSIS in Mode 4. The protection provided by the Logarithmic Power Level-High RPS function will provide the necessary protection in these MODES. This change is consistent with NUREG-1432.

NO SIGNIFICANT HAZARDS CONSIDERATION
SPECIFICATION 3.3.2

ADMINISTRATIVE CHANGES
(ITS 3.3.2 Discussion of Changes Labeled A.1, A.2, A.3, A.4, A.5, A.6, A.7, A.8 and A.9)

Arizona Public Service Company, Palo Verde Nuclear Generating Station (PVNGS), Units 1, 2, and 3, is converting to the ITS as outlined in NUREG-1432, "Standard Technical Specifications, Combustion Engineering Plants." The proposed changes involve the reformatting, renumbering, rewording of the Technical Specifications (TS) and Bases with no change in intent, and the incorporation of current operating practices consistent with NUREG-1432. These changes, since they do not involve technical changes to the Current TS (CTS), are administrative. Below are the No Significant Hazards Consideration (NSHC) for the conversion of this Section/Chapter to NUREG-1432.

The Commission has provided standards for determining whether a significant hazards consideration exists as stated in 10 CFR 50.92. A proposed amendment to an operating license for a facility involves a no significant hazards consideration if operation of the facility, in accordance with a proposed amendment, would not 1) involve a significant increase in the probability or consequences of an accident previously evaluated; 2) create the possibility of a new or different kind of accident from any accident previously evaluated; or 3) involve a significant reduction in a margin of safety. A discussion of these standards as they relate to this amendment request follows:

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

> The proposed changes involve reformatting, renumbering, and rewording of the CTS and Bases along with incorporation of PVNGS current operating practices and other changes to the CTS as discussed in the specific Discussion of Changes listed above in order to be consistent with NUREG-1432. The reformatting, renumbering, and rewording along with the other changes listed above, involves no technical changes to the CTS. Specifically, there will be no change in the requirements imposed on PVNGS due to these changes. During development of NUREG-1432, certain wording preferences or English language conventions were adopted. The proposed changes to this Section/Chapter are administrative in nature and do not impact initiators of any analyzed events. They also do not impact the assumed mitigation of accidents or transient events. Therefore, these changes do not involve a significant increase in the probability or consequences of an accident previously evaluated.

ADMINISTRATIVE CHANGES
(ITS 3.3.2 Discussion of Changes Labeled A.1, A.2, A.3, A.4, A.5, A.6, A.7, A.8 and A.9) (continued)

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

The proposed changes involve reformatting, renumbering, and rewording of the CTS, along with the incorporation of PVNGS current operating practices and other changes, as discussed, in order to be consistent with NUREG-1432. The proposed changes do not involve a physical alteration of the plant (no new or different type of equipment will be installed) or change the methods governing normal plant operation. The proposed changes will not impose any new or different requirements or eliminate any existing requirements. Therefore, these changes do not create the possibility of a new or different kind of accident from any accident previously evaluated.

Standard 3.-- Does the proposed change involve a significant reduction in a margin of safety?

The proposed changes involve reformatting, renumbering, and rewording of the CTS, along with the incorporation of PVNGS current operating practices and other changes, as discussed, in order to be consistent with NUREG-1432. The proposed changes are administrative in nature and will not involve any technical changes. The proposed changes will not reduce a margin of safety because they have no impact on any safety analysis assumptions. Also, because these changes are administrative in nature, no question of safety is involved. Therefore, these changes do not involve a significant reduction in a margin of safety.

TECHNICAL CHANGES - MORE RESTRICTIVE
(ITS 3.3.2 Discussion of Changes Labeled M.1 and M.2)

Arizona Public Service Company, Palo Verde Nuclear Generating Station (PVNGS), Units 1, 2, and 3 is converting to the ITS as outlined in NUREG-1432. This particular NSHC is for the changes labeled "Technical Changes - More Restrictive" described in the specific Discussion of Changes listed above. The proposed changes incorporate more restrictive changes into the CTS by either making current requirements more stringent or adding new requirements which currently do not exist.

The Commission has provided standards for determining whether a significant hazards consideration exists as stated in 10 CFR 50.92. A proposed amendment to an operating license for a facility involves a no significant hazards consideration if operation of the facility, in accordance with a proposed amendment, would not 1) involve a significant increase in the probability or consequences of an accident previously evaluated; 2) create the possibility of a new or different kind of accident from any accident previously evaluated; or 3) involve a significant reduction in a margin of safety. A discussion of these standards as they relate to this amendment request follows:

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

> The proposed changes provide more stringent requirements than previously existed in the CTS. The more stringent requirements will not result in operation that will increase the probability of initiating an analyzed event. If anything, the new requirements may decrease the probability or consequences of an analyzed event by incorporating the more restrictive changes discussed in the specific Discussion of Changes listed above. These changes will not alter assumptions relative to mitigation of an accident or transient event. The more restrictive requirements will not alter the operation and will continue to ensure process variables, structures, systems, or components are maintained consistent with safety analyses and licensing basis. These changes have been reviewed to ensure that no previously evaluated accident has been adversely affected. Therefore, these changes will not involve a significant increase in the probability or consequences of an accident evaluated.

TECHNICAL CHANGES - MORE RESTRICTIVE
(ITS 3.3.2 Discussion of Changes Labeled M.1 and M.2)

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

Making existing requirements more restrictive and adding more restrictive requirements to the CTS will not alter the plant configuration (no new or different type of equipment will be installed) or change the methods governing normal plant operation. These changes do impose different requirements. However, they are consistent with the assumptions made in the safety analyses, licensing basis, and NUREG-1432. Therefore, these changes will not create the possibility of a new or different kind of accident from any accident previously evaluated.

Standard 3.-- Does the proposed change involve a significant reduction in a margin of safety?

The proposed changes provide more stringent requirements than previously existed in the CTS. An evaluation of these changes concluded that adding these more restrictive requirements either increases or has no impact on the margin of safety. The changes provide additional restrictions which may enhance plant safety. These changes maintain requirements of the safety analysis, licensing basis, and NUREG-1432. As such, no question of safety is involved. Therefore, these changes will not involve a significant reduction in a margin of safety.

TECHNICAL CHANGES - RELOCATIONS
(ITS 3.3.2 Discussion of Changes Labeled LA.1, LA.2, LA.3 and LA.4)

Arizona Public Service Company, Palo Verde Nuclear Generating Station (PVNGS), Units 1, 2, and 3 is converting to the ITS as outlined in NUREG-1432. The proposed changes, since detail is being removed from the CTS to a Licensee Controlled Document, are less restrictive. The descriptions of these changes are in the Discussion of Changes listed above.

The Commission has provided standards for determining whether a significant hazards consideration exists as stated in 10 CFR 50.92. A proposed amendment to an operating license for a facility involves a no significant hazards consideration if operation of the facility, in accordance with a proposed amendment, would not 1) involve a significant increase in the probability or consequences of an accident previously evaluated; 2) create the possibility of a new or different kind of accident from any accident previously evaluated; or 3) involve a significant reduction in a margin of safety. A discussion of these standards as they relate to this amendment request follows:

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

> The proposed changes relocate requirements from the CTS to a Licensee Controlled Document. These changes do not result in any hardware changes or changes to plant operating practices. The details being relocated are not assumed to be an initiator of any analyzed event. The Licensee Controlled Document containing the relocated requirements will be maintained using the provisions of 10 CFR 50.59 or other specified control processes and is subject to the change control process in the Administrative Controls Section of the ITS. Since any changes to a Licensee Controlled Document will be evaluated, no increase in the probability or consequences of an accident previously evaluated will be allowed. Therefore, these changes will not involve a significant increase in the probability or consequences of an accident previously evaluated.

TECHNICAL CHANGES - RELOCATIONS
(ITS 3.3.2 Discussion of Changes Labeled LA.1, LA.2, LA.3 and LA.4) (continued)

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

The proposed changes relocate requirements from the CTS to a Licensee Controlled Document. These changes will not alter the plant configuration (no new or different type of equipment will be installed) or change the methods governing normal plant operation. These changes will not impose different requirements and adequate control of information will still be maintained. These changes will not alter assumptions made in the safety analysis or licensing basis. Therefore, these changes will not create the possibility of a new or different kind of accident from any accident previously evaluated.

Standard 3.-- Does the proposed change involve a significant reduction in a margin of safety?

The proposed changes relocate requirements from the CTS to a Licensee Controlled Document. These changes will not reduce a margin of safety since they have no impact on any safety analysis assumptions. In addition, the requirements to be transposed from the CTS to the Licensee Controlled Document are the same as the CTS. Since any future changes to this Licensee Controlled Document will be evaluated per the requirements of 10 CFR 50.59, or other specified control processes, no reduction (significant or insignificant) in a margin of safety will be allowed. Therefore, these changes will not involve a significant reduction in a margin of safety.

The NRC review provides a certain margin of safety, and although this review will no longer be performed prior to submittal, the NRC still inspects the 10 CFR 50.59 process. The proposed changes are consistent with NUREG-1432, which was approved by the NRC Staff. The change controls for proposed relocated details and requirements provide an acceptable level of regulatory authority. Revising the CTS to reflect the approved level of detail per NUREG-1432 reinforces the conclusion that there is not a significant reduction in the margin of safety. Therefore, revising the CTS to reflect the NRC accepted level of detail and requirements ensures no reduction in a margin of safety.

TECHNICAL CHANGES - LESS RESTRICTIVE
(ITS 3.3.2 Discussion of Changes Labeled L.1)

Arizona Public Service Company, Palo Verde Nuclear Generating Station (PVNGS), Units 1, 2, and 3 is converting to the ITS as outlined in NUREG-1432. The proposed change involves making the CTS less restrictive. Below is the description of this less restrictive change and the NSHC for the conversion to NUREG 1432.

L.1 CTS Table 3.3-1 B.2.a requires Action 9 for inoperable Logarithmic Power Level - High channels in Modes 3, 4, and 5 with the RTCBs closed. Action 9 requires that with the number of Operable channels one less than the minimum required number of channels Operable, restore the inoperable channel to Operable status within 48 hours or open the RTCBs within the next hour. This Action would allow operation with two Operable channels for 48 hours. Action 9 does not require an inoperable channel to be tripped or bypassed so the RPS could be in a 2 out of 2 logic condition for 48 hours. A failure in either of the remaining two channels during this 48 hour period would prevent a RPS trip.

The ITS will change the requirements for Modes 3, 4, and 5 with the RTCBs closed to match the requirements for the RPS functions in an operating Mode. This will require an inoperable channel to be tripped or bypassed within one hour. A second inoperable channel requires one of the channels to be tripped and one to be bypassed within one hour. Operation with one channel tripped and one channel bypassed may continue until the next CHANNEL FUNCTIONAL TEST is required. This is less restrictive in that operation with two channels inoperable may continue longer than the 48 hours allowed in the CTS. The ITS Actions A and B also allow the plant to change Modes while in these Actions, the CTS Action 9 does not have a 3.0.4 exclusion. This is acceptable because the system will be in a 1 out of 2 logic while in this Action and the system will continue to meet the single failure criteria.

This change is more restrictive for the first 48 hours. The failed RPS channels must be tripped or bypassed within one hour. After that hour the system must be placed in a 1 out of 2 logic configuration and will meet single failure criteria. A second requirement that will be more restrictive will be imposed by the ITS. This is a requirement that an inoperable channel must be returned to Operable Status prior to entering Mode 2 following the next Mode 5 entry. After the first 48 hours, the change is less restrictive because the RTCBs are not required to be opened until the next CHANNEL FUNCTIONAL TEST is due. Allowing the RTCBs to remain closed until the next FUNCTIONAL TEST is acceptable because the system will meet the single failure criteria in this condition. This change will provide consistent requirements for the RPS in both the operating and shutdown modes. This change is consistent with NUREG-1432.

TECHNICAL CHANGES - LESS RESTRICTIVE
(ITS 3.3.2 Discussion of Changes Labeled L.1) (continued)

The Commission has provided standards for determining whether a significant hazards consideration exists as stated in 10 CFR 50.92. A proposed amendment to an operating license for a facility involves a no significant hazards consideration if operation of the facility, in accordance with a proposed amendment, would not 1) involve a significant increase in the probability or consequences of an accident previously evaluated; 2) create the possibility of a new or different kind of accident from any accident previously evaluated; or 3) involve a significant reduction in a margin of safety. A discussion of these standards as they relate to this amendment request follows:

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

The proposed change will modify the Action required for less than four channels of Excore Neutron Flux measurement channels Operable. CTS Table 3.3-1 B.2.a requires Action 9 for inoperable Logarithmic Power Level - High channels in Modes 3, 4, and 5 with the RTCBs closed. Action 9 requires that with the number of Operable channels one less than the minimum required number of channels Operable, restore the inoperable channel to Operable status within 48 hours or open the RTCBs within the next hour. This Action would allow operation with two Operable channels for 48 hours. Action 9 does not require an inoperable channel to be tripped or bypassed so the RPS could be in a 2 out of 2 logic condition for 48 hours. A failure in either of the remaining two channels during this 48 hour period would prevent a RPS trip.

The ITS will change the requirements for Modes 3, 4, and 5 with the RTCBs closed to match the requirements for the RPS functions in an operating Mode. This will require an inoperable channel to be tripped or bypassed within one hour. A second inoperable channel requires one of the channels to be tripped and one to be bypassed within one hour. Operation with one channel tripped and one channel bypassed may continue until the next CHANNEL FUNCTIONAL TEST is required. This is less restrictive in that operation with two channels inoperable may continue longer than the 48 hours allowed in the CTS. The system will be in a 1 out of 2 logic while in this Action and the system will continue to meet the single failure criteria.

TECHNICAL CHANGES - LESS RESTRICTIVE
(ITS 3.3.2 Discussion of Changes Labeled L.1) (continued)

This change is more restrictive for the first 48 hours. The failed RPS channels must be tripped or bypassed within one hour. After that hour the system must be placed in a 1 out of 2 logic configuration and will meet single failure criteria. A second requirement that will be more restrictive will be imposed by the ITS. This is a requirement that an inoperable channel must be returned to Operable Status prior to entering Mode 2 following the next Mode 5 entry. After the first 48 hours, the change is less restrictive because the RTCBs are not required to be opened until the next CHANNEL FUNCTIONAL TEST is due. Allowing the RTCBs to remain closed until the next FUNCTIONAL TEST is acceptable because the system will meet the single failure criteria in this condition. This change will provide consistent requirements for the RPS in both the operating and shutdown modes.

This change is consistent with NUREG-1432. This change does not result in any hardware changes or changes to plant operating practices nor does it affect plant operation. Therefore this change will not involve a significant increase in the probability or consequences of an accident previously evaluated.

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

The proposed change will modify the Action required for less than four channels of Excore Neutron Flux measurement channels Operable. CTS Table 3.3-1 B.2.a requires Action 9 for inoperable Logarithmic Power Level - High channels in Modes 3, 4, and 5 with the RTCBs closed. Action 9 requires that with the number of Operable channels one less than the minimum required number of channels Operable, restore the inoperable channel to Operable status within 48 hours or open the RTCBs within the next hour. This Action would allow operation with two Operable channels for 48 hours. Action 9 does not require an inoperable channel to be tripped or bypassed so the RPS could be in a 2 out of 2 logic condition for 48 hours. A failure in either of the remaining two channels during this 48 hour period would prevent a RPS trip.

TECHNICAL CHANGES - LESS RESTRICTIVE
(ITS 3.3.2 Discussion of Changes Labeled L.1) (continued)

The ITS will change the requirements for Modes 3, 4, and 5 with the RTCBs closed to match the requirements for the RPS functions in an operating Mode. This will require an inoperable channel to be tripped or bypassed within one hour. A second inoperable channel requires one of the channels to be tripped and one to be bypassed within one hour. Operation with one channel tripped and one channel bypassed may continue until the next CHANNEL FUNCTIONAL TEST is required. This is less restrictive in that operation with two channels inoperable may continue longer than the 48 hours allowed in the CTS. The system will be in a 1 out of 2 logic while in this Action and the system will continue to meet the single failure criteria.

This change is more restrictive for the first 48 hours. The failed RPS channels must be tripped or bypassed within one hour. After that hour the system must be placed in a 1 out of 2 logic configuration and will meet single failure criteria. A second requirement that will be more restrictive will be imposed by the ITS. This is a requirement that an inoperable channel must be returned to Operable Status prior to entering Mode 2 following the next Mode 5 entry. After the first 48 hours, the change is less restrictive because the RTCBs are not required to be opened until the next CHANNEL FUNCTIONAL TEST is due. Allowing the RTCBs to remain closed until the next FUNCTIONAL TEST is acceptable because the system will meet the single failure criteria in this condition. This change will provide consistent requirements for the RPS in both the operating and shutdown modes.

This change is consistent with NUREG-1432. This change will not alter the plant configuration (no new or different type of equipment will be installed) or change the methods of governing normal plant operation. This change will not alter assumptions made in the safety analysis or licensing basis. Therefore, this change will not create the possibility of a new or different kind of accident from any accident previously evaluated.

TECHNICAL CHANGES - LESS RESTRICTIVE
(ITS 3.3.2 Discussion of Changes Labeled L.1) (continued)

Standard 3.-- Does the proposed change involve a significant reduction in a margin of safety?

The proposed change will modify the Action required for less than four channels of Excore Neutron Flux measurement channels Operable. CTS Table 3.3-1 B.2.a requires Action 9 for inoperable Logarithmic Power Level - High channels in Modes 3, 4, and 5 with the RTCBs closed. Action 9 requires that with the number of Operable channels one less than the minimum required number of channels Operable, restore the inoperable channel to Operable status within 48 hours or open the RTCBs within the next hour. This Action would allow operation with two Operable channels for 48 hours. Action 9 does not require an inoperable channel to be tripped or bypassed so the RPS could be in a 2 out of 2 logic condition for 48 hours. A failure in either of the remaining two channels during this 48 hour period would prevent a RPS trip.

The ITS will change the requirements for Modes 3, 4, and 5 with the RTCBs closed to match the requirements for the RPS functions in an operating Mode. This will require an inoperable channel to be tripped or bypassed within one hour. A second inoperable channel requires one of the channels to be tripped and one to be bypassed within one hour. Operation with one channel tripped and one channel bypassed may continue until the next CHANNEL FUNCTIONAL TEST is required. This is less restrictive in that operation with two channels inoperable may continue longer than the 48 hours allowed in the CTS. The system will be in a 1 out of 2 logic while in this Action and the system will continue to meet the single failure criteria.

TECHNICAL CHANGES - LESS RESTRICTIVE
(ITS 3.3.2 Discussion of Changes Labeled L.1) (continued)

This change is more restrictive for the first 48 hours. The failed RPS channels must be tripped or bypassed within one hour. After that hour the system must be placed in a 1 out of 2 logic configuration and will meet single failure criteria. A second requirement that will be more restrictive will be imposed by the ITS. This is a requirement that an inoperable channel must be returned to Operable Status prior to entering Mode 2 following the next Mode 5 entry. After the first 48 hours, the change is less restrictive because the RTCBs are not required to be opened until the next CHANNEL FUNCTIONAL TEST is due. Allowing the RTCBs to remain closed until the next FUNCTIONAL TEST is acceptable because the system will meet the single failure criteria in this condition. This change will provide consistent requirements for the RPS in both the operating and shutdown modes.

This change will not reduce a margin of safety since it has no impact on safety analysis assumptions. This change is consistent with NUREG-1432, which was approved by the NRC Staff. Therefore, this change does not result in a reduction in a margin of safety.

TECHNICAL CHANGES - LESS RESTRICTIVE
(ITS 3.3.2 Discussion of Changes Labeled L.2)

Arizona Public Service Company, Palo Verde Nuclear Generating Station (PVNGS), Units 1, 2, and 3 is converting to the ITS as outlined in NUREG-1432. The proposed change involves making the CTS less restrictive. Below is the description of this less restrictive change and the NSHC for conversion to NUREG-1432.

L.2 CTS Table 3.3-1, Action Statement 2 states in part: "The channel shall be returned to OPERABLE status no later than during the next COLD SHUTDOWN. The ITS will state that the channel will be restored to Operable status prior to entering Mode 2 following the next Mode 5 entry. The CTS Action states that the channel must be returned to Operable status prior to leaving cold shutdown. ITS Action A.1 and C.1 or C.2.1 require an inoperable channel to be placed in the trip channel bypass or tripped. This places the system in either a 2 out of 3 logic or a 1 out of 2 logic. In either case the system meets the requirement that no single random failure will prevent a reactor trip when required. This change is consistent with NUREG-1432.

The Commission has provided standards for determining whether a significant hazards consideration exists as stated in 10 CFR 50.92. A proposed amendment to an operating license for a facility involves a no significant hazards consideration if operation of the facility, in accordance with a proposed amendment, would not 1) involve a significant increase in the probability or consequences of an accident previously evaluated; 2) create the possibility of a new or different kind of accident from any accident previously evaluated; or 3) involve a significant reduction in a margin of safety. A discussion of these standards as they relate to this amendment request follows:

TECHNICAL CHANGES - LESS RESTRICTIVE
(ITS 3.3.2 Discussion of Changes Labeled L.2) (continued)

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

The proposed change will require that an inoperable RPS channel be restored prior to entry into MODE 2 following the next MODE 5 entry. CTS Table 3.3-1, Action Statement 2 states in part: "The channel shall be returned to OPERABLE status no later than during the next COLD SHUTDOWN. The ITS will state that the channel will be restored to Operable status prior to entering Mode 2 following the next Mode 5 entry. The CTS Action states that the channel must be returned to Operable status prior to leaving cold shutdown. The system will continue to meet the single failure criteria while operating with an inoperable RPS channel. In some cases equipment cannot be made Operable during the Cold Shutdown because of retesting that requires higher Modes to complete. This change will still insure that all of the RPS channels are restored to Operable status prior to power operations following a MODE 5 entry.

This change is consistent with NUREG-1432. This change does not result in any hardware changes or changes to plant operating practices nor does it affect plant operation. Therefore this change will not involve a significant increase in the probability or consequences of an accident previously evaluated.

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

The proposed change will require that an inoperable RPS channel be restored prior to entry into MODE 2 following the next MODE 5 entry. CTS Table 3.3-1, Action Statement 2 states in part: "The channel shall be returned to OPERABLE status no later than during the next COLD SHUTDOWN. The ITS will state that the channel will be restored to Operable status prior to entering Mode 2 following the next Mode 5 entry. The CTS Action states that the channel must be returned to Operable status prior to leaving cold shutdown. The system will continue to meet the single failure criteria while operating with an inoperable RPS channel. In some cases equipment cannot be made Operable during the Cold Shutdown because of retesting that requires higher Modes to complete. This change will still insure that all of the RPS channels are restored to Operable status prior to power operations following a MODE 5 entry.

TECHNICAL CHANGES - LESS RESTRICTIVE
(ITS 3.3.2 Discussion of Changes Labeled L.2) (continued)

This change is consistent with NUREG-1432. This change will not alter the plant configuration (no new or different type of equipment will be installed) or change the methods of governing normal plant operation. This change will not alter assumptions made in the safety analysis or licensing basis. Therefore, this change will not create the possibility of a new or different kind of accident from any accident previously evaluated.

Standard 3.-- Does the proposed change involve a significant reduction in a margin of safety?

The proposed change will require that an inoperable RPS channel be restored prior to entry into MODE 2 following the next MODE 5 entry. CTS Table 3.3-1, Action Statement 2 states in part; "The channel shall be returned to OPERABLE status no later than during the next COLD SHUTDOWN. The ITS will state that the channel will be restored to Operable status prior to entering Mode 2 following the next Mode 5 entry. The CTS Action states that the channel must be returned to Operable status prior to leaving cold shutdown. The system will continue to meet the single failure criteria while operating with an inoperable RPS channel. In some cases equipment cannot be made Operable during the Cold Shutdown because of retesting that requires higher Modes to complete. This change will still insure that all of the RPS channels are restored to Operable status prior to power operations following a MODE 5 entry.

This change will not reduce a margin of safety since it has no impact on safety analysis assumptions. This change is consistent with NUREG-1432, which was approved by the NRC Staff. Therefore, this change does not result in a reduction in a margin of safety.

TECHNICAL CHANGES - LESS RESTRICTIVE
(ITS 3.3.2 Discussion of Changes Labeled L.3)

Arizona Public Service Company, Palo Verde Nuclear Generating Station (PVNGS), Units 1, 2, and 3 is converting to the ITS as outlined in NUREG-1432. The proposed change involves making the CTS less restrictive. Below is the description of this less restrictive change and the NSHC for conversion to NUREG-1432.

L.3 CTS Table 4.3-1, Item I.B.2 requires a CHANNEL FUNCTIONAL TEST of the Logarithmic Power Level - High function quarterly and each startup or when required with the reactor trip breakers closed and the CEA drive system capable of rod withdrawal, if not performed in the previous 7 days. The ITS SR 3.3.2.2 will require the Logarithmic Power Level - HIGH FUNCTIONAL TEST to be performed every 92 days. It will not require a FUNCTIONAL TEST within 7 days of startup or prior to closing the RTCBs with the CEA drive system capable of rod withdrawal.

The RPS FUNCTIONAL TEST Frequency of 92 days is based on the reliability analysis presented in Topical Report CEN-327-A, "RPS/ESFAS Extended Test Interval Evaluation", CEN-327-A supplement 1, and calculation 13-JC-SB-200-Rev. 01 "Plant Protection System Bistable Drift Analysis". These evaluations show that a FUNCTIONAL TEST Frequency of 92 days is sufficient to provide the reliability needed to maintain the Core Damage Frequency within acceptable levels. This change is consistent with NUREG-1432.

The Commission has provided standards for determining whether a significant hazards consideration exists as stated in 10 CFR 50.92. A proposed amendment to an operating license for a facility involves a no significant hazards consideration if operation of the facility, in accordance with a proposed amendment, would not 1) involve a significant increase in the probability or consequences of an accident previously evaluated; 2) create the possibility of a new or different kind of accident from any accident previously evaluated; or 3) involve a significant reduction in a margin of safety. A discussion of these standards as they relate to this amendment request follows:

TECHNICAL CHANGES - LESS RESTRICTIVE
(ITS 3.3.2 Discussion of Changes Labeled L.3) (continued)

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

The proposed change will remove the requirement for a CHANNEL FUNCTIONAL TEST within 7 days of startup or when RTCBs are closed and CEAs are capable of withdrawal. CTS Table 4.3-1, Item I.B.2 requires a CHANNEL FUNCTIONAL TEST of the Logarithmic Power Level - High function quarterly and each startup or when required with the reactor trip breakers closed and the CEA drive system capable of rod withdrawal, if not performed in the previous 7 days. The ITS SR 3.3.2.2 will require the Logarithmic Power Level - HIGH FUNCTIONAL TEST to be performed every 92 days. It will not require a FUNCTIONAL TEST within 7 days of startup or prior to closing the RTCBs with the CEA drive system capable of rod withdrawal.

The RPS FUNCTIONAL TEST Frequency of 92 days is based on the reliability analysis presented in Topical Report CEN-327-A, "RPS/ESFAS Extended Test Interval Evaluation", CEN-327-A supplement 1, and calculation 13-JC-SB-200-Rev. 01 "Plant Protection System Bistable Drift Analysis". These evaluations show that a FUNCTIONAL TEST Frequency of 92 days is sufficient to provide the reliability needed to maintain the Core Damage Frequency within acceptable levels.

This change is consistent with NUREG-1432. This change does not result in any hardware changes or changes to plant operating practices nor does it affect plant operation. Therefore this change will not involve a significant increase in the probability or consequences of an accident previously evaluated.

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

The proposed change will remove the requirement for a CHANNEL FUNCTIONAL TEST within 7 days of startup or when RTCBs are closed and CEAs are capable of withdrawal. CTS Table 4.3-1, Item I.B.2 requires a CHANNEL FUNCTIONAL TEST of the Logarithmic Power Level - High function quarterly and each startup or when required with the reactor trip breakers closed and the CEA drive system capable of rod withdrawal, if not performed in the previous 7 days. The ITS SR 3.3.2.2 will require the Logarithmic Power Level - HIGH FUNCTIONAL TEST to be performed every 92 days. It will not require a FUNCTIONAL TEST within 7 days of startup or prior to closing the RTCBs with the CEA drive system capable of rod withdrawal.

TECHNICAL CHANGES - LESS RESTRICTIVE
(ITS 3.3.2 Discussion of Changes Labeled L.3) (continued)

The RPS FUNCTIONAL TEST Frequency of 92 days is based on the reliability analysis presented in Topical Report CEN-327-A, "RPS/ESFAS Extended Test Interval Evaluation", CEN-327-A supplement 1, and calculation 13-JC-SB-200-Rev. 01 "Plant Protection System Bistable Drift Analysis". These evaluations show that a FUNCTIONAL TEST Frequency of 92 days is sufficient to provide the reliability needed to maintain the Core Damage Frequency within acceptable levels.

This change is consistent with NUREG-1432. This change will not alter the plant configuration (no new or different type of equipment will be installed) or change the methods of governing normal plant operation. This change will not alter assumptions made in the safety analysis or licensing basis. Therefore, this change will not create the possibility of a new or different kind of accident from any accident previously evaluated.

Standard 3.-- Does the proposed change involve a significant reduction in a margin of safety?

The proposed change will remove the requirement for a CHANNEL FUNCTIONAL TEST within 7 days of startup or when RTCBs are closed and CEAs are capable of withdrawal. CTS Table 4.3-1, Item I.B.2 requires a CHANNEL FUNCTIONAL TEST of the Logarithmic Power Level - High function quarterly and each startup or when required with the reactor trip breakers closed and the CEA drive system capable of rod withdrawal, if not performed in the previous 7 days. The ITS SR 3.3.2.2 will require the Logarithmic Power Level - HIGH FUNCTIONAL TEST to be performed every 92 days. It will not require a FUNCTIONAL TEST within 7 days of startup or prior to closing the RTCBs with the CEA drive system capable of rod withdrawal.

The RPS FUNCTIONAL TEST Frequency of 92 days is based on the reliability analysis presented in Topical Report CEN-327-A, "RPS/ESFAS Extended Test Interval Evaluation", CEN-327-A supplement 1, and calculation 13-JC-SB-200-Rev. 01 "Plant Protection System Bistable Drift Analysis". These evaluations show that a FUNCTIONAL TEST Frequency of 92 days is sufficient to provide the reliability needed to maintain the Core Damage Frequency within acceptable levels.

This change will not reduce a margin of safety since it has no impact on safety analysis assumptions. This change is consistent with NUREG-1432, which was approved by the NRC Staff. Therefore, this change does not result in a reduction in a margin of safety.

TECHNICAL CHANGES - LESS RESTRICTIVE
(ITS 3.3.2 Discussion of Changes Labeled L.4)

Arizona Public Service Company, Palo Verde Nuclear Generating Station (PVNGS), Units 1, 2, and 3 is converting to the ITS as outlined in NUREG-1432. The proposed change involves making the CTS less restrictive. Below is the description of this less restrictive change and the NSHC for conversion to NUREG-1432.

L.4 CTS LCO 3.3.1 states that the instrument channels and bypasses in Table 3.3-1 shall be Operable. The ITS will state the instrument and bypass removal channels for each function in Table 3.3.2-1 shall be Operable. The bypass functions are manually enabled when plant conditions allow, and are automatically removed when plant conditions change and the bypass is no longer allowed. The ITS LCO 3.3.2 clarifies that only the automatic bypass removal function affects the OPERABILITY of the channel. The ability to manually bypass a function is needed to prevent unnecessary trips when plant conditions are such that the protective function is not needed. If the channel cannot be manually bypassed it does not affect the ability of the channel to provide the trip function when needed therefore it does not affect the OPERABILITY of the channel. This change is consistent with NUREG-1432.

The Commission has provided standards for determining whether a significant hazards consideration exists as stated in 10 CFR 50.92. A proposed amendment to an operating license for a facility involves a no significant hazards consideration if operation of the facility, in accordance with a proposed amendment, would not 1) involve a significant increase in the probability or consequences of an accident previously evaluated; 2) create the possibility of a new or different kind of accident from any accident previously evaluated; or 3) involve a significant reduction in a margin of safety. A discussion of these standards as they relate to this amendment request follows:

TECHNICAL CHANGES - LESS RESTRICTIVE
(ITS 3.3.2 Discussion of Changes Labeled L.4) (continued)

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

The proposed change will remove the requirement of the bypass channel for Operability of the RPS instrument channel. This will allow the RPS channel to remain Operable if the bypass removal channel is disabled. CTS LCO 3.3.1 states that the instrument channels and bypasses in Table 3.3-1 shall be Operable. The ITS will state the instrument and bypass removal channels for each function in Table 3.3.2-1 shall be Operable. The bypass functions are manually enabled when plant conditions allow, and are automatically removed when plant conditions change and the bypass is no longer allowed. The ITS LCO 3.3.2 clarifies that only the automatic bypass removal function affects the OPERABILITY of the channel. The ability to manually bypass a function is needed to prevent unnecessary trips when plant conditions are such that the protective function is not needed. If the channel cannot be manually bypassed it does not affect the ability of the channel to provide the trip function when needed therefore it does not affect the OPERABILITY of the channel.

This change is consistent with NUREG-1432. This change does not result in any hardware changes or changes to plant operating practices nor does it affect plant operation. Therefore this change will not involve a significant increase in the probability or consequences of an accident previously evaluated.

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

The proposed change will remove the requirement of the bypass channel for Operability of the RPS instrument channel. This will allow the RPS channel to remain Operable if the bypass removal channel is disabled. CTS LCO 3.3.1 states that the instrument channels and bypasses in Table 3.3-1 shall be Operable. The ITS will state the instrument and bypass removal channels for each function in Table 3.3.2-1 shall be Operable. The bypass functions are manually enabled when plant conditions allow, and are automatically removed when plant conditions change and the bypass is no longer allowed. The ITS LCO 3.3.2 clarifies that only the automatic bypass removal function affects the OPERABILITY of the channel. The ability to manually bypass a function is needed to prevent unnecessary trips when plant conditions are such that the protective function is not needed. If the channel cannot be manually bypassed it does not affect the ability of the channel to provide the trip function when needed therefore it does not affect the OPERABILITY of the channel.

TECHNICAL CHANGES - LESS RESTRICTIVE
(ITS 3.3.2 Discussion of Changes Labeled L.4) (continued)

This change is consistent with NUREG-1432. This change will not alter the plant configuration (no new or different type of equipment will be installed) or change the methods of governing normal plant operation. This change will not alter assumptions made in the safety analysis or licensing basis. Therefore, this change will not create the possibility of a new or different kind of accident from any accident previously evaluated.

Standard 3.-- Does the proposed change involve a significant reduction in a margin of safety?

The proposed change will remove the requirement of the bypass channel for Operability of the RPS instrument channel. This will allow the RPS channel to remain Operable if the bypass removal channel is disabled. CTS LCO 3.3.1 states that the instrument channels and bypasses in Table 3.3-1 shall be Operable. The ITS will state the instrument and bypass removal channels for each function in Table 3.3.2-1 shall be Operable. The bypass functions are manually enabled when plant conditions allow, and are automatically removed when plant conditions change and the bypass is no longer allowed. The ITS LCO 3.3.2 clarifies that only the automatic bypass removal function affects the OPERABILITY of the channel. The ability to manually bypass a function is needed to prevent unnecessary trips when plant conditions are such that the protective function is not needed. If the channel cannot be manually bypassed it does not affect the ability of the channel to provide the trip function when needed therefore it does not affect the OPERABILITY of the channel.

This change will not reduce a margin of safety since it has no impact on safety analysis assumptions. This change is consistent with NUREG-1432, which was approved by the NRC Staff. Therefore, this change does not result in a reduction in a margin of safety.

TECHNICAL CHANGES - LESS RESTRICTIVE
(ITS 3.3.2 Discussion of Changes Labeled L.5)

Arizona Public Service Company, Palo Verde Nuclear Generating Station (PVNGS), Units 1, 2, and 3 is converting to the ITS as outlined in NUREG-1432. The proposed change involves making the CTS less restrictive. Below is the description of this less restrictive change and the NSHC for conversion to NUREG-1432.

L.5 The ITS provides a new Action for inoperable channel operational bypass removal functions for channels that are equipped with operational bypasses whereas the CTS requires the channel to be made inoperable and placed in trip channel bypass if the operational bypass removal function is inoperable. The CTS does not provide an action for an inoperable operational bypass removal. The ITS will allow an inoperable operational bypass function to be disabled, with the channel remaining OPERABLE. If the operational bypass function is not disabled the channel is placed in trip channel bypass or tripped. Only the automatic bypass removal function affects the Operability of the channel. The ability to manually bypass a function is needed to prevent unnecessary trips when plant conditions are such that the protective function is not needed. If the channel cannot be manually placed in operational bypass it does not affect the ability of the channel to provide the trip function when needed therefore it does not affect the OPERABILITY of the channel, and operation with a disabled operational bypass has no impact on plant safety. This change allows a channel with a disabled bypass channel to remain Operable. This change will maximize the channel availability by eliminating the need to make the channel inoperable due to the failure of a operating bypass function. The system logic will remain in 2 out of 4 channels required for an RPS trip vs. 2 out of 3 channels required for an RPS trip with an inoperable channel. This change is consistent with NUREG-1432.

The Commission has provided standards for determining whether a significant hazards consideration exists as stated in 10 CFR 50.92. A proposed amendment to an operating license for a facility involves a no significant hazards consideration if operation of the facility, in accordance with a proposed amendment, would not 1) involve a significant increase in the probability or consequences of an accident previously evaluated; 2) create the possibility of a new or different kind of accident from any accident previously evaluated; or 3) involve a significant reduction in a margin of safety. A discussion of these standards as they relate to this amendment request follows:

TECHNICAL CHANGES - LESS RESTRICTIVE
(ITS 3.3.2 Discussion of Changes Labeled L.5) (continued)

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

The proposed change will add an Action for an Inoperable bypass removal channel. The CTS provides a set of Actions for an inoperable channel. This Action is the same whether the trip function is inoperable or the bypass function is inoperable. The ITS will allow an inoperable bypass function to be disabled, with the channel remaining Operable. If the bypass function is not disabled, the channel is bypassed or tripped. Only the automatic bypass removal function affects the OPERABILITY of the channel. The ability to manually bypass a function is needed to prevent unnecessary trips when plant conditions are such that the protective function is not needed. If the channel cannot be manually bypassed, it does not affect the ability of the channel to provide the trip function when needed therefore it does not affect the OPERABILITY of the channel. This change allow a channel with a disabled bypass channel to remain Operable. This change will maximize the channel availability by eliminating the need to make the channel inoperable due to the failure of a bypass function. The system logic will remain in 2 out of 4 channels required for an RPS trip vs. 2 out of 3 channels required for an RPS trip with an inoperable channel.

This change is consistent with NUREG-1432. This change does not result in any hardware changes or changes to plant operating practices nor does it affect plant operation. Therefore this change will not involve a significant increase in the probability or consequences of an accident previously evaluated.

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

The proposed change will add an Action for an Inoperable bypass removal channel. The CTS provides a set of Actions for an inoperable channel. This Action is the same whether the trip function is inoperable or the bypass function is inoperable. The ITS will allow an inoperable bypass function to be disabled, with the channel remaining Operable. If the bypass function is not disabled, the channel is bypassed or tripped. Only the automatic bypass removal function affects the OPERABILITY of the channel. The ability to manually bypass a function is needed to prevent unnecessary trips when plant conditions are such that the protective function is not needed. If the channel cannot be manually bypassed, it does not affect the ability of the channel to provide the trip function when needed therefore it does not

TECHNICAL CHANGES - LESS RESTRICTIVE
(ITS 3.3.2 Discussion of Changes Labeled L.5) (continued)

affect the OPERABILITY of the channel. This change allow a channel with a disabled bypass channel to remain Operable. This change will maximize the channel availability by eliminating the need to make the channel inoperable due to the failure of a bypass function. The system logic will remain in 2 out of 4 channels required for an RPS trip vs. 2 out of 3 channels required for an RPS trip with an inoperable channel.

This change is consistent with NUREG-1432. This change will not alter the plant configuration (no new or different type of equipment will be installed) or change the methods of governing normal plant operation. This change will not alter assumptions made in the safety analysis or licensing basis. Therefore, this change will not create the possibility of a new or different kind of accident from any accident previously evaluated.

Standard 3.-- Does the proposed change involve a significant reduction in a margin of safety?

The proposed change will add an Action for an Inoperable bypass removal channel. The CTS provides a set of Actions for an inoperable channel. This Action is the same whether the trip function is inoperable or the bypass function is inoperable. The ITS will allow an inoperable bypass function to be disabled, with the channel remaining Operable. If the bypass function is not disabled, the channel is bypassed or tripped. Only the automatic bypass removal function affects the OPERABILITY of the channel. The ability to manually bypass a function is needed to prevent unnecessary trips when plant conditions are such that the protective function is not needed. If the channel cannot be manually bypassed, it does not affect the ability of the channel to provide the trip function when needed therefore it does not affect the OPERABILITY of the channel. This change allow a channel with a disabled bypass channel to remain Operable. This change will maximize the channel availability by eliminating the need to make the channel inoperable due to the failure of a bypass function. The system logic will remain in 2 out of 4 channels required for an RPS trip vs. 2 out of 3 channels required for an RPS trip with an inoperable channel.

This change will not reduce a margin of safety since it has no impact on safety analysis assumptions. This change is consistent with NUREG-1432, which was approved by the NRC Staff. Therefore, this change does not result in a reduction in a margin of safety.

TECHNICAL CHANGES - LESS RESTRICTIVE
(ITS 3.3.2 Discussion of Changes Labeled L.6)

Arizona Public Service Company, Palo Verde Nuclear Generating Station (PVNGS), Units 1, 2, and 3 is converting to the ITS as outlined in NUREG-1432. The proposed change involves making the CTS less restrictive. Below is the description of this less restrictive change and the NSHC for conversion to NUREG-1432.

L.6 The ITS will clarify the intent of the requirement to lower the setpoint for the Logarithmic Power Level - High RPS trip in Modes 3, 4, and 5 with the RTCBs closed and the CEDMCS capable of CEA withdrawal. This requirement was added to the CTS by amendment 98 to the Unit 1 Technical Specifications, amendment 86 to the Unit 2 Technical Specifications, and amendment 69 to the Unit 3 Technical Specifications. The requirement was added to insure assumptions in the PVNGS safety analysis are included in the Technical Specifications. If all four Reactor Coolant Pumps (RCPs) are running the Logarithmic Power Level trip setpoint of 1E -2% RTP is will provide the necessary protection. If less than four RCPs are running the trip setpoint must be lowered to 1E -4% RTP to provide the necessary protection for a bank CEA withdrawal. The CTS allows an alternate method of providing the necessary trip at 1E -4% RTP by making the Core Protection Calculators (CPCs) Operable. The CPCs will be bypassed at less than 1E -4% RTP. If power increases above 1E -4% RTP the CPCs will automatically be removed from bypass. A trip will then be generated because the CPCs will trip with less than 4 RCPs running. The ITS removes the option of using the CPCs for protection in MODES 3, 4, and 5. This change is consistent with the PVNGS safety analysis.

The Commission has provided standards for determining whether a significant hazards consideration exists as stated in 10 CFR 50.92. A proposed amendment to an operating license for a facility involves a no significant hazards consideration if operation of the facility, in accordance with a proposed amendment, would not 1) involve a significant increase in the probability or consequences of an accident previously evaluated; 2) create the possibility of a new or different kind of accident from any accident previously evaluated; or 3) involve a significant reduction in a margin of safety. A discussion of these standards as they relate to this amendment request follows:

TECHNICAL CHANGES - LESS RESTRICTIVE
(ITS 3.3.2 Discussion of Changes Labeled L.6) (continued)

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

The proposed change will clarify the intent of the requirement lower the setpoint for the Logarithmic Power Level - High RPS trip in Modes 3, 4, and 5 with the RTCBs closed and the CEDMCS capable of CEA withdrawal. This requirement was added to the CTS by amendment 98 to the Unit 1 Technical Specifications, amendment 86 to the Unit 2 Technical Specifications, and amendment 69 to the Unit 3 Technical Specifications. The requirement was added to insure assumptions in the PVNGS safety analysis are included in the Technical Specifications. If all four Reactor Coolant Pumps (RCPs) are running the Logarithmic Power Level trip setpoint of 1E -2% RTP is will provide the necessary protection. If less than four RCPs are running the trip setpoint must be lowered to 1E -4% RTP to provide the necessary protection for a bank CEA withdrawal.

The CTS allows an alternate method of providing the necessary trip at 1E -4% RTP is to make the Core Protection Calculators (CPCs) Operable. The CPCs will be bypassed at less than 1E -4% RTP. If power increases above 1E -4 % RTP the CPCs will automatically be removed from bypass. A trip will then be generated because the CPCs will trip with less than 4 RCPs running. The ITS removes the option of using the CPCs for protection in MODES 3, 4, and 5.

This change is consistent with NUREG-1432. This change does not result in any hardware changes or changes to plant operating practices nor does it affect plant operation. Therefore this change will not involve a significant increase in the probability or consequences of an accident previously evaluated.

TECHNICAL CHANGES - LESS RESTRICTIVE
(ITS 3.3.2 Discussion of Changes Labeled L.6) (continued)

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

The proposed change will clarify the intent of the requirement lower the setpoint for the Logarithmic Power Level - High RPS trip in Modes 3, 4, and 5 with the RTCBs closed and the CEDMCS capable of CEA withdrawal. This requirement was added to the CTS by amendment 98 to the Unit 1 Technical Specifications, amendment 86 to the Unit 2 Technical Specifications, and amendment 69 to the Unit 3 Technical Specifications. The requirement was added to insure assumptions in the PVNGS safety analysis are included in the Technical Specifications. If all four Reactor Coolant Pumps (RCPs) are running the Logarithmic Power Level trip setpoint of 1E -2% RTP is will provide the necessary protection. If less than four RCPs are running the trip setpoint must be lowered to 1E -4% RTP to provide the necessary protection for a bank CEA withdrawal.

The CTS allows an alternate method of providing the necessary trip at 1E -4% RTP is to make the Core Protection Calculators (CPCs) Operable. The CPCs will be bypassed at less than 1E -4% RTP. If power increases above 1E -4 % RTP the CPCs will automatically be removed from bypass. A trip will then be generated because the CPCs will trip with less than 4 RCPs running. The ITS removes the option of using the CPCs for protection in MODES 3, 4, and 5.

This change is consistent with NUREG-1432. This change will not alter the plant configuration (no new or different type of equipment will be installed) or change the methods of governing normal plant operation. This change will not alter assumptions made in the safety analysis or licensing basis. Therefore, this change will not create the possibility of a new or different kind of accident from any accident previously evaluated.

TECHNICAL CHANGES - LESS RESTRICTIVE
(ITS 3.3.2 Discussion of Changes Labeled L.6) (continued)

Standard 3.-- Does the proposed change involve a significant reduction in a margin of safety?

The proposed change will clarify the intent of the requirement to lower setpoint for the Logarithmic Power Level - High RPS trip in Modes 3, 4, and 5 with the RTCBs closed and the CEDMCS capable of CEA withdrawal. This requirement was added to the CTS by amendment 98 to the Unit 1 Technical Specifications, amendment 86 to the Unit 2 Technical Specifications, and amendment 69 to the Unit 3 Technical Specifications. The requirement was added to insure assumptions in the PVNGS safety analysis are included in the Technical Specifications. If all four Reactor Coolant Pumps (RCPs) are running the Logarithmic Power Level trip setpoint of 1E -2% RTP is will provide the necessary protection. If less than four RCPs are running the trip setpoint must be lowered to 1E -4% RTP to provide the necessary protection for a bank CEA withdrawal.

The CTS allows an alternate method of providing the necessary trip at 1E -4% RTP is to make the Core Protection Calculators (CPCs) Operable. The CPCs will be bypassed at less than 1E -4% RTP. If power increases above 1E -4 % RTP the CPCs will automatically be removed from bypass. A trip will then be generated because the CPCs will trip with less than 4 RCPs running. The ITS removes the option of using the CPCs for protection in MODES 3, 4, and 5.

This change will not reduce a margin of safety since it has no impact on safety analysis assumptions. This change is consistent with NUREG-1432, which was approved by the NRC Staff. Therefore, this change does not result in a reduction in a margin of safety.

TECHNICAL CHANGES - LESS RESTRICTIVE
(ITS 3.3.2 Discussion of Changes Labeled L.7)

Arizona Public Service Company, Palo Verde Nuclear Generating Station (PVNGS), Units 1, 2, and 3 is converting to the ITS as outlined in NUREG-1432. The proposed change involves making the CTS less restrictive. Below is the description of this less restrictive change and the NSHC for conversion to NUREG-1432.

L.7 CTS Table 3.3-1 and Table 4.3-1 Item 1.A.5 requires the OPERABILITY of the low steam generator pressure reactor trip functions in MODES 1, 2, 3(*) and 4(*). The ITS Specification 3.3.1 requires the OPERABILITY of these functions in MODES 1 and 2, and ITS Specification 3.3.2 requires the OPERABILITY of these functions in MODE 3 with the RTCBs closed and CEAs capable of withdrawal. The ITS does not require the OPERABILITY of the low steam generator pressure RPS trip in MODE 4 with the RTCBs closed and any CEA capable of withdrawal. The purpose of the low steam generator pressure RPS trip in MODE 3(*) is to provide shutdown margin to prevent or minimize the return to power following a Main Steam Line Break (MSLB). In MODES 4(*) and 5(*) the function is not required because the steam generator temperature is lower, therefore, the energy release and resulting cooldown following a MSLB is less than in MODE 3(*). In Mode 4 the RCS temperature is less than 350°F. This saturation pressure for 350°F is approximately 135 psia. The CTS for SG Low Pressure (2.2.1 and 3.2.1) allow decreasing the steam generator low pressure trip setpoint in Mode 4 provided the margin between the actual SG pressure and the setpoint is less than or equal to 200 psi. In Mode 4 the steam generator pressure setpoint is less than zero psia, preventing an automatic MSIS in this Mode. The PVNGS Safety Analysis does not require an Automatic MSIS in Mode 4. The protection provided by the Logarithmic Power Level-High RPS function will provide the necessary protection in these MODES. This change is consistent with NUREG-1432.

The Commission has provided standards for determining whether a significant hazards consideration exists as stated in 10 CFR 50.92. A proposed amendment to an operating license for a facility involves a no significant hazards consideration if operation of the facility, in accordance with a proposed amendment, would not 1) involve a significant increase in the probability or consequences of an accident previously evaluated; 2) create the possibility of a new or different kind of accident from any accident previously evaluated; or 3) involve a significant reduction in a margin of safety. A discussion of these standards as they relate to this amendment request follows:

TECHNICAL CHANGES - LESS RESTRICTIVE
(ITS 3.3.2 Discussion of Changes Labeled L.7) (continued)

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

The proposed change will remove the requirement for the Operability of the steam generator pressure - low RPS function in MODE 4 with the RTCBs closed and the CEAs capable of withdrawal. The CTS Table 3.3-1 and 4.3-1 Item 1.A.5 require the Operability of the steam generator pressure - low RPS function in MODES 1, 2, 3(*), and 4(*). The (*) indicates with the RTCBs closed and the CEAs capable of withdrawal. The ITS Specification 3.3.1 will require the Operability of the steam generator pressure - low function in MODES 1 and 2. The ITS Specification 3.3.2 will require the Operability of the steam generator pressure - low function in MODE 3 with the RTCBs closed and the CEAs capable of withdrawal. The ITS will not require the Operability of the steam generator pressure - low function in MODE 4 with the RTCBs closed and the CEAs capable of withdrawal.

The purpose of the steam generator pressure - low RPS function in MODE 3(*) is to provide shutdown margin to prevent or minimize the return to power following a Main Steam Line Break (MSLB). In MODES 4(*) and 5(*) the function is not required because the steam generator temperature is lower, therefore the energy release and resulting RCS cooldown following a MSLB is less than in MODE 3(*). The protection provided by the logarithmic power level - high RPS trip function will provide the necessary protection in these MODES.

This change is consistent with NUREG-1432. This change does not result in any hardware changes or changes to plant operating practices nor does it affect plant operation. Therefore this change will not involve a significant increase in the probability or consequences of an accident previously evaluated.

TECHNICAL CHANGES - LESS RESTRICTIVE
(ITS 3.3.2 Discussion of Changes Labeled L.7) (continued)

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

The proposed change will remove the requirement for the Operability of the steam generator pressure - low RPS function in MODE 4 with the RTCBs closed and the CEAs capable of withdrawal. The CTS Table 3.3-1 and 4.3-1 Item 1.A.5 require the Operability of the steam generator pressure - low RPS function in MODES 1, 2, 3(*), and 4(*). The (*) indicates with the RTCBs closed and the CEAs capable of withdrawal. The ITS Specification 3.3.1 will require the Operability of the steam generator pressure - low function in MODES 1 and 2. The ITS Specification 3.3.2 will require the Operability of the steam generator pressure - low function in MODE 3 with the RTCBs closed and the CEAs capable of withdrawal. The ITS will not require the Operability of the steam generator pressure - low function in MODE 4 with the RTCBs closed and the CEAs capable of withdrawal.

The purpose of the steam generator pressure - low RPS function in MODE 3(*) is to provide shutdown margin to prevent or minimize the return to power following a Main Steam Line Break (MSLB). In MODES 4(*) and 5(*) the function is not required because the steam generator temperature is lower, therefore the energy release and resulting RCS cooldown following a MSLB is less than in MODE 3(*). The protection provided by the logarithmic power level - high RPS trip function will provide the necessary protection in these MODES.

This change is consistent with NUREG-1432. This change will not alter the plant configuration (no new or different type of equipment will be installed) or change the methods of governing normal plant operation. This change will not alter assumptions made in the safety analysis or licensing basis. Therefore, this change will not create the possibility of a new or different kind of accident from any accident previously evaluated.

TECHNICAL CHANGES - LESS RESTRICTIVE
(ITS 3.3.2 Discussion of Changes Labeled L.7) (continued)

Standard 3.-- Does the proposed change involve a significant reduction in a margin of safety?

The proposed change will remove the requirement for the Operability of the steam generator pressure - low RPS function in MODE 4 with the RTCBs closed and the CEAs capable of withdrawal. The CTS Table 3.3-1 and 4.3-1 Item 1.A.5 require the Operability of the steam generator pressure - low RPS function in MODES 1, 2, 3(*), and 4(*). The (*) indicates with the RTCBs closed and the CEAs capable of withdrawal. The ITS Specification 3.3.1 will require the Operability of the steam generator pressure - low function in MODES 1 and 2. The ITS Specification 3.3.2 will require the Operability of the steam generator pressure - low function in MODE 3 with the RTCBs closed and the CEAs capable of withdrawal. The ITS will not require the Operability of the steam generator pressure - low function in MODE 4 with the RTCBs closed and the CEAs capable of withdrawal.

The purpose of the steam generator pressure - low RPS function in MODE 3(*) is to provide shutdown margin to prevent or minimize the return to power following a Main Steam Line Break (MSLB). In MODES 4(*) and 5(*) the function is not required because the steam generator temperature is lower, therefore the energy release and resulting RCS cooldown following a MSLB is less than in MODE 3(*). The protection provided by the logarithmic power level - high RPS trip function will provide the necessary protection in these MODES.

This change will not reduce a margin of safety since it has no impact on safety analysis assumptions. This change is consistent with NUREG-1432, which was approved by the NRC Staff. Therefore, this change does not result in a reduction in a margin of safety.

CE STS

NUREG-1432 REV. 1

SPECIFICATION 3.3.3

MARK UP

<DOC>
<CTS>
<3.3.1>

3.3 INSTRUMENTATION

3.3.3 Control Element Assembly Calculators (CEACs) ~~(Digital)~~ 7

LCO 3.3.3 Two CEACs shall be OPERABLE.

APPLICABILITY: MODES 1 and 2.

ACTIONS

<Table 3.3-1 Action Statement 6a>

<Table 3.3-1 Action Statement 6b>

CONDITION	REQUIRED ACTION	COMPLETION TIME
A. One CEAC inoperable.	A.1 Perform SR 3.1.5.1.	Once per 4 hours
	AND	
	A.2 Restore CEAC to OPERABLE status.	7 days
B. Required Action and associated Completion Time of Condition A not met. OR Both CEACs inoperable.	B.1 Verify the departure from nucleate boiling ratio requirement of LCO 3.2.4, "Departure from Nucleate Boiling Ratio (DNBR)," is met. ~~[and the Reactor Power Cutback System is disabled].~~ 6	4 hours
	AND	
		(continued)

<DOC>
<CTS>

ACTIONS

CONDITION	REQUIRED ACTION		COMPLETION TIME
B. (continued) <Table 3.3-1 Action Statement 6b2a>	B.2	Verify all full length and part length control element assembly (CEA) groups are fully withdrawn and maintained fully withdrawn, except during Surveillance testing pursuant to SR 3.1.5.3 ~~and SR 3.1.5.4~~ ~~(~~or for control, when CEA group ~~#6~~ #5 may be inserted to a maximum of 127.5 inches~~)~~. 1 2	4 hours
	AND		
<Table 3.3-1 Action Statement 6b2b>	B.3	Verify the "RSPT/CEAC Inoperable" addressable constant in each core protection calculator (CPC) is set to indicate that both CEACs are inoperable.	4 hours
	AND		
<Table 3.3-1 Action Statement 6b2C> 3	B.4	Verify the Control Element Drive Mechanism Control System is placed in ~~"OFF"~~ Standby mode and maintained in ~~"OFF,"~~ Standby mode except during CEA motion permitted by Required Action B.2.	4 hours
	AND		
<Table 3.3-1 Action Statement 6b3>	B.5	Perform SR 3.1.5.1.	Once per 4 hours

(continued)

6
AND

B.6 Disable the Reactor Power Cutback System (RPCS) — 4 hours

<DOC>

<CTS>

ACTIONS (continued)

	CONDITION	REQUIRED ACTION	COMPLETION TIME
<4.3.1.6>	C. Receipt of a CPC channel B or C cabinet high temperature alarm.	C.1 Perform CHANNEL FUNCTIONAL TEST on affected CEAC(s).	12 hours
<Table 3.3-1 Action Statement 7>	D. One or two CEACs with three or more autorestarts during a 12 hour period.	D.1 Perform CHANNEL FUNCTIONAL TEST on affected CEAC.	24 hours
<DOC A.6>	E. Required Action and associated Completion Time of Condition B, C, or D not met.	E.1 Be in MODE 3.	6 hours

SURVEILLANCE REQUIREMENTS

	SURVEILLANCE		FREQUENCY
<Table 4.3-1>	SR 3.3.3.1	Perform a CHANNEL CHECK.	12 hours
<4.3.1.5>	SR 3.3.3.2	Check the CEAC autorestart count.	12 hours
<Table 4.3-1>	SR 3.3.3.3	Perform a CHANNEL FUNCTIONAL TEST.	92 days
<Table 4.3-1>	SR 3.3.3.4	Perform a CHANNEL CALIBRATION.	18 months

(continued)

<Doc>
<CTS>

SURVEILLANCE REQUIREMENTS (continued)

	SURVEILLANCE	FREQUENCY
<Table 4.3-1>	SR 3.3.3.5 Perform a CHANNEL FUNCTIONAL TEST.	~~[18]~~ 18 months
<4.3.1.4>	SR 3.3.3.6 Verify the isolation characteristics of each CEAC isolation amplifier~~, and each optical isolator for CEAC to CPC data transfer.~~ 4	~~[18]~~ 18 months

CE STS
NUREG-1432 REV. 1
SPECIFICATION 3.3.3
BASES MARK UP

B 3.3 INSTRUMENTATION

B 3.3.3 Control Element Assembly Calculators (CEACs) (Digital)

BASES

BACKGROUND

The Reactor Protective System (RPS) initiates a reactor trip to protect against violating the core specified acceptable fuel design limits (SAFDLs) and breaching the reactor coolant pressure boundary (RCPB) 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 thresholds 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 (DNBR) 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

(continued)

BASES

BACKGROUND (continued)

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 four interconnected modules. These modules are:

- Measurement channels;
- Bistable trip units;
- RPS Logic; and
- Reactor trip circuit breakers (RTCBs).

This LCO addresses the CEACs. LCO 3.3.1, "Reactor Protective System (RPS) Instrumentation—Operating," provides a description of this equipment in the RPS.

(8) Variable Over Power

The excore nuclear instrumentation, the core protection calculators (CPCs), and the CEACs are considered components ~~in the measurement channels of the Linear Power Level~~—High, Logarithmic Power Level—High, DNBR—Low, and Local Power Density (LPD)—High trips. The CEACs are addressed by this Specification.

(7) penalty

All four CPCs receive control element assembly (CEA) deviation penalty factors from each CEAC and use the larger of the ~~power~~ factors from the two CEACs in the calculation of DNBR and LPD. CPCs are further described in the Background section of LCO 3.3.1.

The CEACs perform the calculations required to determine the position of CEAs within their subgroups for the CPCs. Two independent CEACs compare the position of each CEA to its subgroup position. If a deviation is detected by either CEAC, an annunciator sounds and appropriate "penalty factors" are transmitted to all CPCs. These penalty factors conservatively adjust the effective operating margins to the DNBR—Low and LPD—High trips. Each CEAC also drives a single cathode ray tube (CRT), which is switchable between CEACs. The CRT displays individual CEA positions ~~and current values of the penalty factors~~ (8) from the selected CEAC.

(continued)

BASES

BACKGROUND (continued)

Each CEA has two separate reed switch assemblies mounted outside the RCPB. Each of the two CEACs receives CEA position input from one of the two reed switch position transmitters on each CEA, so that the position of all CEAs is independently monitored by both CEACs.

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. Nuclear instrumentation, the CPCs, and the CEACs can be similarly tested. ~~FSAR,~~ UFSAR Section 7.2 (Ref. 3), provides more detail on RPS testing. Process transmitter calibration is normally performed on a refueling basis. 7

APPLICABLE SAFETY ANALYSES

Each of the analyzed transients and accidents can be detected by one or more RPS Functions.

The effect of any misoperated CEA within a subgroup on the core power distribution is assessed by the CEACs, and an appropriately augmented power distribution penalty factor will be supplied as input to the CPCs. As the reactor core responds to the reactivity changes caused by the misoperated CEA and the ensuing reactor coolant and doppler feedback effects, the CPCs will initiate a DNBR—Low or LPD—High trip signal if SAFDLs are approached. Each CPC also directly monitors one "target CEA" from each subgroup and uses this information to account for excessive radial peaking factors for events involving CEA groups out of sequence and subgroup deviations within a group, without the need for CEACs.

Therefore, although the CEACs do not provide a direct reactor trip Function, their input to the CPCs is taken credit for in the CEA misoperation analysis. 7

The CEACs satisfy Criterion 3 of 10 CFR 50.36(c)(2)(ii) ~~the NRC Policy Statement~~.

LCO

This LCO on the CEACs ensures that the CPCs are either informed of individual CEA position within each subgroup, using one or both CEACs, or that appropriate conservatism is included in the CPC calculations to account for anticipated

(continued)

This LCO is applicable to the CEACs in MODES 1 and 2. The RPS Instrumentation in MODES 1 and 2 is addressed in LCO 3.3.1. The RPS Instrumentation in MODES 3, 4, and 5 with any RTCB closed and any CEA capable of withdrawal, is addressed in LCO 3.3.2. The RPS Matrix Logic, Initiation Logic, RTCB, and Manual Trips in MODES 1, 2, 3, 4, and 5 are addressed in LCO 3.3.4.

BASES

LCO (continued)

CEA deviations. ~~Each CEAC provides an identical input into~~ all four CPC channels. Each CPC uses the higher of the two CEAC transmitted CEA deviation penalty factors. Thus, only one OPERABLE CEAC is required to provide CEA deviation protection. This LCO requires both CEACs to be OPERABLE so that no single CEAC failure can prevent a required reactor trip from occurring. 7

APPLICABILITY

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, which maintains the SLs during AOOs and assists the Engineered Safety Features Actuation System in providing acceptable consequences during accidents. Most trips are not required to be OPERABLE in MODES 3, 4, and 5. In MODES 3, 4, and 5, the emphasis is placed on return to power events. The reactor is protected in these MODES by ensuring adequate SDM.

Because CEACs provide the inputs to the DNBR—Low and LPD—High trips, they are required to be OPERABLE in ~~the same~~ MODES 1 and 2 ~~as those trips~~ for the same reasons. 7

ACTIONS

A.1 and A.2

Condition A applies to the failure of a single CEAC channel. There are only two CEACs, each providing CEA deviation input into all four CPC channels. The CEACs include complex diagnostic software, making it unlikely that a CEAC will fail without informing the CPCs of its failed status. With one failed CEAC, the CPC will receive CEA deviation penalty factors from the remaining OPERABLE CEAC. If the second CEAC should fail (Condition B), the CPC will use large preassigned penalty factors. The specific Required Actions allowed are as follows:

With one CEAC inoperable, the second CEAC still provides a comprehensive set of comparison checks on individual CEAs within subgroups, as well as outputs to all CPCs, CEA deviation alarms, and position indication for display. Verification every 4 hours that each CEA is within ~~7~~ 6.6 inches of the other CEAs in its group provides a check on the 8

(continued)

BASES

ACTIONS

A.1 and A.2 (continued)

position of all CEAs and provides verification of the proper operation of the remaining CEAC. An OPERABLE CEAC will not generate penalty factors until deviations of > ~~7~~ 6.6 inches within a subgroup are encountered. 8

The Completion Time of once per 4 hours is adequate based on operating experience, considering the low probability of an undetected CEA deviation coincident with an undetected failure in the remaining CEAC within this limited time frame.

As long as Required Action A.1 is accomplished as specified, the inoperable CEAC can be restored to OPERABLE status within 7 days. The Completion Time of 7 days is adequate for most repairs, while minimizing risk, considering that dropped CEAs are detectable by the redundant CEAC, and other LCOs specify Required Actions necessary to maintain DNBR and LPD margin.

B.1, B.2, B.3, B.4, ~~and~~ B.5 and B.6 6

Condition B applies if the Required Action and associated Completion Time of Required Action A are not met, or if both CEACs are inoperable. Actions associated with this Condition involve disabling the Control Element Drive Mechanism Control System (CEDMCS), while providing increased assurance that CEA deviations are not occurring and informing all OPERABLE CPC channels, via a software flag, that both CEACs are failed. This will ensure that the large penalty factor associated with two CEAC failures will be applied to CPC calculations. The penalty factor for two failed CEACs is sufficiently large that power must be maintained significantly < 100% RTP if CPC generated reactor trips are to be avoided. The Completion Time of 4 hours is adequate to accomplish these actions while minimizing risks.

The Required Actions are as follows: 7

B.1

4. "DNBR"

Meeting the DNBR margin requirements of LCO 3.2.~~5, "AXIAL SHAPE INDEX (ASI),"~~4. "DNBR" ensures that power level ~~and ASI are~~ 13 within a conservative region of operation based on actual

(continued)

BASES

ACTIONS

B.1 (continued)

B.6

core conditions. ~~In addition to the above actions,~~ the Reactor Power Cutback (RPCB) System must be disabled. This ensures that CEA position will not be affected by RPCB operation. 6

B.2

This Action requires that the CEAs are maintained fully withdrawn (≥ 144.75")

The Upper Electrical Limit (UEL) CEA reed switches provide an acceptable indication of CEA position

~~The "full out" CEA reed switches provide acceptable indication of CEA position. Therefore, the CEAs will remain fully withdrawn,~~ except as required for specified testing or flux control via group ~~6~~ #5. This verification ensures that undesired perturbations in local fuel burnup are prevented. 8

B.3

The "RSPT/CEAC Inoperable" addressable constant in each of the OPERABLE CPCs is set to indicate that both CEACs are inoperable. This provides a conservative penalty factor to ensure that a conservative effective margin is maintained by the CPCs in the computation of DNBR and LPD trips. 8

B.4

The CEDMCS is placed and maintained in ~~"Off,"~~ "Standby" except during CEA motion permitted by Required Action B.2, to prevent inadvertent motion and possible misalignment of the CEAs.

B.5

A comprehensive set of comparison checks on individual CEAs within groups must be made within 4 hours. Verification that each CEA is within ~~7~~ 6.6 inches of other CEAs in its group provides a check that no CEA has deviated from its proper position within the group. 8

C.1

Condition C applies if the CPC channel B or C cabinet receives a high temperature alarm. There ~~is one~~ are redundant temperature ~~sensor~~ sensors in each of the four CPC bays. Since CPC bays B and C also house CEAC calculators 1 and 2, respectively, a high temperature in either of these bays may also indicate a problem with the associated CEAC.

A high temperature alarm in any CPC cabinet requires entry into LCO 3.3.1, Condition E. 8

(continued)

BASES

ACTIONS

C.1 (continued)

an OPERABLE

on OPERABLE CEACs

If a CPC channel B or C cabinet high temperature alarm is received, it is possible for ~~the~~ CEAC to be affected and not be completely reliable. Therefore, a CHANNEL FUNCTIONAL TEST must be performed within 12 hours. The Completion Time of 12 hours is adequate, considering the low probability of undetected failure, the consequences of failure, and the time required to perform a CHANNEL FUNCTIONAL TEST.

D.1

Condition D applies if an OPERABLE CEAC has three or more autorestarts in a 12 hour period.

CPCs and CEACs will attempt to autorestart if they detect a fault condition such as a calculator malfunction or loss of power. A successful autorestart restores the calculator to operation; however, excessive autorestarts might be indicative of a calculator problem.

8

The autorestart periodic test restart (code 30), and normal system load (code 33) are not included in the total

OPERABLE

If a ~~nonbypassed~~ CEAC has three or more autorestarts, it may not be completely reliable. Therefore, a CHANNEL FUNCTIONAL TEST must be performed on the CEAC to ensure it is functioning properly. Based on plant operating experience, the Completion Time of 24 hours is adequate and reasonable to perform the test while still keeping the risk of operating in this condition at an acceptable level, since overt channel failure will most likely be indicated and annunciated by CPC online diagnostics.

E.1

Condition E is entered when the Required Action and associated Completion Time of Condition B, C, or D are not met.

If the Required Actions associated with these Conditions cannot be completed within the required Completion Time, the reactor must be brought to a MODE where the Required Actions do not apply. The Completion Time of 6 hours is reasonable, based on operating experience, for reaching the required plant conditions from full power conditions in an orderly manner and without challenging plant systems.

(continued)

BASES (continued)

SURVEILLANCE REQUIREMENTS

~~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 plant (Ref. 4).~~ 8

SR 3.3.3.1

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 another channel. 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 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 limits.

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 3.3.3.2

The CEAC autorestart count is checked every 12 hours to monitor the CPC and CEAC for normal operation. If three or

(continued)

BASES

SURVEILLANCE REQUIREMENTS

8

The autorestart periodic test restart (code 30) and normal system load (code 33) are not included in the total.

SR 3.3.3.2 (continued)

more autorestarts of a nonbypassed CPC occur within a 12 hour period, the CPC may not be completely reliable. Therefore, the Required Action of Condition D must be performed. The Frequency is based on operating experience that demonstrates the rarity of more than one channel failing within the same 12 hour interval.

SR 3.3.3.3

A CHANNEL FUNCTIONAL TEST on each CEAC channel is performed every 92 days to ensure the entire channel will perform its intended function when needed. The quarterly CHANNEL FUNCTIONAL TEST is performed using test software. 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 3.3.3.4

SR 3.3.3.4 is the performance of a CHANNEL CALIBRATION every 8 ~~[~~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 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 surveillance interval extension analysis. The requirements for this review are outlined in Reference ~~[~~5~~]~~. 7

8

The Frequency is based upon the assumption of an ~~[~~18~~]~~ month calibration interval in the determination of the magnitude of equipment drift in the setpoint analysis and includes operating experience and consistency with the typical ~~[~~18~~]~~ month fuel cycle.

(continued)

BASES

SURVEILLANCE REQUIREMENTS (continued)

SR 3.3.3.5

8 Every ~~[18]~~ months, a CHANNEL FUNCTIONAL TEST is performed on the CEACs. The CHANNEL FUNCTIONAL TEST shall include the injection of a signal as close to the sensors as practicable to verify OPERABILITY, including alarm and trip Functions.

4 The basis for the ~~[18]~~ month Frequency is that the CEACs perform a continuous self monitoring function that eliminates the need for frequent CHANNEL FUNCTIONAL TESTS. This CHANNEL FUNCTIONAL TEST essentially validates the self monitoring function and checks for a small set of failure modes that are undetectable by the self monitoring function. Operating experience has shown that undetected CPC or CEAC failures do not occur in any given ~~[18]~~ month interval. 4

SR 3.3.3.6

The isolation characteristics of each CEAC CEA position isolation amplifier ~~and each optical isolator for CEAC to CPC data transfer~~ 4 are verified once per refueling to ensure that a fault in a CEAC or a CPC channel will not render another CEAC or CPC channel inoperable. The CEAC CEA position isolation amplifiers, mounted in CPC cabinets A and D, prevent a CEAC fault from propagating back to CPC A or D. ~~The optical isolators for CPC to CEAC data transfer prevent a fault originating in any CPC channel from propagating back to any CEAC through this data link.~~ 4

8 The CEA position isolator amplifier isolation characteristics tests shall include the following: 1) with 120 VAC (60 Hz) applied for at least 30 seconds across the output, the reading on the input does not change by more than 0.015 VDC with an applied input voltage of 5-10 VDC, and 2) with 120 VAC (60 Hz) applied for at least 30 seconds across the input, the reading on the output does not exceed 15 VDC.

The Frequency is based on plant operating experience with regard to channel OPERABILITY, which demonstrates the failure of a channel in any ~~[18]~~ month interval is rare.

REFERENCES

1. 10 CFR 50.
2. 10 CFR 100.
3. 8 FSAR, Section ~~[7.2]~~.
4. NRC Safety Evaluation Report, ~~[Date]~~ July 15, 1994.
5. 8 CEN-327, June 2, 1986, including Supplement 1, March 3, 1989, and Calculation 13-JS-SB-200.

NUREG-1432 EXCEPTIONS
SPECIFICATION 3.3.3

1. Action B.2 of LCO 3.3.3 requires CEAs to be fully withdrawn except during surveillance testing pursuant to SR 3.1.5.3 and SR 3.1.5.4. The SR 3.1.5.4 is not correct for this Action. This Action is entered when a single CEAC is inoperable for more than 7 days, or when both CEACs are inoperable. SR 3.1.5.4 is an 18 month functional test of each RSPT. The bases for 3.1.5.4 require the reactor to be shutdown for this test since full travel of the CEA is required. This test should not be performed on line and should not be performed with inoperable CEACs since the other requirements of this action are intended to minimize CEA motion. PVNGS CTS do not allow this SR to be performed during this action. This change is consistent with the PVNGS licensing basis.

2. LCO 3.3.3, Table 3.3.-1 Action Statement B.2 allows insertion of CEA group #6 for control. PVNGS does not have a CEA group #6. CTS Action 6.b.2.a, allows insertion of CEA group #5 for control. The ITS will allow insertion of group #5 for control. This is consistent with the current PVNGS licensing basis, and current operating practice.

3. LCO 3.3.3, Table 3.3.-1 Action Statement B.4 requires the Control Element Drive Mechanism Control System (CEDMCS) to be placed and maintained in the "OFF" position. The PVNGS CEDMCS system does not have an "OFF" position. The "STANDBY" position is equivalent to the "OFF" position. In the standby mode there is no CEA movement in either manual or automatic modes. CTS Table 3.3.-1 Action Statement 6.b.2.c requires the CEDMCS to be placed in the standby mode. This change is consistent with PVNGS current licensing basis, and current operating practice.

4. SR 3.3.3.6 requires verification of the isolation characteristics of the CEAC isolation amplifier and the optical isolator for the CEAC to CPC data transfer. The PVNGS CTS SR 4.3.1.4 requires verification of the isolation characteristics of the CEAC isolation amplifier. The ITS will not require verification of the isolation characteristics of the optical isolator for the CEAC to CPC data transfer. The PVNGS design does not use an optical isolator for the CEAC to CPC data transfer. The PVNGS design uses fiber optic modems to convert the electrical signal to an optical signal. This optical signal is sent to the CPCs through a fiber optic cable. Another fiber optic modem in the CPC converts the optical signal to an electrical signal. There are no electrical signals transferred between the CEACs and CPCs. The fiber optic cable has no electrically conductive materials and no failure modes that would require testing to verify the isolation characteristics. The Bases have been revised to be consistent with the LCO/Bases. This change is consistent with the current PVNGS licensing basis, design, and current operating practice.

5. NOT USED

6. NUREG-1432 Required Action B.1 provides two unrelated Required Actions for verification of DNBR and disabling the reactor power cutback system. The ITS makes these two Actions separated by a AND logical connector. The Bases have been revised to be consistent with the LCO/Surveillance. This is a format change only and it is consistent with the PVNGS licensing basis.

7. Grammar and/or editorial changes have been made to enhance clarity. No technical or intent changes to the Specification are made by this change.

8. The plant specific titles, nomenclature, number, parameter/value, reference, system description, system design, operating practices or analysis description was used (additions, deletions, and/or changes are included). Plant specific parameters/values were directly transferred from the CTS to the ITS.

PVNGS CTS
SPECIFICATION 3.3.3
MARK UP

<DOC>
<CTS>

<3.3.1>

3.3 INSTRUMENTATION

3.3.3 Control Element Assembly Calculators (CEACs) ~~(Digital)~~ 7

LCO 3.3.3 Two CEACs shall be OPERABLE.

APPLICABILITY: MODES 1 and 2.

ACTIONS

<Table 3.3-1 Action Statement 6a>

<Table 3.3-1 Action Statement 6b>

CONDITION	REQUIRED ACTION		COMPLETION TIME
A. One CEAC inoperable.	A.1	Perform SR 3.1.5.1.	Once per 4 hours
	AND		
	A.2	Restore CEAC to OPERABLE status.	7 days
B. Required Action and associated Completion Time of Condition A not met. OR Both CEACs inoperable.	B.1	Verify the departure from nucleate boiling ratio requirement of LCO 3.2.4, "Departure from Nucleate Boiling Ratio (DNBR)," is met. ~~[and the Reactor Power Cutback System is disabled].~~ 6	4 hours
	AND		(continued)

SPECIFICATION 3.3.3
(3.3.1/3.3.2/3.3.3/3.3.4/3.3.12)

A.1

3.3
~~3/4.3~~ INSTRUMENTATION
3.3.3
~~3/4.3.1 REACTOR PROTECTIVE INSTRUMENTATION~~ Control Element Assembly Calculators (CEACs)

~~LIMITING CONDITION FOR OPERATION~~

LCO 3.3.3 Two CEACs shall be OPERABLE A.2

3.3.1 As a minimum, the reactor protective instrumentation channels and bypasses of Table 3.3-1 shall be OPERABLE.

APPLICABILITY: ~~As shown in Table 3.3-1.~~ MODES 1 and 2

ACTION:

As shown in Table 3.3-1.

SURVEILLANCE REQUIREMENTS

ITS 3.3.1
ITS 3.3.2
ITS 3.3.3
ITS 3.3.4
ITS 3.3.12

~~4.3.1.1~~ Each reactor protective instrumentation channel shall be demonstrated OPERABLE by the performance of the CHANNEL CHECK, CHANNEL CALIBRATION and CHANNEL FUNCTIONAL TEST operations for the MODES and at the frequencies shown in Table 4.3-1.

ITS 3.3.1
ITS 3.3.2

4.3.1.2 The logic for the bypasses shall be demonstrated OPERABLE prior to each reactor startup unless performed during the preceding 92 days. The total bypass function shall be demonstrated OPERABLE at least once per 18 months during CHANNEL CALIBRATION testing of each channel affected by bypass operation.

ITS 3.3.1
ITS 3.3.2

4.3.1.3 The REACTOR TRIP SYSTEM RESPONSE TIME of each reactor trip function shall be demonstrated to be within its limit at least once per 18 months. Neutron detectors are exempt from response time testing. Each test shall include at least one channel per function such that all channels are tested at least once every N times 18 months where N is the total number of redundant channels in a specific reactor trip function as shown in the "Total No. of Channels" column of Table 3.3-1.

ITS 3.3.3

~~4.3.1.4~~ The isolation characteristics of each CEA isolation amplifier shall be verified at least once per 18 months during the shutdown per the following tests for the CEA position isolation amplifiers:

SR 3.3.3.6

a. With 120 volts A.C. (60 Hz) applied for at least 30 seconds across the output, the reading on the input does not change by more than 0.015 volt D.C. with an applied input voltage of 5-10 volts D.C.

LA.1

SPECIFICATION 3.3.3
(3.3.1/3.3.3)

SURVEILLANCE REQUIREMENTS (Continued)

ITS 3.3.3

b. ~~With 120 volts A.C. (60 Hz) applied for at least 30 seconds across the input, the reading on the output does not exceed 15 volts D.C.~~ LA.1

ITS 3.3.1
ITS 3.3.3
SR 3.3.3.2

~~4.3.1.5~~ The ~~Core Protection Calculators~~ CEACs A.3 shall be determined OPERABLE at least once per 12 hours by verifying that less than three auto restarts have occurred on each calculator during the past 12 hours. ~~The auto restart periodic tests Restart (Code 30) and Normal System Load (Code 33) shall not be included in this total.~~ LA.2

ACT C

~~4.3.1.6~~ The ~~Core Protection Calculators~~ affected CEAC L.1 shall be subjected to a CHANNEL FUNCTIONAL TEST to verify OPERABILITY within 12 hours of receipt of a High CPC Cabinet Temperature alarm.

Channel B or C L.1

ADD ACTION E (A.6)

SPECIFICATION 3.3.3
(3.3.1/3.3.2/3.3.3/3.3.12)

TABLE 3.3-1

REACTOR PROTECTIVE INSTRUMENTATION

	FUNCTIONAL UNIT	TOTAL NO. OF CHANNELS	CHANNELS TO TRIP	MINIMUM CHANNELS OPERABLE	APPLICABLE MODES	ACTION
	1. TRIP GENERATION					
	A. Process					
ITS 3.3.1	1. Pressurizer Pressure - High	4	2	3	1,2	2#,3#
	2. Pressurizer Pressure - Low	4	2 (b)	3	1,2	2#,3#
	3. Steam Generator Level - Low	4/SG	2/SG	3/SG	1,2	2#,3#
	4. Steam Generator Level - High	4/SG	2/SG	3/SG	1,2 ITS 3.3.2	2#,3#
	5. Steam Generator Pressure - Low	4/SG	2/SG	3/SG	1,2,3*,4*	2#,3#
	6. Containment Pressure - High	4	2	3	1,2	2#,3#
	7. Reactor Coolant Flow - Low	4/SG	2/SG	3/SG	1,2	2#,3#
	8. Local Power Density - High	4	2 (c)(d)	3	1,2	2#,3#
	9. DNBR - Low	4	2 (c)(d)	3	1,2	2#,3#
	B. Excore Neutron Flux					
	1. Variable Overpower Trip	4	2	3	1,2	2#,3#
	2. Logarithmic Power Level - High					
ITS 3.3.1	a. Startup and Operating	4	2(a)(d)	3	1,2	2#,3#
ITS 3.3.2		4	2	3	3*,4*,5*	9
ITS 3.3.12	b. Shutdown	4	0	2	3,4,5	4
ITS 3.3.3	C. Core Protection Calculator System					
	1. CEA Calculators	2	1	2 (e)	1,2	6,7
ITS 3.3.1	2. Core Protection Calculators	4	2 (c)(d)	3	1,2,3*,4*,5* ITS 3.3.2	2#,3#,7,10

SPECIFIC[illegible]ON
(3.3.4 / Split Report)

TABLE 3.3-1 (Continued)

REACTOR PROTECTIVE INSTRUMENTATION

Relocated - see split Report

ITS 3.3.4

FUNCTIONAL UNIT	TOTAL NO. OF CHANNELS	CHANNELS TO TRIP	MINIMUM CHANNELS OPERABLE	APPLICABLE MODES	ACTION
D. Supplementary Protection System Pressurizer Pressure - High	4 (f)	2	3	1, 2	8
II. RPS LOGIC					
A. Matrix Logic	6	1	3	1, 2	1
	6	1	3	3*, 4*, 5*	9
B. Initiation Logic	4	2	4	1, 2	5
	4	2	4	3*, 4*, 5*	8
III. RPS ACTUATION DEVICES					
A. Reactor Trip Breaker	4 (f)	2	4	1, 2	5
	4 (f)	2	4	3*, 4*, 5*	8
B. Manual Trip	4 (f)	2	4	1, 2	5
	4 (f)	2	4	3*, 4*, 5*	8

SPECIFICATION 3.3.3

(3.3.1/3.3.2/3.3.3/3.3.4)

TABLE 3.3-1 (Continued)

TABLE NOTATIONS

ITS 3.3.2

*With the protective system trip breakers in the closed position, the CEA drive system capable of CEA withdrawal, and fuel in the reactor vessel.

ITS 3.3.1

#The provisions of Specification 3.0.4 are not applicable.

(a) Trip may be manually bypassed above $10^{-4}\%$ of RATED THERMAL POWER; bypass shall be automatically removed when THERMAL POWER is less than or equal to $10^{-4}\%$ of RATED THERMAL POWER.

(b) Trip may be manually bypassed below 400 psia; bypass shall be automatically removed whenever pressurizer pressure is greater than or equal to 500 psia.

(c) Trip may be manually bypassed below $10^{-4}\%$ of RATED THERMAL POWER; bypass shall be automatically removed when THERMAL POWER is greater than or equal to $10^{-4}\%$ of RATED THERMAL POWER.

(d) Trip may be bypassed during testing pursuant to Special Test Exception 3.10.3.

ITS 3.3.1

ITS 3.3.3

~~(e) See Special Test Exception 3.10.2.~~ A.7

ITS 3.3.4

(f) There are four channels, each of which is comprised of one of the four reactor trip breakers, arranged in a selective two-out-of-four configuration (i.e., one-out-of-two taken twice).

ACTION STATEMENTS

ACTION 1 - With the number of channels OPERABLE one less than required by the Minimum Channels OPERABLE requirement, restore the inoperable channel to OPERABLE status within 48 hours or be in at least HOT STANDBY within the next 6 hours and/or open the protective system trip breakers.

ITS 3.3.4

ITS 3.3.1

ACTION 2 - With the number of channels OPERABLE one less than the Total Number of Channels, STARTUP and/or POWER OPERATION may continue provided the inoperable channel is placed in the bypassed or tripped condition within 1 hour. If the inoperable channel is bypassed, the desirability of maintaining this channel in the bypassed condition shall be reviewed in accordance with Specification 6.5.1.6.g. The channel shall be returned to OPERABLE status no later than during the next COLD SHUTDOWN.

SPECIFICATION

(3.3.1 / 3.3.2)

TABLE 3.3-1 (Continued)

ACTION STATEMENTS

ITS 3.3.1

ITS 3.3.2

With a channel process measurement circuit that affects multiple functional units inoperable or in test, bypass or trip all associated functional units as listed below:

Process Measurement Circuit	Functional Unit Bypassed/Tripped
1. Linear Power (Subchannel or Linear)	Variable Overpower (RPS) Local Power Density - High (RPS) DNBR - Low (RPS)
2. Pressurizer Pressure - High (Narrow Range)	Pressurizer Pressure - High (RPS) Local Power Density - High (RPS) DNBR - Low (RPS)
3. Steam Generator Pressure - Low	Steam Generator Pressure - Low Steam Generator Level 1-Low (ESF) Steam Generator Level 2-Low (ESF)
4. Steam Generator Level - Low (Wide Range)	Steam Generator Level - Low (RPS) Steam Generator Level 1-Low (ESF) Steam Generator Level 2-Low (ESF)
5. Core Protection Calculator	Local Power Density - High (RPS) DNBR - Low (RPS)

ACTION 3 - With the number of channels OPERABLE one less than the Minimum Channels OPERABLE requirement, STARTUP and/or POWER OPERATION may continue provided the following conditions are satisfied:

a. Verify that one of the inoperable channels has been bypassed and place the other channel in the tripped condition within 1 hour, and

b. All functional units affected by the bypassed/tripped channel shall also be placed in the bypassed/tripped condition as listed below:

Process Measurement Circuit	Functional Unit Bypassed/Tripped
1. Linear Power (Subchannel or Linear)	Variable Overpower (RPS) Local Power Density - High (RPS) DNBR - Low (RPS)
2. Pressurizer Pressure - High (Narrow Range)	Pressurizer Pressure - High (RPS) Local Power Density - High (RPS) DNBR - Low (RPS)

SPECIFICATION 3.3.3

(3.3.1/3.3.2/3.3.3/3.3.4/3.3.12)

TABLE 3.3-1 (Continued)

ACTION STATEMENTS

ITS 3.3.1

ITS 3.3.2

3.	Steam Generator Pressure - Low	Steam Generator Pressure - Low Steam Generator Level 1-Low (ESF) Steam Generator Level 2-Low (ESF)
4.	Steam Generator Level - Low (Wide Range)	Steam Generator Level - Low (RPS) Steam Generator Level 1-Low (ESF) Steam Generator Level 2-Low (ESF)
5.	Core Protection Calculator	Local Power Density - High (RPS) DNBR - Low (RPS)

STARTUP and/or POWER OPERATION may continue until the performance of the next required CHANNEL FUNCTIONAL TEST. Subsequent STARTUP and/or POWER OPERATION may continue if one channel is restored to OPERABLE status and the provisions of ACTION 2 are satisfied.

ITS 3.3.12 ACTION 4 - With the number of channels OPERABLE one less than required by the Minimum Channels OPERABLE requirement, suspend all operations involving positive reactivity changes.

ACTION 5 - With the number of channels OPERABLE one less than required by the Minimum Channels OPERABLE requirement, STARTUP and/or POWER OPERATION may continue provided the reactor trip breaker of the inoperable channel is placed in the tripped condition within 1 hour, otherwise, be in at least HOT STANDBY within 6 hours; however, the trip breaker associated with the inoperable channel may be closed for up to 1 hour for surveillance testing per Specification 4.3.1.1.

ITS 3.3.4

~~ACTION 6~~ -

ITS 3.3.3

ACT A

a. With one CEAC inoperable, operation may continue for up to 7 days provided that ~~the requirements of Specification 4.1.3.1.1 are met.~~ After 7 days, operation may continue provided that the following conditions ~~of Action Item 6.b~~ are met. A.1

ACT B

b. With both ~~CEACs~~ inoperable, operation may continue provided that:

4 hours L.2

ACT B.1

1. Within ~~1 hour~~ the DNBR margin required by Specification 3.2.4.b (COLSS in service) or 3.2.4.d (COLSS out of service) is satisfied and the Reactor Power Cutback System is disabled, and A.8

ACT B.6

SR 3.1.5.1 is performed every 4 hours A.5

TABLE 3.3-1 (Continued)

ITS 3.3.3

ACTION STATEMENTS

2. Within 4 hours:

ACT B.2 a) All full-length and part-length CEA groups must be ~~withdrawn within the limits of Specifications 3.1.3.5, 3.1.3.6b, and 3.1.3.7b~~ except during surveillance testing pursuant to the requirements of ~~Specification 4.1.3.1.2.~~ ~~Specification 3.1.3.6b allows~~ CEA group 5 insertion to ~~no further than~~ 127.5 inches withdrawn. A.1

fully withdrawn and maintained fully withdrawn A.4

SR 3.1.5.3

or for control when

a maximum of A.1

ACT B.3 b) The "RSPT/CEAC Inoperable" addressable constant in the CPCs is set to be indicated that both CEAC's are inoperable.

ACT B.4 c) The Control Element Drive Mechanism Control System (CEDMCS) is placed in and subsequently maintained in the "Standby" mode except during CEA motion permitted by ~~Specifications 3.1.3.5, 3.1.3.6b, and 3.1.3.7b when the CEDMCS may be operated in either the "Manual Group" or "Manual Individual" mode.~~

A.4 required Action B.2

L.4

ACT B.5 3. ~~CEA position surveillance must meet the requirements of Specifications 4.1.3.1.1, 4.1.3.5, 4.1.3.6, and 4.1.3.7 except during surveillance testing pursuant to Specification 4.1.3.1.2.~~

Perform SR 3.1.5.1 Once Per 4 hours L.3

ITS 3.3.1 ITS 3.3.3	~~ACTION 7~~ ACT D	-	With three or more auto restarts, ~~excluding periodic auto restarts (Code 30 and Code 33),~~ LA.2 of one non-bypassed calculator during a 12-hour interval, demonstrate calculator OPERABILITY by performing a CHANNEL FUNCTIONAL TEST on affected CEAC(s) A.1 within the next 24 hours.
Relocated- See Split Report	ACTION 8	-	With the number of OPERABLE channels one less than the Minimum Channels OPERABLE requirement, restore an inoperable channel to OPERABLE status within 48 hours or open an affected reactor trip breaker within the next hour.
ITS 3.3.2 ITS 3.3.4	ACTION 9	-	With the number of OPERABLE channels one less than the Minimum Channels OPERABLE requirement, restore the inoperable channel to OPERABLE status within 48 hours or open the reactor trip breakers within the next hour.
ITS 3.3.2	ACTION 10	-	In MODES 3, 4, or 5, the Core Protection Calculator channels are not required to be OPERABLE when the Logarithmic Power Level - High trip is OPERABLE with the trip setpoint lowered to $\leq 10^{-4}$% of Rated Thermal Power.

THIS PAGE INTENTIALLY LEFT BLANK

THIS PAGE INTENTIALLY LEFT BLANK

THIS PAGE INTENTIONALLY LEFT BLANK

THIS PAGE INTENTIONALLY LEFT BLANK

THIS PAGE INTENTIALLY LEFT BLANK

SPECIFICATION 3.3
(3.3.1/3.3.2/3.3.3/3.3.12)

Palo Verde - Units 1, 2, 3

TABLE 4.3-1

REACTOR PROTECTIVE INSTRUMENTATION SURVEILLANCE REQUIREMENTS

	FUNCTIONAL UNIT	CHANNEL CHECK	CHANNEL CALIBRATION	CHANNEL FUNCTIONAL TEST	MODES IN WHICH SURVEILLANCE REQUIRED	
	I. TRIP GENERATION					
ITS 3.3.1	A. Process					
	1. Pressurizer Pressure - High	S	R	Q	1, 2	
	2. Pressurizer Pressure - Low	S	R	Q	1, 2	
	3. Steam Generator Level - Low	S	R	Q	1, 2	
	4. Steam Generator Level - High	S	R	Q	1, 2	
	5. Steam Generator Pressure - Low	S	R	Q	1, 2, 3*, 4*	ITS 3.3.2
	6. Containment Pressure - High	S	R	Q	1, 2	
	7. Reactor Coolant Flow - Low	S	R	Q	1, 2	
	8. Local Power Density - High	S	D (2, 4), R (4, 5)	Q, R (6)	1, 2	
	9. DNBR - Low	S	D (2, 4), R (4, 5) H (8), S (7)	Q, R (6)	1, 2	
	B. Excore Neutron Flux					
ITS 3.3.1	1. Variable Overpower Trip	S	D (2, 4), H (3, 4) Q (4)	Q	1, 2	ITS 3.3.1
ITS 3.3.1 ITS 3.3.2 ITS 3.3.12	2. Logarithmic Power Level - High	S	R (4)	Q and S/U (1)	1, 2, 3, 4, 5 and *	ITS 3.3.12 ITS 3.3.2
	C. Core Protection Calculator System	SR 3.3.3.1	SR 3.3.3.4	SR 3.3.3.3 SR 3.3.3.5		
ITS 3.3.3	1. CEA Calculators	S	R	Q, R (6)	1, 2	
ITS 3.3.1	2. Core Protection Calculators	S	D (2, 4), R (4, 5) H (8), S (7)	Q (9), R (6)	1, 2	

SPECIFICA N
(3.3.4/Split Report)

TABLE 4.3-1 (Continued)

REACTOR PROTECTIVE INSTRUMENTATION SURVEILLANCE REQUIREMENTS

	FUNCTIONAL UNIT	CHANNEL CHECK	CHANNEL CALIBRATION	CHANNEL FUNCTIONAL TEST	MODES IN WHICH SURVEILLANCE REQUIRED
Relocated- see Split Report	D. Supplementary Protection System				
	Pressurizer Pressure - High	S	R	Q	1, 2
ITS 3.3.4	II. RPS LOGIC				
	A. Matrix Logic	N.A.	N.A.	Q	1, 2, 3*, 4*, 5*
	B. Initiation Logic	N.A.	N.A.	Q	1, 2, 3*, 4*, 5*
	III. RPS ACTUATION DEVICES				
	A. Reactor Trip Breakers	N.A.	N.A.	M, R (10)	1, 2, 3*, 4*, 5*
	B. Manual Trip	N.A.	N.A.	Q	1, 2, 3*, 4*, 5*

SPECIFICATION
(3.3.1/3.3.2)

TABLE 4.3-1 (Continued)

TABLE NOTATIONS

ITS 3.3.1

ITS 3.3.2

* - With reactor trip breakers in the closed position and the CEA drive system capable of CEA withdrawal, and fuel in the reactor vessel.

(1) - Each STARTUP or when required with the reactor trip breakers closed and the CEA drive system capable of rod withdrawal, if not performed in the previous 7 days.

ITS 3.3.1

(2) Heat balance only (CHANNEL FUNCTIONAL TEST not included):

a. Between 15% and 80% of RATED THERMAL POWER, compare the linear power level, the CPC delta T power and the CPC nuclear power signals to the calorimetric calculation.

If any signal is within -0.5% to 10% of the calorimetric then do not calibrate except as required during initial power ascension after refueling.

If any signal is less than the calorimetric calculation by more than 0.5%, then adjust the affected signal(s) to agree with the calorimetric calculation.

If any signal is greater than the calorimetric calculation by more than 10% then adjust the affected signal(s) to agree with the calorimetric calculation within 8% to 10%.

b. At or above 80% of RATED THERMAL POWER; compare the linear power level, the CPC delta T power and the CPC nuclear power signals to the calorimetric calculation. If any signal differs from the calorimetric calculation by an absolute difference of more than 2%, then adjust the affected signal(s) to agree with the calorimetric calculation.

During PHYSICS TESTS, these daily calibrations may be suspended provided these calibrations are performed upon reaching each major test power plateau and prior to proceeding to the next major test power plateau.

(3) - Above 15% of RATED THERMAL POWER, verify that the linear power subchannel gains of the excore detectors are consistent with the values used to establish the shape annealing matrix elements in the Core Protection Calculators.

(4) - Neutron detectors may be excluded from CHANNEL CALIBRATION.

(5) - After each fuel loading and prior to exceeding 70% of RATED THERMAL POWER, the incore detectors shall be used to determine or verify the shape annealing matrix elements used in the Core Protection Calculators.

SPECIFICATION 3.3.3

(3.3.1/3.3.3/3.3.4)

TABLE 4.3-1 (Continued)

TABLE NOTATIONS

ITS 3.3.1
ITS 3.3.3 SR 3.3.3.5 ~~(6)~~ - ~~This~~ Perform a CHANNEL FUNCTIONAL TEST ~~shall include the injection of simulated process signals into the channel as close to the sensors as practicable to verify OPERABILITY including alarm and/or trip functions.~~ LA.3

ITS 3.3.1 (7) - Above 70% of RATED THERMAL POWER, verify that the total steady-state RCS flow rate as indicated by each CPC is less than or equal to the actual RCS total flow rate determined by either using the reactor coolant pump differential pressure instrumentation or by calorimetric calculations and if necessary, adjust the CPC addressable constant flow coefficients such that each CPC indicated flow is less than or equal to the actual flow rate. The flow measurement uncertainty may be included in the BERR1 team in the CPC and is equal to or greater than 4%.

(8) - Above 70% of RATED THERMAL POWER, verify that the total steady-state RCS flow rate as indicated by each CPC is less than or equal to the actual RCS total flow rate determined by either using the reactor coolant pump differential pressure instrumentation and the ultrasonic flow meter adjusted pump curves or calorimetric calculations.

ITS 3.3.1 (9) - The quarterly CHANNEL FUNCTIONAL TEST shall include verification that the correct current values of addressable constants are installed in each OPERABLE CPC.

ITS 3.3.4 (10) - At least once per 18 months and following maintenance or adjustment of the reactor trip breakers, the CHANNEL FUNCTIONAL TEST shall include independent verification of the undervoltage and shunt trips.

SPECIFICATION 3.3.3
(3.1.5/3.3.3)

REACTIVITY CONTROL SYSTEMS

LIMITING CONDITION FOR OPERATION (Continued)

ACTION: (Continued)

b) The SHUTDOWN MARGIN requirement of Specification 3.1.1.2 is determined at least once per 12 hours.

Otherwise, be in at least HOT STANDBY within 6 hours.

d. With one full-length CEA inoperable due to causes other than addressed by ACTION a.; above, but within its above specified alignment requirements, operation in MODES 1 and 2 may continue pursuant to the requirements of Specification 3.1.3.6.

e. With one part-length CEA inoperable and inserted in the core, operation may continue provided the alignment of the inoperable part length CEA is maintained within 6.6 inches (indicated position) of all other part-length CEAs in its group and the CEA is maintained pursuant to the requirements of Specification 3.1.3.7.

SURVEILLANCE REQUIREMENTS

3.1.5 4.1.3.1.1 The position of each full-length and part-length CEA shall be determined to be within 6.6 inches (indicated position) of all other CEAs in its group at least once per 12 hours

3.3.3 except during time intervals when one CEAC is inoperable or when both CEACs are inoperable, then verify the individual CEA positions at least once per 4 hours. Action A.1 Action B.5

3.1.5 4.1.3.1.2 Each full-length CEA not fully inserted and each part-length CEA which is inserted in the core shall be determined to be OPERABLE by movement of at least 5 inches in any one direction at least once per 92 days.*

*With the exception that CEA #64 is exempt from this surveillance requirement for the remainder of Cycle 2 operations (i.e., until restart from the second refueling outage).

SPECIFICATION 3.3.3
(3.1.6/3.3.3)

REACTIVITY CONTROL SYSTEMS

SHUTDOWN CEA INSERTION LIMIT

LIMITING CONDITION FOR OPERATION

3.1.3.5 All shutdown CEAs shall be withdrawn to at least 144.75 inches.

APPLICABILITY: MODES 1 and 2*#.

ACTION:

With a maximum of one shutdown CEA withdrawn to less than 144.75 inches, except for surveillance testing pursuant to Specification 4.1.3.1.2, within 1 hour either:

a. Withdraw the CEA to at least 144.75 inches, or

b. Declare the CEA inoperable and comply with Specification 3.1.3.1.

SURVEILLANCE REQUIREMENTS

4.1.3.5 Each shutdown CEA shall be determined to be withdrawn to at least 144.75 inches:

a. Within 15 minutes prior to withdrawal of any CEAs in regulating groups during an approach to reactor criticality, and

3.1.6 / 3.3.3 L.3 b. At least once per 12 hours thereafter ~~except during time intervals when both CEAC's are inoperable, then verify the individual CEA positions at least once per 4 hours.~~

3.3.3 / 3.1.6

*See Special Test Exception 3.10.2.

#With K_{eff} greater than or equal to 1.

SPECIFICATION 3.3.3
(3.1.7/3.3.3)

REGULATING CEA INSERTION LIMITS

LIMITING CONDITION FOR OPERATION

ITS 3.1.7 3.1.3.6 The regulating CEA groups shall be maintained within the following limits:

ITS 3.3.3 COND A a. One or more CEAC's OPERABLE

ITS 3.1.7 1. The regulating CEA groups shall be limited to the withdrawal sequence, and to the insertion limits## specified in the CORE OPERATING LIMITS REPORT when the COLSS is in service or when the COLSS is not in service. The CEA insertion between the Long Term Steady State Insertion Limits and the Transient Insertion Limits is restricted to:

a) Less than or equal to 5 Effective Full Power Days per 30 Effective Full Power Day interval, and

b) Less than or equal to 14 Effective Full Power Days per 18 Effective Full Power Months.

2. CEA insertion between the Short Term Steady State Insertion Limits and the Transient Insertion Limits shall be restricted to $\leq$ 4 hours per 24 hour interval. ITS 3.1.7

ITS 3.3.3 ~~b.~~ Both CEAC's INOPERABLE (with or without COLSS in service)

COND B ACT B.2 Regulating CEA group 5 may be inserted no further than 127.5 inches withdrawn ~~which is the Transient Insertion Limit when both CEAC's are inoperable.~~ A.1

Regulating CEA groups which are excluded by these insertion limits must be maintained fully withdrawn $\geq$ 144.75 inches, which is the Transient Insertion Limit except for surveillance testing pursuant to ~~Specification 4.1.3.1.2.~~ SR 3.1.5.3 ITS 3.3.3

ITS 3.1.7 APPLICABILITY: MODES 1* and 2*#.

ACTION:

a. With the regulating CEA groups inserted beyond the Transient Insertion Limits, except for surveillance testing pursuant to Specification 4.1.3.1.2, within 2 hours either:

---

*See Special Test Exceptions 3.10.2 and 3.10.4.

#With K_{eff} greater than or equal to 1.

##A reactor power cutback will cause either (Case 1) Regulating Group 5 or Regulating Group 4 and 5 to be dropped with no sequential insertion of additional Regulating Groups (Groups 1, 2, 3, and 4) or (Case 2) Regulating Group 5 or Regulating Group 4 and 5 to be dropped with all or part of the remaining Regulating Groups (Groups 1, 2, 3, and 4) being sequentially inserted. In either case, the Transient Insertion Limit and the withdrawal sequence specified in the CORE OPERATING LIMITS REPORT can be exceeded for up to 2 hours.

SPECIFICATION 3.3.3
(3.1.7/3.3.3)

REGULATING CEA INSERTION LIMITS

LIMITING CONDITION FOR OPERATION (Continued)

ACTION: (Continued)

1. Restore the regulating CEA groups to within the limits, or

ITS 3.1.7 2. Reduce THERMAL POWER as follows:

ITS 3.3.3 COND A ~~a)~~ One or more CEAC's OPERABLE

ITS 3.1.7 1) Reduce THERMAL POWER to less than or equal to that fraction of RATED THERMAL POWER which is allowed by the CEA group position specified in the CORE OPERATING LIMITS REPORT or

ITS 3.1.7 2) Be in at least HOT STANDBY within 6 hours.

ITS 3.3.3 ACTION E ~~b)~~ Both CEAC's ~~INOPERABLE~~ A.1
Be in ~~at least HOT STANDBY~~ MODE 3 within 6 hours.

ITS 3.1.7 b. With the regulating CEA groups inserted between the Long Term Steady State Insertion Limits and the Transient Insertion Limits for intervals greater than 5 EFPD per 30 EFPD interval or greater than 14 EFPD per 18 Effective Full Power Months, either;

1. Restore the regulating groups to within the Long Term Steady State Insertion Limits within 2 hours, or

2. Be in at least HOT STANDBY within 6 hours.

c. With the regulating CEA groups inserted between the Short Term Steady State Insertion Limits and the Transient Insertion Limits for intervals > 4 hours per 24 hour interval, operation may proceed provided any subsequent increase in THERMAL POWER is restricted to ≤ 5% of RATED THERMAL POWER per hour.

SURVEILLANCE REQUIREMENTS

3.1.7 4.1.3.6 The position of each regulating CEA group shall be determined to be within the Transient Insertion Limits at least once per 12 hours except during time intervals when the PDIL Auctioneer Alarm Circuit is inoperable,

3.3.3 ~~or both CEAC's are inoperable, then verify the CEA group positions at least once per 4 hours.~~ L.3

3.1.7 The accumulated times during which the regulating CEA groups are inserted beyond the Long Term Steady State Insertion Limits but within the Transient Insertion Limits shall be determined at least once per 24 hours.

SPECIFICATION 3.3.3
(3.1.8/3.3.3)

REACTIVITY CONTROL SYSTEMS

PART LENGTH CEA INSERTION LIMITS

LIMITING CONDITION FOR OPERATION

3.1.3.7 The part length CEA groups shall be maintained within the following limits with COLSS in service or out of service:

ITS 3.1.8

ITS 3.3.3 a. One or more CEACs OPERABLE COND A

ITS 3.1.8 The part length CEA groups shall be limited to the insertion limits specified in the CORE OPERATING LIMITS REPORT with PLCEA insertion between the Long Term Steady State Insertion Limit and the Transient Insertion Limit restricted to:

1. $\leq$ 7 EFPD per 30 EFPD interval, and

2. $\leq$ 14 EFPD per calendar year.

ITS 3.1.8

ITS 3.3.3 ~~b.~~ Both CEACs INOPERABLE Action B.2

The part length CEA groups must be maintained fully withdrawn ($\geq$ 144.75 inches) ~~which is the Transient Insertion Limit when both CEACs are inoperable.~~ A.1

ITS 3.3.3

ITS 3.1.8 APPLICABILITY: MODES 1* and 2*

ACTION:

a. With the part length CEA groups inserted beyond the Transient Insertion Limit, except for surveillance testing pursuant to Specification 4.1.3.1.2, within two hours, either:

1. Restore the part length CEA groups to within the limits, or

ITS 3.1.8 2. Reduce THERMAL POWER as follows:

ITS 3.3.3

ITS 3.3.3 a) One or more CEACs OPERABLE COND A

ITS 3.1.8 1) Reduce THERMAL POWER to less than or equal to that fraction of RATED THERMAL POWER which is allowed by the PLCEA group position specified in the CORE OPERATING LIMITS REPORT

ITS 3.1.8 2) Be in at least HOT STANDBY within 6 hours.

ITS 3.3.3 ~~b)~~ Both CEACS INOPERABLE A.1 Action E

Be in ~~at least HOT STANDBY~~ MODE 3 within 6 hours.

ITS 3.3.3

ITS 3.1.8

*See Special Test Exceptions 3.10.2 and 3.10.4.

SPECIFICATION 3.3.3
(3.1.8/3.3.3)

LIMITING CONDITION FOR OPERATION (Continued)

ACTION: (Continued)

b. With the part length CEA groups inserted between the Long Term Steady State Insertion Limit and the Transient Insertion Limit for intervals > 7 EFPD per 30 EFPD interval or > 14 EFPD per calendar year, either:

1. Restore the part length groups within the Long Term Steady State Insertion Limit within two hours, or

2. Be in at least HOT STANDBY within 6 hours.

SURVEILLANCE REQUIREMENTS

3.1.8 4.1.3.7 The positions of the part length CEA groups shall be determined to be within the Transient Insertion Limit at least once per 12 hours ~~except during time intervals when both CEACs are inoperable, then verify the part length CEA group positions at least once per 4 hours.~~ L.3

3.3.3

DISCUSSION OF CHANGES
SPECIFICATION 3.3.3

ADMINISTRATIVE CHANGES

A.1 All reformatting and numbering is in accordance with the Combustion Engineering Plant (CEOG) Standard Technical Specifications NUREG-1432 Rev. 1. As a result, the Palo Verde Nuclear Generating Station (PVNGS) Technical Specifications should be more readable, and therefore more understandable by plant operators, as well as others. During the reformatting and renumbering of the Improved Technical Specifications (ITS), no technical changes (either actual or interpretational) to the Current Technical Specifications (CTS) were made unless they were identified and justified.

Editorial rewording (either adding or deleting) is made consistent with NUREG-1432. During NUREG-1432 development, certain working preferences or English language conventions were adopted which resulted in no technical changes (either actual or interpretational) to the CTS.

Additional information has also been added to more fully describe each subsection. This wording is consistent with the NUREG-1432. Since the design is already approved by the NRC, adding more detail does not result in a technical change.

A.2 CTS LCO 3.3.1 states; "As a minimum, the reactor protective instrumentation channels and bypasses of Table 3.3-1 shall be OPERABLE". ITS LCO 3.3.3 states, "Two CEACs shall be OPERABLE". The CTS refers the user to Table 3.3.-1 because the CEACs have two channels, the RPS logic has six channels, and the remainder of the items on the Table have four channels. In the ITS these Logics/channels are divided into separate Specifications: the CEACs in ITS 3.3.3 and the RPS in ITS 3.3.4 with the remaining instrumentation in ITS 3.3.1. Because the CEACs in ITS 3.3.3 have two channels, LCO 3.3.3 will specify two operable CEACs instead of referring to a Table for the equipment required to be Operable. There is no change to the OPERABILITY requirements of ITS LCO 3.3.3. This change provides additional clarity by dividing up the subject instrumentation/channels. This change is only a presentation change and is therefore considered administrative. This change is consistent with NUREG-1432.

ADMINISTRATIVE CHANGES (continued)

A.3 CTS SR 4.3.1.5 states that the Core Protection Calculators shall be determined operable at least once per shift by verifying that less than three auto restarts have occurred in the last 12 hours. The CTS phrase "Core Protection Calculators" is being replaced by "CEACs". This change to CEAC in ITS 3.3.3 clarifies that it applies to both the CEAC and the CPC. In Table 3.3-1 Action Statement 7 describes the actions to be taken for more than three auto restarts in less than 12 hours. Action 7 is listed for both the CPC and CEAC functions. Although CTS SR 4.3.1.5 uses the term "Core Protection Calculator" Table 3.3-1 Action 7 shows it is intended to include both the CPCs and CEACs. This requirement is listed in both ITS 3.3.1 and ITS 3.3.3. In ITS 3.3.1 the requirement is listed as applicable to the CPC, in ITS 3.3.3 the requirement will be listed as applicable to the CEACs. This will make the wording more clear and it is not a change the intent or requirement. This change is consistent with NUREG-1432.

A.4 The CTS LCO 3.3.1 Table 3.3-1 Action Statement 6.b.2.a states that all full-length and part-length CEA groups must be withdrawn within the limits of Specifications 3.1.3.5, 3.1.3.6.b, and 3.1.3.7.b. except during surveillance testing pursuant to the requirements of CTS 4.1.3.1.2. CTS 3.1.3.6.b allows CEA group 5 insertion to no further than 127.5 inches withdrawn. This wording will be simplified in the ITS. Specifications 3.1.3.5 and 3.1.3.7.b require the CEAs to be fully withdrawn so the statement "fully withdrawn and maintained fully withdrawn" will replace the references to the Specifications. Similarly in Action 6.b.2.c the Specifications will be replaced with required Action B2. Required Action B2 lists these same Specifications. These changes are consistent with NUREG-1432.

A.5 CTS LCO 3.3.1 Table 3.3.-1 Action Statement 6.a states operation with one CEAC may continue provided the requirements of SR 4.1.3.1.1 are met. SR 4.1.3.1.1 requires the Frequency of testing (to verify all CEAs are within 6.6 inches of the other CEAs in the same group) increases from every 12 hours to every 4 hours. The ITS LCO 3.3.3 Action A states the Frequency of the SR will be increased from 12 hours to 4 hours. The requirement will remain the same, however it will be specified in the CEAC LCO and not the CEA Alignment SR 4.1.3.1.1.

ADMINISTRATIVE CHANGES (continued)

A.6 ITS Specification 3.3.3 will add an Action E. This requires entry into Mode 3 within 6 hours if the Completion Time for Actions B, C, or D are not met. The CTS would require entry into LCO 3.0.3. This would require the unit to be placed in a Mode in which the Specification does not apply (in this case Mode 3) by placing the Unit in HOT STANDBY within 6 hours.

A.7 "CTS Table 3.3-1 Table Notation (e) References STE. 3.10.2. Cross references are not used in the ITS or NUREG-1432. Removing cross references does not alter the requirements of the referenced Specification. Therefore, this is an administrative change with no impact on safety. This change is consistent with NUREG-1432."

A.8 CTS Table 3.3-1 Action 6.b.1 requires DNBR margin to be established by Specification 3.2.4.b or 3.2.4.d. The ITS refers the user to Specification 3.2.4. The ITS 3.2.4 provides sufficient detail that the reference to the specific subsection is not required and is removed. the requirements are not affected by this format change.

TECHNICAL CHANGES - MORE RESTRICTIVE

None

DETAILS RELOCATED

LA.1 The CTS SR 4.3.1.4 provides detailed instructions for the test requirements and the acceptance criteria for the CEA Isolation Amplifier. This information is not required to determine the OPERABILITY of the system and therefore is being relocated to a Licensee Controlled Document.

Any changes to the requirements of the Licensee Controlled Document will be governed by the provisions of 10 CFR 50.59. This provides an equivalent level of regulatory control and is an administrative change with no impact on the margin of safety. This requirement is not required to be in the ITS to provide adequate protection of the public health and safety. Therefore relocation of this requirement to a Licensee Controlled Document is acceptable and consistent with NUREG-1432.

DETAILS RELOCATED (continued)

LA.2 The CTS SR 4.3.1.5 and Action 7 state that the auto restart periodic tests restart (code 30) and normal system load (code 33) shall not be included in the autorestart total. This requirement is not required to determine the OPERABILITY of the system and therefore is being relocated to a Licensee Controlled Document. When the autorestart count on the CEAC is checked, the codes 30 and 33 are not included in the count. The CEAC will attempt to autorestart if it detects a fault condition, such as a calculator malfunction or loss of power. A successful autorestart restores the calculator to operation, however excessive autorestarts might be an indication of a calculator problem. The restart codes 30 and 33 are not an indication of a fault in the CEAC and should not be included in the autorestart count. The information regarding how autorestart codes 30 and 33 are counted will be relocated to the bases in the ITS.

Any changes to the requirements of the Bases will be governed by the provisions of the Bases Control Program. This provides an equivalent level of regulatory control and is an administrative change with no impact on the margin of safety. This requirement is not required to be in the ITS to provide adequate protection of the public health and safety. Therefore relocation of this requirement to the Bases is acceptable and consistent with NUREG-1432.

LA.3 CTS Table 4.3-1, Table 3.3.-1 Notations, Note (6) states: This CHANNEL FUNCTIONAL TEST shall include the injection of simulated process signals into the channel as close to the sensors as practicable to verify OPERABILITY including alarm and/or trip functions. The ITS will state perform a CHANNEL FUNCTIONAL TEST. The detail of the test will be provided in the ITS bases. This information is not required to determine the operability of the system and therefore is being relocated to a Licensee controlled document

Any changes to the requirements of the Licensee Controlled Document will be governed by the provisions of 10 CFR 50.59. This provides an equivalent level of regulatory control and is an administrative change with no impact on the margin of safety. This requirement is not required to be in the ITS to provide adequate protection of the public health and safety. Therefore relocation of this requirement to a Licensee Controlled Document is acceptable and consistent with NUREG-1432.

DETAIL RELOCATED PER SPLIT REPORT

None

TECHNICAL CHANGES - LESS RESTRICTIVE

L.1 CTS SR 4.3.1.6 requires the CPCs to be FUNCTIONAL tested within 12 hours of a cabinet high temperature alarm. The ITS will require a FUNCTIONAL TEST on the affected CEAC for a channel B or C alarm. The CEACs are in separate enclosures. CEAC-1 is located in the Channel B enclosure. CEAC-2 is located in Channel C enclosure. There are separate cooling systems and high temperature alarms for each enclosure. A high temperature alarm in a channel may indicate the CEAC is less reliable and a FUNCTIONAL TEST to verify OPERABILITY is needed. The other CEAC channel has not been exposed to the high temperature condition, since it is located in a separate enclosure and therefore a FUNCTIONAL TEST is not needed for the other channel. The ITS will specify a high temperature alarm in channels B and C because CEACs are located in those two channels. This change is consistent with NUREG-1432.

L.2 CTS Table 3.3-1 Action Statement 6.b.1 requires the DNBR margin to be increased and the Reactor Power Cutback (RPC) System to be disabled within 1 hour of either both CEACs inoperable or if one CEAC is inoperable for 7 days. The ITS Required Action B.1 will allow 4 hours to complete these actions.

The Completion Time of four hours is based on the low probability of a CEA deviation or a dropped CEA during this limited time frame. Increasing the DNBR margin requires a reduction in Reactor power. The Completion time of 4 hours allowed by the ITS is reasonable for reaching the required plant conditions from full power conditions in an orderly manner and without challenging plant systems. This change is consistent with NUREG-1432.

TECHNICAL CHANGES - LESS RESTRICTIVE (continued)

L.3 CTS Table 3.3-1 Action Statement 6.b.3 requires the SR 4.1.3.1.1, SR 4.1.3.5, SR 4.1.3.6, and 4.1.3.7 to be met except during SR 4.1.3.1.2. The ITS will require SR 3.1.5.1 to be performed every 4 hours. SR 4.1.3.1.1 is the same requirement as ITS 3.1.5.1, (verify that all CEAs are within 6.6 inches of the other CEAs in the same group). In both the CTS and ITS the frequency of this test will increase from 12 hours to 4 hours while in this action. SR 4.1.3.5 is verification that all shutdown CEAs are fully withdrawn. SR 4.1.3.6 is verification that all regulating groups are within the Transient Insertion Limit of the CORE OPERATING LIMITS REPORT COLR). SR 4.1.3.7 is verification that all of the part length CEA groups are within the Transient Insertion Limits of the COLR. In the CTS SR 4.1.3.5, 4.1.3.6, and 4.1.3.7 go from a 12 hour interval to a 4 hour interval when the CEACs are inoperable. The ITS will not require a change in frequency for these SRs when the CEACs are inoperable.

The 12 hour SR interval is adequate for SR 4.1.3.5, SR 4.1.3.6, and SR 4.1.3.7, because with the CEDMCS in the standby mode as required by this action, there is a reduced probability of CEA misalignment. Information independent of the CEAC is available to the operator. If the CEA is fully withdrawn there is an upper electrical limit indicating light on the CEDMCS operator module on the main control board. If the CEA is fully inserted there is a CEA bottom light on a core mimic display on the main control board. There is a Power Dependent Insertion Limit (PDIL) alarm for the regulating groups, to indicate improper operation of the regulating groups. SR 3.1.5.2 verifies that two of the three means of indication are available to the operator, for each CEA. SR 3.1.5.1 requires the operator to determine the position of each CEA every four hours and compare the position to the other CEAs in the group. This would allow the operator to detect any CEA that is not fully withdrawn as required by LCO 3.3.3 ACTION B.2 or if Regulating CEA group #5 is inserted more than 127.5 inches withdrawn. This change is consistent with NUREG-1432.

TECHNICAL CHANGES - LESS RESTRICTIVE (continued)

L.4 CTS LCO 3.3.1 Table 3.3-1 Action Statement 6.b.2.c states CEA motion is permitted and that CEDMCS must be operated in either the Manual Group or Manual Individual modes. The ITS does not specify the modes that must be used for the CEA motion permitted by the Action statement. This will allow CEA control in the Manual sequential mode of operation and constitutes a less restrictive change. CEA control in the Manual Sequential mode of operation is limited to Group #5 to a maximum of 127.5 inches withdrawn for control, per ITS Action B.2. The sequential modes of operation do not move Group #4 until Group #5 is inserted to 90" withdrawn. Regulating Group #5 cannot be inserted to 90 inches withdrawn under the conditions of this LCO, so Regulating Group #4 will not move in the Manual Sequential mode. The operation of the CEAs in sequential modes will not violate the requirements of ITS required Action B.2, and therefore will not result in operation outside of the limits assumed in the Safety Analysis. This change is consistent with NUREG-1432.

NO SIGNIFICANT HAZARDS CONSIDERATION
SPECIFICATION 3.3.3

ADMINISTRATIVE CHANGES
(ITS 3.3.3 Discussion of Changes Labeled A.1, A.2, A.3, A.4, A.5, A.6, A.7 and A.8)

Arizona Public Service Company, Palo Verde Nuclear Generating Station (PVNGS), Units 1, 2, and 3, is converting to the ITS as outlined in NUREG-1432, "Standard Technical Specifications, Combustion Engineering Plants." The proposed changes involve the reformatting, renumbering, rewording of the Technical Specifications (TS) and Bases with no change in intent, and the incorporation of current operating practices consistent with NUREG-1432. These changes, since they do not involve technical changes to the Current TS (CTS), are administrative. Below are the No Significant Hazards Consideration (NSHC) for the conversion of this Section/Chapter to NUREG-1432.

The Commission has provided standards for determining whether a significant hazards consideration exists as stated in 10 CFR 50.92. A proposed amendment to an operating license for a facility involves a no significant hazards consideration if operation of the facility, in accordance with a proposed amendment, would not 1) involve a significant increase in the probability or consequences of an accident previously evaluated; 2) create the possibility of a new or different kind of accident from any accident previously evaluated; or 3) involve a significant reduction in a margin of safety. A discussion of these standards as they relate to this amendment request follows:

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

> The proposed changes involve reformatting, renumbering, and rewording of the CTS and Bases along with incorporation of PVNGS current operating practices and other changes to the CTS as discussed in the specific Discussion of Changes listed above in order to be consistent with NUREG-1432. The reformatting, renumbering, and rewording along with the other changes listed above, involves no technical changes to the CTS. Specifically, there will be no change in the requirements imposed on PVNGS due to these changes. During development of NUREG-1432, certain wording preferences or English language conventions were adopted. The proposed changes to this Section/Chapter are administrative in nature and do not impact initiators of any analyzed events. They also do not impact the assumed mitigation of accidents or transient events. Therefore, these changes do not involve a significant increase in the probability or consequences of an accident previously evaluated.

ADMINISTRATIVE CHANGES
(ITS 3.3.3 Discussion of Changes Labeled A.1, A.2, A.3, A.4, A.5, A.6, A.7 and A.8)

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

The proposed changes involve reformatting, renumbering, and rewording of the CTS, along with the incorporation of PVNGS current operating practices and other changes, as discussed, in order to be consistent with NUREG-1432. The proposed changes do not involve a physical alteration of the plant (no new or different type of equipment will be installed) or change the methods governing normal plant operation. The proposed changes will not impose any new or different requirements or eliminate any existing requirements. Therefore, these changes do not create the possibility of a new or different kind of accident from any accident previously evaluated.

Standard 3.-- Does the proposed change involve a significant reduction in a margin of safety?

The proposed changes involve reformatting, renumbering, and rewording of the CTS, along with the incorporation of PVNGS current operating practices and other changes, as discussed, in order to be consistent with NUREG-1432. The proposed changes are administrative in nature and will not involve any technical changes. The proposed changes will not reduce a margin of safety because they have no impact on any safety analysis assumptions. Also, because these changes are administrative in nature, no question of safety is involved. Therefore, these changes do not involve a significant reduction in a margin of safety.

TECHNICAL CHANGES - RELOCATIONS
(ITS 3.3.3 Discussion of Changes Labeled LA.1, LA.2, and LA.3)

Arizona Public Service Company, Palo Verde Nuclear Generating Station (PVNGS), Units 1, 2, and 3 is converting to the ITS as outlined in NUREG-1432. The proposed changes, since detail is being removed from the CTS to a Licensee Controlled Document, are less restrictive. The descriptions of these changes are in the Discussion of Changes listed above.

The Commission has provided standards for determining whether a significant hazards consideration exists as stated in 10 CFR 50.92. A proposed amendment to an operating license for a facility involves a no significant hazards consideration if operation of the facility, in accordance with a proposed amendment, would not 1) involve a significant increase in the probability or consequences of an accident previously evaluated; 2) create the possibility of a new or different kind of accident from any accident previously evaluated; or 3) involve a significant reduction in a margin of safety. A discussion of these standards as they relate to this amendment request follows:

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

> The proposed changes relocate requirements from the CTS to a Licensee Controlled Document. These changes do not result in any hardware changes or changes to plant operating practices. The details being relocated are not assumed to be an initiator of any analyzed event. The Licensee Controlled Document containing the relocated requirements will be maintained using the provisions of 10 CFR 50.59 or other specified control processes and is subject to the change control process in the Administrative Controls Section of the ITS. Since any changes to a Licensee Controlled Document will be evaluated, no increase in the probability or consequences of an accident previously evaluated will be allowed. Therefore, these changes will not involve a significant increase in the probability or consequences of an accident previously evaluated.

TECHNICAL CHANGES - RELOCATIONS
(ITS 3.3.3 Discussion of Changes Labeled LA.1, LA.2, and LA.3) (continued)

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

The proposed changes relocate requirements from the CTS to a Licensee Controlled Document. These changes will not alter the plant configuration (no new or different type of equipment will be installed) or change the methods governing normal plant operation. These changes will not impose different requirements and adequate control of information will still be maintained. These changes will not alter assumptions made in the safety analysis or licensing basis. Therefore, these changes will not create the possibility of a new or different kind of accident from any accident previously evaluated.

Standard 3.-- Does the proposed change involve a significant reduction in a margin of safety?

The proposed changes relocate requirements from the CTS to a Licensee Controlled Document. These changes will not reduce a margin of safety since they have no impact on any safety analysis assumptions. In addition, the requirements to be transposed from the CTS to the Licensee Controlled Document are the same as the CTS. Since any future changes to this Licensee Controlled Document will be evaluated per the requirements of 10 CFR 50.59, or other specified control processes, no reduction (significant or insignificant) in a margin of safety will be allowed. Therefore, these changes will not involve a significant reduction in a margin of safety.

The NRC review provides a certain margin of safety, and although this review will no longer be performed prior to submittal, the NRC still inspects the 10 CFR 50.59 process. The proposed changes are consistent with NUREG-1432, which was approved by the NRC Staff. The change controls for proposed relocated details and requirements provide an acceptable level of regulatory authority. Revising the CTS to reflect the approved level of detail per NUREG-1432 reinforces the conclusion that there is not a significant reduction in the margin of safety. Therefore, revising the CTS to reflect the NRC accepted level of detail and requirements ensures no reduction in a margin of safety.

TECHNICAL CHANGES - LESS RESTRICTIVE
(ITS 3.3.3 Discussion of Changes Labeled L.1)

Arizona Public Service Company, Palo Verde Nuclear Generating Station (PVNGS), Units 1, 2, and 3 is converting to the ITS as outlined in NUREG-1432. The proposed change involves making the CTS less restrictive. Below is the description of this less restrictive change and the NSHC for the conversion to NUREG 1432.

L.1 CTS SR 4.3.1.6 requires the CPCs to be FUNCTIONAL tested within 12 hours of a cabinet high temperature alarm. The ITS will require a FUNCTIONAL TEST on the affected CEAC for a channel B or C alarm. The CEACs are in separate enclosures, CEAC-1 is located in the Channel B enclosure, CEAC-2 is located in Channel C enclosure. There are separate cooling systems and high temperature alarms for each enclosure. A high temperature alarm in a channel may indicate the CEAC is less reliable and a FUNCTIONAL TEST to verify OPERABILITY is needed. The other CEAC channel has not been exposed to the high temperature condition, since it is located in a separate enclosure and therefore a FUNCTIONAL TEST is not needed for the other channel. The ITS will specify a high temperature alarm in channels B and C because CEACs are located in those two channels. This change is consistent with NUREG-1432.

The Commission has provided standards for determining whether a significant hazards consideration exists as stated in 10 CFR 50.92. A proposed amendment to an operating license for a facility involves a no significant hazards consideration if operation of the facility, in accordance with a proposed amendment, would not 1) involve a significant increase in the probability or consequences of an accident previously evaluated; 2) create the possibility of a new or different kind of accident from any accident previously evaluated; or 3) involve a significant reduction in a margin of safety. A discussion of these standards as they relate to this amendment request follows:

TECHNICAL CHANGES - LESS RESTRICTIVE
(ITS 3.3.3 Discussion of Changes Labeled L.1) (continued)

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

The proposed change will modify the requirements of CTS SR 4.3.1.6. This requires the CPCs to be FUNCTIONAL tested within 12 hours of a cabinet high temperature alarm. ITS 3.3.3 Condition C will require a FUNCTIONAL TEST only on the affected CEAC for a channel B or C alarm. There are separate cooling systems and high temperature alarms for each channel. A high temperature alarm in a channel may indicate the CEAC is less reliable and a FUNCTIONAL TEST is needed to verify OPERABILITY. The other CEAC channel has not been exposed to the high temperature and therefore a FUNCTIONAL TEST is not needed for the unaffected channels. The ITS will specify a high temperature alarm in channels B and C because CEACs are located in those two channels

This change is consistent with NUREG-1432. This change does not result in any hardware changes or changes to plant operating practices nor does it affect plant operation. Therefore this change will not involve a significant increase in the probability or consequences of an accident previously evaluated.

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

The proposed change will modify the requirements of CTS SR 4.3.1.6. This requires the CPCs to be FUNCTIONAL tested within 12 hours of a cabinet high temperature alarm. ITS 3.3.3 Condition C will require a FUNCTIONAL TEST only on the affected CEAC for a channel B or C alarm. There are separate cooling systems and high temperature alarms for each channel. A high temperature alarm in a channel may indicate the CEAC is less reliable and a FUNCTIONAL TEST is needed to verify OPERABILITY. The other CEAC channel has not been exposed to the high temperature and therefore a FUNCTIONAL TEST is not needed for the unaffected channels. The ITS will specify a high temperature alarm in channels B and C because CEACs are located in those two channels

TECHNICAL CHANGES - LESS RESTRICTIVE
(ITS 3.3.3 Discussion of Changes Labeled L.1) (continued)

This change is consistent with NUREG-1432. This change will not alter the plant configuration (no new or different type of equipment will be installed) or change the methods of governing normal plant operation. This change will not alter assumptions made in the safety analysis or licensing basis. Therefore, this change will not create the possibility of a new or different kind of accident from any accident previously evaluated.

Standard 3.-- Does the proposed change involve a significant reduction in a margin of safety?

The proposed change will modify the requirements of CTS SR 4.3.1.6. This requires the CPCs to be FUNCTIONAL tested within 12 hours of a cabinet high temperature alarm. ITS 3.3.3 Condition C will require a FUNCTIONAL TEST only on the affected CEAC for a channel B or C alarm. There are separate cooling systems and high temperature alarms for each channel. A high temperature alarm in a channel may indicate the CEAC is less reliable and a FUNCTIONAL TEST is needed to verify OPERABILITY. The other CEAC channel has not been exposed to the high temperature and therefore a FUNCTIONAL TEST is not needed for the unaffected channels. The ITS will specify a high temperature alarm in channels B and C because CEACs are located in those two channels

This change will not reduce a margin of safety since it has no impact on safety analysis assumptions. This change is consistent with NUREG-1432, which was approved by the NRC Staff. Therefore, this change does not result in a reduction in a margin of safety.

TECHNICAL CHANGES - LESS RESTRICTIVE
(ITS 3.3.3 Discussion of Changes Labeled L.2)

Arizona Public Service Company, Palo Verde Nuclear Generating Station (PVNGS), Units 1, 2, and 3 is converting to the ITS as outlined in NUREG-1432. The proposed change involves making the CTS less restrictive. Below is the description of this less restrictive change and the NSHC for conversion to NUREG-1432.

L.2 CTS Table 3.3-1 Action Statement 6.b.1 requires the DNBR margin to be increased and the Reactor Power Cutback (RPC) System to be disabled within 1 hour of either both CEACs inoperable or if one CEAC is inoperable for 7 days. The ITS Required Action B.1 will allow 4 hours to complete these actions.

The Completion Time of four hours is based on the low probability of a CEA deviation or a dropped CEA during this limited time frame. Increasing the DNBR margin requires a reduction in Reactor power. The Completion time of 4 hours allowed by the ITS is reasonable for reaching the required plant conditions from full power conditions in an orderly manner and without challenging plant systems. This change is consistent with NUREG-1432.

The Commission has provided standards for determining whether a significant hazards consideration exists as stated in 10 CFR 50.92. A proposed amendment to an operating license for a facility involves a no significant hazards consideration if operation of the facility, in accordance with a proposed amendment, would not 1) involve a significant increase in the probability or consequences of an accident previously evaluated; 2) create the possibility of a new or different kind of accident from any accident previously evaluated; or 3) involve a significant reduction in a margin of safety. A discussion of these standards as they relate to this amendment request follows:

TECHNICAL CHANGES - LESS RESTRICTIVE
(ITS 3.3.3 Discussion of Changes Labeled L.2) (continued)

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

The proposed change will increase the completion time for ITS 3.3.3 Required Action B.1. CTS Table 3.3-1 Action Statement 6.b.1 requires the DNBR margin to be increased and the Reactor Power Cutback (RPC) System to be disabled within 1 hour of either both CEACs inoperable or if one CEAC is inoperable for 7 days. The ITS Required Action B.1 will allow 4 hours to complete these actions.

The Completion Time of four hours is based on the low probability of a CEA deviation or a dropped CEA during this limited time frame. Increasing the DNBR margin requires a reduction in Reactor power. The Completion time of 4 hours allowed by the ITS is reasonable for reaching the required plant conditions from full power conditions in an orderly manner and without challenging plant systems.

This change is consistent with NUREG-1432. This change does not result in any hardware changes or changes to plant operating practices nor does it affect plant operation. Therefore this change will not involve a significant increase in the probability or consequences of an accident previously evaluated.

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

The proposed change will increase the completion time for ITS 3.3.3 Required Action B.1. CTS Table 3.3-1 Action Statement 6.b.1 requires the DNBR margin to be increased and the Reactor Power Cutback (RPC) System to be disabled within 1 hour of either both CEACs inoperable or if one CEAC is inoperable for 7 days. The ITS Required Action B.1 will allow 4 hours to complete these actions.

The Completion Time of four hours is based on the low probability of a CEA deviation or a dropped CEA during this limited time frame. Increasing the DNBR margin requires a reduction in Reactor power. The Completion time of 4 hours allowed by the ITS is reasonable for reaching the required plant conditions from full power conditions in an orderly manner and without challenging plant systems.

TECHNICAL CHANGES - LESS RESTRICTIVE
(ITS 3.3.3 Discussion of Changes Labeled L.2) (continued)

This change is consistent with NUREG-1432. This change will not alter the plant configuration (no new or different type of equipment will be installed) or change the methods of governing normal plant operation. This change will not alter assumptions made in the safety analysis or licensing basis. Therefore, this change will not create the possibility of a new or different kind of accident from any accident previously evaluated.

Standard 3.-- Does the proposed change involve a significant reduction in a margin of safety?

The proposed change will increase the completion time for ITS 3.3.3 Required Action B.1. CTS Table 3.3-1 Action Statement 6.b.1 requires the DNBR margin to be increased and the Reactor Power Cutback (RPC) System to be disabled within 1 hour of either both CEACs inoperable or if one CEAC is inoperable for 7 days. The ITS Required Action B.1 will allow 4 hours to complete these actions.

The Completion Time of four hours is based on the low probability of a CEA deviation or a dropped CEA during this limited time frame. Increasing the DNBR margin requires a reduction in Reactor power. The Completion time of 4 hours allowed by the ITS is reasonable for reaching the required plant conditions from full power conditions in an orderly manner and without challenging plant systems.

This change will not reduce a margin of safety since it has no impact on safety analysis assumptions. This change is consistent with NUREG-1432, which was approved by the NRC Staff. Therefore, this change does not result in a reduction in a margin of safety.

TECHNICAL CHANGES - LESS RESTRICTIVE
(ITS 3.3.3 Discussion of Changes Labeled L.3)

Arizona Public Service Company, Palo Verde Nuclear Generating Station (PVNGS), Units 1, 2, and 3 is converting to the ITS as outlined in NUREG-1432. The proposed change involves making the CTS less restrictive. Below is the description of this less restrictive change and the NSHC for conversion to NUREG-1432.

L.3 CTS Table 3.3-1 Action Statement 6.b.3 requires the SR 4.1.3.1.1, SR 4.1.3.5, SR 4.1.3.6, and 4.1.3.7 to be met except during SR 4.1.3.1.2. The ITS will require SR 3.1.5.1 to be performed every 4 hours. SR 4.1.3.1.1 is the same requirement as ITS 3.1.5.1. (verify that all CEAs are within 6.6 inches of the other CEAs in the same group). In both the CTS and ITS the frequency of this test will increase from 12 hours to 4 hours while in this action. SR 4.1.3.5 is verification that all shutdown CEAs are fully withdrawn. SR 4.1.3.6 is verification that all regulating groups are within the Transient Insertion Limit of the CORE OPERATING LIMITS REPORT COLR). SR 4.1.3.7 is verification that all of the part length CEA groups are within the Transient Insertion Limits of the COLR. In the CTS SR 4.1.3.5, 4.1.3.6, and 4.1.3.7 go from a 12 hour interval to a 4 hour interval when the CEACs are inoperable. The ITS will not require a change in frequency for these SRs when the CEACs are inoperable.

The 12 hour SR interval is adequate for SR 4.1.3.5, SR 4.1.3.6, and SR 4.1.3.7, because with the CEDMCS in the standby mode as required by this action, there is a reduced probability of CEA misalignment. Information independent of the CEAC is available to the operator. If the CEA is fully withdrawn there is an upper electrical limit indicating light on the CEDMCS operator module on the main control board. If the CEA is fully inserted there is a CEA bottom light on a core mimic display on the main control board. There is a Power Dependent Insertion Limit (PDIL) alarm for the regulating groups, to indicate improper operation of the regulating groups. SR 3.1.5.2 verifies that two of the three means of indication are available to the operator, for each CEA. SR 3.1.5.1 requires the operator to determine the position of each CEA every four hours and compare the position to the other CEAs in the group. This would allow the operator to detect any CEA that is not fully withdrawn as required by LCO 3.3.3 ACTION B.2 or if Regulating CEA group #5 is inserted more than 127.5 inches withdrawn. This change is consistent with NUREG-1432.

TECHNICAL CHANGES - LESS RESTRICTIVE
(ITS 3.3.3 Discussion of Changes Labeled L.3) (continued)

The Commission has provided standards for determining whether a significant hazards consideration exists as stated in 10 CFR 50.92. A proposed amendment to an operating license for a facility involves a no significant hazards consideration if operation of the facility, in accordance with a proposed amendment, would not 1) involve a significant increase in the probability or consequences of an accident previously evaluated; 2) create the possibility of a new or different kind of accident from any accident previously evaluated; or 3) involve a significant reduction in a margin of safety. A discussion of these standards as they relate to this amendment request follows:

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

The proposed change will remove the requirement for increased performance frequency for SR 4.1.3.5, SR 4.1.3.6, and SR 4.3.1.7. In the CTS SR 4.1.3.5, 4.1.3.6, and 4.1.3.7 go from a 12 hour interval to a 4 hour interval when the CEACs are inoperable. The ITS will not require a change in frequency for these SRs when the CEACs are inoperable.

CTS Table 3.3-1 Action Statement 6.b.3 requires the performance of SR 4.1.3.1.1. The ITS will require SR 3.1.5.1 to be performed every 4 hours. SR 4.1.3.1.1 is the same requirement as ITS 3.1.5.1, (verify that all CEAs are within 6.6 inches of the other CEAs in the same group). In both the CTS and ITS the frequency of this test will increase from 12 hours to 4 hours while in this action.

SR 4.1.3.5 is verification that all shutdown CEAs are fully withdrawn. SR 4.1.3.6 is verification that all regulating groups are within the Transient Insertion Limit of the CORE OPERATING LIMITS REPORT COLR). SR 4.1.3.7 is verification that all of the part length CEA groups are within the Transient Insertion Limits of the COLR.

TECHNICAL CHANGES - LESS RESTRICTIVE
(ITS 3.3.3 Discussion of Changes Labeled L.3) (continued)

The 12 hour SR interval is adequate for SR 4.1.3.5, SR 4.1.3.6, and SR 4.1.3.7, because with the CEDMCS in the standby mode as required by this action, there is a reduced probability of CEA misalignment. Information independent of the CEAC is also available to the operator. If the CEA is fully withdrawn there is an upper electrical limit indicating light on the CEDMCS operator module on the main control board. If the CEA is fully inserted there is a CEA bottom light on a core mimic display on the main control board. There is a Power Dependent Insertion Limit (PDIL) alarm for the regulating groups, to indicate improper operation of the regulating groups. SR 3.1.5.2 verifies that two of the three means of indication are available to the operator, for each CEA. SR 3.1.5.1 requires the operator to determine the position of each CEA every four hours and compare the position to the other CEAs in the group. This would allow the operator to detect any CEA that is not fully withdrawn as required by LCO 3.3.3 ACTION B.2 or if Regulating CEA group #5 is inserted more than 127.5 inches withdrawn.

This change is consistent with NUREG-1432. This change does not result in any hardware changes or changes to plant operating practices nor does it affect plant operation. Therefore this change will not involve a significant increase in the probability or consequences of an accident previously evaluated.

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

The proposed change will remove the requirement for increased performance frequency for SR 4.1.3.5, SR 4.1.3.6, and SR 4.3.1.7. In the CTS SR 4.1.3.5, 4.1.3.6, and 4.1.3.7 go from a 12 hour interval to a 4 hour interval when the CEACs are inoperable. The ITS will not require a change in frequency for these SRs when the CEACs are inoperable.

CTS Table 3.3-1 Action Statement 6.b.3 requires the performance of SR 4.1.3.1.1. The ITS will require SR 3.1.5.1 to be performed every 4 hours. SR 4.1.3.1.1 is the same requirement as ITS 3.1.5.1, (verify that all CEAs are within 6.6 inches of the other CEAs in the same group). In both the CTS and ITS the frequency of this test will increase from 12 hours to 4 hours while in this action.

TECHNICAL CHANGES - LESS RESTRICTIVE
(ITS 3.3.3 Discussion of Changes Labeled L.3) (continued)

SR 4.1.3.5 is verification that all shutdown CEAs are fully withdrawn. SR 4.1.3.6 is verification that all regulating groups are within the Transient Insertion Limit of the CORE OPERATING LIMITS REPORT COLR). SR 4.1.3.7 is verification that all of the part length CEA groups are within the Transient Insertion Limits of the COLR.

The 12 hour SR interval is adequate for SR 4.1.3.5, SR 4.1.3.6, and SR 4.1.3.7, because with the CEDMCS in the standby mode as required by this action, there is a reduced probability of CEA misalignment. Information independent of the CEAC is also available to the operator. If the CEA is fully withdrawn there is an upper electrical limit indicating light on the CEDMCS operator module on the main control board. If the CEA is fully inserted there is a CEA bottom light on a core mimic display on the main control board. There is a Power Dependent Insertion Limit (PDIL) alarm for the regulating groups, to indicate improper operation of the regulating groups. SR 3.1.5.2 verifies that two of the three means of indication are available to the operator, for each CEA. SR 3.1.5.1 requires the operator to determine the position of each CEA every four hours and compare the position to the other CEAs in the group. This would allow the operator to detect any CEA that is not fully withdrawn as required by LCO 3.3.3 ACTION B.2 or if Regulating CEA group #5 is inserted more than 127.5 inches withdrawn.

This change is consistent with NUREG-1432. This change will not alter the plant configuration (no new or different type of equipment will be installed) or change the methods of governing normal plant operation. This change will not alter assumptions made in the safety analysis or licensing basis. Therefore, this change will not create the possibility of a new or different kind of accident from any accident previously evaluated.

Standard 3.-- Does the proposed change involve a significant reduction in a margin of safety?

The proposed change will remove the requirement for increased performance frequency for SR 4.1.3.5, SR 4.1.3.6, and SR 4.3.1.7. In the CTS SR 4.1.3.5, 4.1.3.6, and 4.1.3.7 go from a 12 hour interval to a 4 hour interval when the CEACs are inoperable. The ITS will not require a change in frequency for these SRs when the CEACs are inoperable.

TECHNICAL CHANGES - LESS RESTRICTIVE
(ITS 3.3.3 Discussion of Changes Labeled L.3) (continued)

CTS Table 3.3-1 Action Statement 6.b.3 requires the performance of SR 4.1.3.1.1. The ITS will require SR 3.1.5.1 to be performed every 4 hours. SR 4.1.3.1.1 is the same requirement as ITS 3.1.5.1, (verify that all CEAs are within 6.6 inches of the other CEAs in the same group). In both the CTS and ITS the frequency of this test will increase from 12 hours to 4 hours while in this action.

SR 4.1.3.5 is verification that all shutdown CEAs are fully withdrawn. SR 4.1.3.6 is verification that all regulating groups are within the Transient Insertion Limit of the CORE OPERATING LIMITS REPORT COLR). SR 4.1.3.7 is verification that all of the part length CEA groups are within the Transient Insertion Limits of the COLR.

The 12 hour SR interval is adequate for SR 4.1.3.5, SR 4.1.3.6, and SR 4.1.3.7, because with the CEDMCS in the standby mode as required by this action, there is a reduced probability of CEA misalignment. Information independent of the CEAC is also available to the operator. If the CEA is fully withdrawn there is an upper electrical limit indicating light on the CEDMCS operator module on the main control board. If the CEA is fully inserted there is a CEA bottom light on a core mimic display on the main control board. There is a Power Dependent Insertion Limit (PDIL) alarm for the regulating groups, to indicate improper operation of the regulating groups. SR 3.1.5.2 verifies that two of the three means of indication are available to the operator, for each CEA. SR 3.1.5.1 requires the operator to determine the position of each CEA every four hours and compare the position to the other CEAs in the group. This would allow the operator to detect any CEA that is not fully withdrawn as required by LCO 3.3.3 ACTION B.2 or if Regulating CEA group #5 is inserted more than 127.5 inches withdrawn.

This change will not reduce a margin of safety since it has no impact on safety analysis assumptions. This change is consistent with NUREG-1432, which was approved by the NRC Staff. Therefore, this change does not result in a reduction in a margin of safety.

TECHNICAL CHANGES - LESS RESTRICTIVE
(ITS 3.3.3 Discussion of Changes Labeled L.4)

Arizona Public Service Company, Palo Verde Nuclear Generating Station (PVNGS), Units 1, 2, and 3 is converting to the ITS as outlined in NUREG-1432. The proposed change involves making the CTS less restrictive. Below is the description of this less restrictive change and the NSHC for conversion to NUREG-1432.

L.4 CTS LCO 3.3.1 Table 3.3-1 Action Statement 6.b.2.c states CEA motion is permitted and that CEDMCS must be operated in either the Manual Group or Manual Individual modes. The ITS does not specify the modes that must be used for the CEA motion permitted by the Action statement. This will allow CEA control in the Manual sequential mode of operation and constitutes a less restrictive change. CEA control in the Manual Sequential mode of operation is limited to Group #5 to a maximum of 127.5 inches withdrawn for control, per ITS Action B.2. The sequential modes of operation do not move Group #4 until Group #5 is inserted to 90" withdrawn. Regulating Group #5 cannot be inserted to 90 inches withdrawn under the conditions of this LCO, so Regulating Group #4 will not move in the Manual Sequential mode. The operation of the CEAs in sequential modes will not violate the requirements of ITS required Action B.2, and therefore will not result in operation outside of the limits assumed in the Safety Analysis. This change is consistent with NUREG-1432.

The Commission has provided standards for determining whether a significant hazards consideration exists as stated in 10 CFR 50.92. A proposed amendment to an operating license for a facility involves a no significant hazards consideration if operation of the facility, in accordance with a proposed amendment, would not 1) involve a significant increase in the probability or consequences of an accident previously evaluated; 2) create the possibility of a new or different kind of accident from any accident previously evaluated; or 3) involve a significant reduction in a margin of safety. A discussion of these standards as they relate to this amendment request follows: