ENCLOSURE 2

VOLUME 6

SEQUOYAH NUCLEAR PLANT
UNIT 1 AND UNIT 2

IMPROVED TECHNICAL SPECIFICATIONS CONVERSION

ITS SECTION 3.1
REACTIVITY CONTROL SYSTEMS

Revision 0

LIST OF ATTACHMENTS

ATTACHMENT 1

ITS 3.1.1, SHUTDOWN MARGIN (SDM)

Current Technical Specification (CTS) Markup and Discussion of Changes (DOCs)

ITS (A01) ITS 3.1.1

3/4.1 REACTIVITY CONTROL SYSTEMS

~~3/4.1.1 BORATION CONTROL~~ (A01)

SHUTDOWN MARGIN ~~- T_{avg} Greater Than 200°F~~ (A02)

LIMITING CONDITION FOR OPERATION

LCO 3.1.1 — 3.1.1.1 The SHUTDOWN MARGIN shall be ~~greater than or equal to 1.6% delta k/k for 4 loop operation~~ [within the limits specified in the COLR] (LA01) (A04).

Applicability — APPLICABILITY: MODES 1, 2~~*~~ [k_{eff} < 1.0] (A03), 3, and 4. (See ITS 3.1.6)

ACTION:

ACTION A — With the SHUTDOWN MARGIN ~~less than 1.6% delta k/k,~~ [not within limits] (LA01) ~~immediately~~ [within 15 minutes] (L01) initiate and ~~continue~~ boration ~~at greater than or equal to 35 gpm of a solution containing greater than or equal to 6120 ppm boron or equivalent~~ (L02) until the required SHUTDOWN MARGIN is restored.

SURVEILLANCE REQUIREMENTS

SR 3.1.1.1 — 4.1.1.1.1 The SHUTDOWN MARGIN shall be determined to be ~~greater than or equal to 1.6% delta k/k~~ [within the limits specified in the COLR] (LA01):

a. Within one hour after detection of an inoperable control rod(s) and at least once per 12 hours thereafter while the rod(s) is inoperable. (See ITS 3.1.4) If the inoperable control rod is immovable or untrippable, the above required SHUTDOWN MARGIN shall be verified acceptable with an increased allowance for the withdrawn worth of the immovable or untrippable control rod(s). (See ITS Chapter 1.0)

b. When in MODE 1 or MODE 2 with K_{eff} greater than or equal to 1.0, at least once per 12 hours by verifying that control bank withdrawal is within the limits of Specification 3.1.3.6.

c. When in MODE 2 with K_{eff} less than 1.0, within 4 hours prior to achieving reactor criticality by verifying that the predicted critical control rod position is within the limits of Specification 3.1.3.6.

(See ITS 3.1.6)

~~*See Special Test Exception 3.10.1~~ (A04)

ITS | A01 | ITS 3.1.1

REACTIVITY CONTROL SYSTEMS

SURVEILLANCE REQUIREMENTS (Continued)

d. ~~Prior to initial operation above 5% RATED THERMAL POWER after each fuel loading, by consideration of the factors of e below, with the control banks at the maximum insertion limit of Specification 3.1.3.6.~~ L03

SR 3.1.1.1 e. When in MODES [MODE 2 with k_{eff} < 1.0] (M01) 3 or 4, [In accordance with the Surveillance Frequency Control Program] (LA02) ~~at least once per 24 hours by consideration of the following factors:~~ (LA03)

~~1. Reactor coolant system boron concentration,~~

~~2. Control rod position,~~

~~3. Reactor coolant system average temperature,~~

~~4. Fuel burnup based on gross thermal energy generation,~~

~~5. Xenon concentration, and~~

~~6. Samarium concentration.~~

4.1.1.1.2 The overall core reactivity balance shall be compared to predicted values to demonstrate agreement within ± 1% delta k/k at least once per 31 Effective Full Power Days (EFPD). This comparison shall consider at least those factors stated in Specification 4.1.1.1.1.e, above. The predicted reactivity values shall be adjusted (normalized) to correspond to the actual core conditions prior to exceeding a fuel burnup of 60 Effective Full Power Days after each fuel loading. [See ITS 3.1.2]

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ITS A01 ITS 3.1.1

REACTIVITY CONTROL SYSTEMS

SHUTDOWN MARGIN - T_{avg} Less Than or Equal to 200°F A02

LIMITING CONDITION FOR OPERATION

within the limits specified in the COLR LA01

LCO 3.1.1 3.1.1.2 The SHUTDOWN MARGIN shall be greater than or equal to 1.0% delta k/k.

Applicability APPLICABILITY: MODE 5.

ACTION:

not within limits LA01

within 15 minutes L01

ACTION A With the SHUTDOWN MARGIN less than 1.0% delta k/k, immediately initiate and continue boration at greater than or equal to 35 gpm of a solution containing greater than or equal to 6120 ppm boron or equivalent until the required SHUTDOWN MARGIN is restored. L02

SURVEILLANCE REQUIREMENTS

within the limits specified in the COLR LA01

SR 3.1.1.1 4.1.1.2 The SHUTDOWN MARGIN shall be determined to be greater than or equal to 1.0% delta k/k:

a. Within one hour after detection of an inoperable control rod(s) and at least once per 12 hours thereafter while the rod(s) is inoperable. If the inoperable control rod is immovable or untrippable, the SHUTDOWN MARGIN shall be verified acceptable with an increased allowance for the withdrawn worth of the immovable or untrippable control rod(s).

See ITS 3.1.4

See ITS Chapter 1.0

b. At least once per 24 hours by consideration of the following factors:

In accordance with the Surveillance Frequency Control Program LA02

1. Reactor coolant system boron concentration,

2. Control rod position,

3. Reactor coolant system average temperature,

4. Fuel burnup based on gross thermal energy generation,

5. Xenon concentration, and

6. Samarium concentration.

LA03

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ITS | A01 | ITS 3.1.1

3/4.1 REACTIVITY CONTROL SYSTEMS

~~3/4.1.1 BORATION CONTROL~~ (A01)

SHUTDOWN MARGIN ~~- $T_{avg} \geq 200°F$~~ (A02)

LIMITING CONDITION FOR OPERATION

LCO 3.1.1 — 3.1.1.1 The SHUTDOWN MARGIN shall be ~~greater than or equal to 1.6% delta k/k for 4 loop operation~~ [within the limits specified in the COLR] (LA01).

Applicability — APPLICABILITY: MODES 1 (See ITS 3.1.6), 2~~*~~ [k_{eff} < 1.0] (A03) (A04), 3, and 4.

ACTION:

ACTION A — With the SHUTDOWN MARGIN ~~less than 1.6% delta k/k~~ [not within limits] (LA01), ~~immediately~~ [within 15 minutes] (L01) initiate and ~~continue~~ boration ~~at greater than or equal to 35 gpm of a solution containing greater than or equal to 6120 ppm boron or equivalent until the required SHUTDOWN MARGIN is restored~~ (L02).

SURVEILLANCE REQUIREMENTS

SR 3.1.1.1 — 4.1.1.1.1 The SHUTDOWN MARGIN shall be determined to be ~~greater than or equal to 1.6% delta k/k~~ [within the limits specified in the COLR] (LA01):

a. Within one hour after detection of an inoperable control rod(s) and at least once per 12 hours thereafter while the rod(s) is inoperable. (See ITS 3.1.4) If the inoperable control rod is immovable or untrippable, the above required SHUTDOWN MARGIN shall be verified acceptable with an increased allowance for the withdrawn worth of the immovable or untrippable control rod(s). (See ITS Chapter 1.0)

b. When in MODE 1 or MODE 2 with K_{eff} greater than or equal to 1.0, at least once per 12 hours by verifying that control bank withdrawal is within the limits of Specification 3.1.3.6.

c. When in MODE 2, with K_{eff} less than 1.0, within 4 hours prior to achieving reactor criticality by verifying that the predicted critical control rod position is within the limits of Specification 3.1.3.6.

(See ITS 3.1.6)

d. ~~Prior to initial operation above 5% RATED THERMAL POWER after each fuel loading, by consideration of the factors of e below, with the control banks at the maximum insertion limit of Specification 3.1.3.6.~~ (L03)

~~* See Special Test Exception 3.10.1~~ (A04)

ITS

A01

ITS 3.1.1

REACTIVITY CONTROL SYSTEMS

SURVEILLANCE REQUIREMENTS (Continued)

SR 3.1.1.1

MODE 2 with k_{eff} < 1.0

M01

e. When in MODES 3 or 4, ~~at least once per 24 hours by consideration of the following factors:~~

In accordance with the Surveillance Frequency Control Program

LA02

~~1. Reactor coolant system boron concentration,~~

~~2. Control rod position,~~

~~3. Reactor coolant system average temperature,~~

LA03

~~4. Fuel burnup based on gross thermal energy generation,~~

~~5. Xenon concentration, and~~

~~6. Samarium concentration~~.

4.1.1.1.2 The overall core reactivity balance shall be compared to predicted values to demonstrate agreement within ± 1% delta k/k at least once per 31 Effective Full Power Days (EFPD). This comparison shall consider at least those factors stated in Specification 4.1.1.1.1.e, above. The predicted reactivity values shall be adjusted (normalized) to correspond to the actual core conditions prior to exceeding a fuel burnup of 60 Effective Full Power Days after each fuel loading.

See ITS 3.1.2

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ITS (A01) ITS 3.1.1

REACTIVITY CONTROL SYSTEMS

SHUTDOWN MARGIN ~~- T_{avg} Less Than or Equal to 200°F~~ (A02)

LIMITING CONDITION FOR OPERATION

LCO 3.1.1 — 3.1.1.2 The SHUTDOWN MARGIN shall ~~be greater than or equal to 1.0% delta k/k~~ [within the limits specified in the COLR] (LA01).

Applicability — APPLICABILITY: MODE 5.

ACTION:

ACTION A — With the SHUTDOWN MARGIN ~~less than 1.0% delta k/k,~~ [not within limits] (LA01) ~~immediately~~ [within 15 minutes] (L01) initiate and ~~continue~~ boration ~~at greater than or equal to 35 gpm of a solution containing greater than or equal to 6120 ppm boron or equivalent~~ (L02) until the required SHUTDOWN MARGIN is restored.

SURVEILLANCE REQUIREMENTS

SR 3.1.1.1 — 4.1.1.2 The SHUTDOWN MARGIN shall be determined to ~~be greater than or equal to 1.0% delta k/k~~ [within the limits specified in the COLR] (LA01):

a. Within one hour after detection of an inoperable control rod(s) and at least once per 12 hours thereafter while the rod(s) is inoperable. (See ITS 3.1.4) If the inoperable control rod is immovable or untrippable, the SHUTDOWN MARGIN shall be verified acceptable with an increased allowance for the withdrawn worth of the immovable or untrippable control rod(s). (See ITS Chapter 1.0)

b. ~~At least once per 24 hours~~ [In accordance with the Surveillance Frequency Control Program] (LA02) ~~by consideration of the following factors:~~ (LA03)

~~1. Reactor coolant system boron concentration,~~

~~2. Control rod position,~~

~~3. Reactor coolant system average temperature,~~

~~4. Fuel burnup based on gross thermal energy generation,~~

~~5. Xenon concentration, and~~

~~6. Samarium concentration~~.

DISCUSSION OF CHANGES
ITS 3.1.1, SHUTDOWN MARGIN (SDM)

ADMINISTRATIVE CHANGES

A01 In the conversion of the Sequoyah Nuclear Plant (SQN) Current Technical Specifications (CTS) to the plant specific Improved Technical Specifications (ITS), certain changes (wording preferences, editorial changes, reformatting, revised numbering, etc.) are made to obtain consistency with NUREG - 1431, Rev. 4.0, "Standard Technical Specifications - Westinghouse Plants" (ISTS) and additional Technical Specification Task Force (TSTF) travelers included in this submittal.

These changes are designated as administrative changes and are acceptable because they do not result in technical changes to the CTS.

A02 CTS 3.1.1.1 provides the SHUTDOWN MARGIN (SDM) requirement in MODES 1, 2, 3, and 4 (i.e., T_{avg} greater than 200°F). CTS 3.1.1.2 provides the SDM requirement in MODE 5 (i.e., T_{avg} less than or equal to 200°F). ITS 3.1.1 provides the SDM requirement in MODE 2 with $k_{eff} < 1.0$ and MODES 3, 4, and 5. This changes the CTS by combining the SDM requirements in MODE 2 with $k_{eff} < 1.0$ and MODES 3, 4, and 5. The change in Applicability for MODE 2 with $k_{eff} < 1.0$ is described in DOC A03.

This change is acceptable because the requirements have not changed. Combining the Specifications is an editorial change. Any technical changes resulting from this combination are discussed in other DOCs. This change is designated as administrative because it does not result in a technical change to the CTS.

A03 CTS 3.1.1.1 provides the SDM requirement in MODES 1, 2, 3, and 4 (i.e., T_{avg} greater than 200°F). CTS 4.1.1.1.1 states, when in MODES 1 and 2 with $k_{eff} \geq 1.0$, verify the control bank withdrawal is within the limits of Specification 3.1.3.6. ITS 3.1.1 is Applicable in MODE 2 with $k_{eff} < 1.0$ and MODES 3, 4, and 5. This changes the CTS by combining the SDM requirement in MODE 2 with $k_{eff} < 1.0$ and MODES 3, 4, and 5. The change in Applicability for MODE 1 and MODE 2 with $k_{eff} \geq 1.0$ is described in ITS 3.1.6 (Control Bank Insertion Limits).

The purpose of CTS 3.1.1.1 is to ensure that the SDM assumed in the accident analysis is available. When the reactor is critical, SDM is verified by ensuring the control rods are within the control rod insertion limits. ITS 3.1.1 Applicability Bases state in MODES 1 and 2, SDM is ensured by complying with LCO 3.1.5, "Shutdown Bank Insertion Limits," and LCO 3.1.6, "Control Bank Insertion Limits." This change is acceptable because the SDM requirements have not changed. Even though CTS 3.1.1.1 is applicable in MODES 1 and 2, the CTS Surveillances only require the verification that control rod bank withdrawal is within the control rod insertion limits. The ITS verifies SDM in MODES 1 and 2 by the rod insertion limits. Any changes to the rod insertion limit requirements are discussed in DOCs for those Specifications. This change is designated as administrative because it does not result in a technical change to the CTS.

A04 CTS 3.1.1.1 Applicability is MODES 1, 2, 3, and 4 with a footnote (footnote *) for MODE 2 stating "See Special Test Exception 3.10.1." ITS 3.1.1 does not contain

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DISCUSSION OF CHANGES
ITS 3.1.1, SHUTDOWN MARGIN (SDM)

the footnote or a reference to the Special Test Exception. This changes the CTS by not including footnote * in the ITS.

The purpose of the footnote reference is to alert the user that a Special Test Exception exists that may modify the Applicability of the Specification. It is an ITS convention to not include these types of footnotes or cross-references. This change is designated as administrative as it incorporates an ITS convention with no technical change to the CTS.

MORE RESTRICTIVE CHANGES

M01 CTS 4.1.1.1.1.e requires SDM to be determined to be within its limits every 24 hours when in MODES 3 and 4. ITS SR 3.1.1.1 requires SDM to be determined to be within its limits in MODE 2 with k_{eff} < 1.0 and MODES 3 and 4. This changes the CTS by expanding the applicability of the Surveillance to include MODE 2 with k_{eff} < 1.0.

The purpose of CTS 4.1.1.1.1.e is to verify that sufficient SDM is available. CTS 4.1.1.1.1.b states that when the reactor is in MODE 1 and MODE 2 with k_{eff} ≥ 1.0, SDM is verified by determining that the control rods are above the rod insertion limits. In MODE 2 with k_{eff} < 1.0, CTS 4.1.1.1.1.c verifies SDM by determining that the control rods are above the rod insertion limits. However, no CTS Surveillance requires a periodic verification of SDM when in MODE 2 with k_{eff} < 1.0. This change is acceptable because the ITS requires a specific verification that the SDM is within the limit when in MODE 2 with k_{eff} < 1.0 on a periodic basis. This change is designated as more restrictive because it expands the conditions under which a Surveillance must be performed.

RELOCATED SPECIFICATIONS

None

REMOVED DETAIL CHANGES

LA01 *(Type 6 – Removal of Cycle-Specific Parameter Limits from the Technical Specifications to the Core Operating Limits Report)* CTS 3.1.1.1, CTS 3.1.1.1 ACTION and CTS 4.1.1.1.1 require the SDM to be greater than or equal to 1.6% delta k/k when in MODES 1, 2, 3, and 4. CTS 3.1.1.2, CTS 3.1.1.2 ACTION and CTS 4.1.1.2.1 require the SDM to be greater than or equal to 1.0% delta k/k when in MODE 5. ITS LCO 3.1.1 requires the SDM to be within the limits specified in the COLR. ITS 3.1.1 ACTION A provides actions when the SDM is not within limits. ITS SR 3.1.1.1 requires verification that the SDM is within limits. This changes the CTS by moving the SDM limits to the COLR.

The removal of these cycle-specific parameter limits from the Technical Specifications to the COLR is acceptable because the cycle-specific limits are developed or utilized under NRC-approved methodologies that will ensure that the safety limits are met. The NRC documented in Generic Letter 88-16,

DISCUSSION OF CHANGES
ITS 3.1.1, SHUTDOWN MARGIN (SDM)

"Removal of Cycle-Specific Parameter Limits From Technical Specifications," that this type of information is not necessary to be included in the Technical Specification to provide adequate protection of public health and safety. The ITS retains the SDM requirement. The methodologies used to develop the parameters in the COLR have obtained approval by the NRC in accordance with Generic Letter 88-16. Furthermore, this change is acceptable because the removed information will be adequately controlled in the COLR under the requirements provided in ITS 5.6.3, "Core Operating Limits Report." ITS 5.6.3 ensures the applicable limits (e.g., fuel thermal mechanical limits, core thermal hydraulic limits, Emergency Core Cooling System limits, and nuclear limits such as SDM, transient analysis limits, and accident analysis limits) of the safety analyses are met. This change is designated as a less restrictive removal of detail change because information relating to cycle-specific parameter limits is being removed from the Technical Specifications.

LA02 *(Type 5 – Removal of SR Frequency to the Surveillance Frequency Control Program)* CTS 4.1.1.1.1.e and CTS 4.1.1.2.b require SDM to be determined to be within its limits every 24 hours. ITS SR 3.1.1.1 requires a similar Surveillance and specifies the periodic Frequency as, "In accordance with the Surveillance Frequency Control Program." This changes the CTS by moving the specified Frequencies for this SR and associated Bases to the Surveillance Frequency Control Program.

The removal of these details related to Surveillance Requirement Frequencies from the Technical Specifications is acceptable, because this type of information is not necessary to be included in the Technical Specifications to provide adequate protection of public health and safety. The existing Surveillance Frequencies are removed from Technical Specifications and placed under licensee control pursuant to the methodology described in NEI 04-10. A new program (Surveillance Frequency Control Program) is being added to the Administrative Controls section of the Technical Specifications describing the control of Surveillance Frequencies. The surveillance test requirements remain in the Technical Specifications. The control of changes to the Surveillance Frequencies will be in accordance with the Surveillance Frequency Control Program. The Program shall ensure that Surveillance Requirements specified in the Technical Specifications are performed at intervals sufficient to assure the associated Limiting Conditions for Operation are met. This change is designated as a less restrictive removal of detail change, because the Surveillance Frequencies are being removed from the Technical Specifications.

LA03 *(Type 3 – Removing Procedural Details for Meeting TS Requirements or Reporting Requirements)* CTS 4.1.1.1.1.e and CTS 4.1.1.2.b require determination that the SDM is within limits, and specifically requires the consideration of the following factors: reactor coolant system boron concentration, control rod position, reactor coolant system average temperature, fuel burnup based on gross thermal energy generation, xenon concentration and samarium concentration. ITS SR 3.1.1.1 requires a determination that the SDM is within limits, but does not describe the factors that must be considered in the calculation. This information is moved to the Bases. This changes the CTS by removing details on how the SDM calculation is performed from the Specification and placing the information in the Bases.

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DISCUSSION OF CHANGES
ITS 3.1.1, SHUTDOWN MARGIN (SDM)

The removal of these details for performing Surveillance Requirements from the Technical Specifications is acceptable because this type of information is not necessary to be included in the Technical Specifications to provide adequate protection of public health and safety. The ITS retains the requirement that the SDM be within limits. The detail of how SDM is calculated does not need to appear in the specification in order for the requirement to apply. Also, this change is acceptable because the removed information will be adequately controlled in the ITS Bases. Changes to the Bases are controlled by the Technical Specification Bases Control Program in Chapter 5. This program provides for the evaluation of changes to ensure the Bases are properly controlled. This change is designated as a less restrictive removal of detail change because information relating to system design is being removed from the Technical Specifications.

LESS RESTRICTIVE CHANGES

L01 *(Category 3 – Relaxation of Completion Time)* CTS 3.1.1.1 ACTION states when the SDM is less than the applicable limit, boration must be initiated immediately. ITS 3.1.1 ACTION states when SDM is not within limits, boration must be initiated within 15 minutes. This changes the CTS by relaxing the Completion Time from "immediately" to 15 minutes.

The purpose of CTS 3.1.1.1 ACTION is to restore the SDM to within its limit promptly. This change is acceptable because the Completion Time is consistent with safe operation under the specific Condition, considering the operability status of the redundant systems of required features, the capacity and capability of remaining features, and the low probability of a DBA occurring during the allowed Completion Time. This ITS Completion Time of 15 minutes is adequate for an operator to correctly align and start the required systems and components. In addition, the ITS Bases for the ACTION states that boration must be initiated promptly. This change is designated as less restrictive because additional time is allowed to restore parameters to within the LCO limits than was allowed in the CTS.

L02 *(Category 4 – Relaxation of Required Action)* CTS 3.1.1.1 ACTION states when the SDM is less than or equal to 1.6% $\Delta k/k$, boration must be initiated and continued at greater than or equal to 35 gpm of a solution containing greater than or equal to 6120 ppm boron or equivalent until the required SDM is restored. ITS 3.1.1 ACTION A states that when the SDM is not within limits to initiate boration to restore SDM to within limits. This changes the CTS by eliminating the specific values of flow rate and the boron concentration used to restore compliance with the LCO.

The purpose of CTS 3.1.1.1 ACTION is to restore the SDM to within its limit. This change is acceptable because the Required Actions are used to establish remedial measures that must be taken in response to the degraded conditions in order to minimize risk associated with continued operation while providing time to repair inoperable features. The Required Actions are consistent with safe operation under the specified Condition, considering the operability status of the

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DISCUSSION OF CHANGES
ITS 3.1.1, SHUTDOWN MARGIN (SDM)

specified redundant systems of required features, the capacity and capability of remaining features, a reasonable time for repairs or replacement of required features, and the low probability of a DBA occurring during the allowed Completion Time. Removing the specific values of flow rate and boron concentration from the CTS ACTION provides flexibility in the restoration of the SDM and eliminates conflicts between the SDM value and the specific boration values in the CTS ACTION. As stated, in the ITS Bases for ACTION A, "In the determination of the required combination of boration flow rate and boron concentration, there is no unique requirement that must be satisfied. Since it is imperative to raise the boron concentration of the RCS as soon as possible, the boron concentration should be a highly concentrated solution, such as that normally found in the boric acid tank, or the refueling water storage tank. The operator should borate with the best source available for the plant conditions." Specifying a minimum flow rate and concentration in the ACTION may not accomplish the objective of raising the RCS boron concentration as soon as possible. This change is designated as less restrictive because less stringent Required Actions are being applied in the ITS than were applied in the CTS.

L03 *(Category 5 – Deletion of Surveillance Requirement)* CTS 4.1.1.1.1.d requires verification that the SDM is within limit, "Prior to initial operation above 5% RATED THERMAL POWER after each fuel loading, by consideration of the factors of e below (CTS 4.1.1.1.1.e), with the control banks at the maximum insertion limit of Specification 3.1.3.6." The ITS does not contain a similar requirement. This changes the CTS by deleting Surveillance Requirement 4.1.1.1.1.d.

The purpose of CTS 4.1.1.1.1.d is to verify core design predictions by determining the SDM with the control rods at the insertion limits. This change is acceptable because the deleted Surveillance Requirement is not necessary to verify the LCO is within limit. The core design predictions, such as rod worth, boron worth, and critical boron concentration, are verified in a manner and at a Frequency necessary to give confidence that these predicted values are within limit in accordance with ITS SR 3.1.2.1. ITS SR 3.1.2.1 has a conditional Frequency similar to that of CTS 4.1.1.1.d requiring performance once prior to entering MODE 1 (> 5% RTP) after each refueling. To ensure the SDM is within limits during reactor startup the critical boron concentration is verified during the startup physics test program and prior to criticality per ITS SR 3.1.6.1 (Estimated Critical Position). Thereafter SDM is confirmed by performance of ITS SR 3.1.4.1 (Rod Alignment), SR 3.1.5.1(Shutdown Bank Rod Insertion Limits), and SR 3.1.6.2 (Control Bank Rod Insertion Limits). Thus, the SDM continues to be verified in a manner and at a Frequency necessary to give confidence that the parameter is within limit. Therefore, the core design parameters upon which SDM relies are verified before exceeding 5% RATED THERMAL POWER after each refueling outage. This change is designated as less restrictive because Surveillances which are required in the CTS will not be required in the ITS.

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Improved Standard Technical Specifications (ISTS) Markup and Justification for Deviations (JFDs)

3.1 REACTIVITY CONTROL SYSTEMS

3.1.1 SHUTDOWN MARGIN (SDM)

3.1.1.1, 3.1.1.2

LCO 3.1.1 SDM shall be within the limits specified in the COLR.

3.1.1.1 Applicability, 3.1.1.2 Applicability

APPLICABILITY: MODE 2 with k_{eff} < 1.0,
MODES 3, 4, and 5.

ACTIONS

	CONDITION	REQUIRED ACTION	COMPLETION TIME
3.1.1.1 ACTION, 3.1.1.2 ACTION	A. SDM not within limits.	A.1 Initiate boration to restore SDM to within limits.	15 minutes

SURVEILLANCE REQUIREMENTS

	SURVEILLANCE	FREQUENCY	
4.1.1.1.1.e, 4.1.1.2.b	SR 3.1.1.1 Verify SDM to be within the limits specified in the COLR.	[24 hours OR In accordance with the Surveillance Frequency Control Program]	1 1

3.1 REACTIVITY CONTROL SYSTEMS

3.1.1 SHUTDOWN MARGIN (SDM)

3.1.1.1, 3.1.1.2

LCO 3.1.1 SDM shall be within the limits specified in the COLR.

3.1.1.1 Applicability, 3.1.1.2 Applicability

APPLICABILITY: MODE 2 with k_{eff} < 1.0,
MODES 3, 4, and 5.

ACTIONS

	CONDITION	REQUIRED ACTION	COMPLETION TIME
3.1.1.1 ACTION, 3.1.1.2 ACTION	A. SDM not within limits.	A.1 Initiate boration to restore SDM to within limits.	15 minutes

SURVEILLANCE REQUIREMENTS

	SURVEILLANCE		FREQUENCY	
4.1.1.1.1.e, 4.1.1.2.b	SR 3.1.1.1	Verify SDM to be within the limits specified in the COLR.	~~[24 hours~~ ~~OR~~ In accordance with the Surveillance Frequency Control Program ~~]~~	1

JUSTIFICATION FOR DEVIATIONS
ITS 3.1.1, SHUTDOWN MARGIN

1. ISTS SR 3.1.1.1 provides two options for controlling the Frequencies of Surveillance Requirements. SQN is proposing to control the Surveillance Frequencies under the Surveillance Frequency Control Program.

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

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Improved Standard Technical Specifications (ISTS) Bases Markup and Bases Justification for Deviations (JFDs)

B 3.1 REACTIVITY CONTROL SYSTEMS

B 3.1.1 SHUTDOWN MARGIN (SDM)

BASES

BACKGROUND

According to GDC 26 (Ref. 1), the reactivity control systems must be redundant and capable of holding the reactor core subcritical when shut down under cold conditions. Maintenance of the SDM ensures that postulated reactivity events will not damage the fuel.

SDM requirements provide sufficient reactivity margin to ensure that acceptable fuel design limits will not be exceeded for normal shutdown and anticipated operational occurrences (AOOs). As such, the SDM defines the degree of subcriticality that would be obtained immediately following the insertion or scram of all shutdown and control rods, assuming that the single rod cluster assembly of highest reactivity worth is fully withdrawn.

The system design requires that two independent reactivity control systems be provided, and that one of these systems be capable of maintaining the core subcritical under cold conditions. These requirements are provided by the use of movable control assemblies and soluble boric acid in the Reactor Coolant System (RCS). The Control Rod System can compensate for the reactivity effects of the fuel and water temperature changes accompanying power level changes over the range from full load to no load. In addition, the Control Rod System, together with the boration system, provides the SDM during power operation and is capable of making the core subcritical rapidly enough to prevent exceeding acceptable fuel damage limits, assuming that the rod of highest reactivity worth remains fully withdrawn. The soluble boron system can compensate for fuel depletion during operation and all xenon burnout reactivity changes and maintain the reactor subcritical under cold conditions.

During power operation, SDM control is ensured by operating with the shutdown banks fully withdrawn and the control banks within the limits of LCO 3.1.6, "Control Bank Insertion Limits." When the unit is in the shutdown and refueling modes, the SDM requirements are met by means of adjustments to the RCS boron concentration.

APPLICABLE SAFETY ANALYSES

The minimum required SDM is assumed as an initial condition in safety analyses. The safety analysis (Ref. 2) establishes a~~n~~ SDM that ensures specified acceptable fuel design limits are not exceeded for normal operation and AOOs, with the assumption of the highest worth rod stuck out on scram. For MODE 5, the primary safety analysis that relies on the SDM limits is the boron dilution analysis. 2

BASES

APPLICABLE SAFETY ANALYSES (continued)

The acceptance criteria for the SDM requirements are that specified acceptable fuel design limits are maintained. This is done by ensuring that:

a. The reactor can be made subcritical from all operating conditions, transients, and Design Basis Events,

b. The reactivity transients associated with postulated accident conditions are controllable within acceptable limits (departure from nucleate boiling ratio (DNBR), fuel centerline temperature limits for AOOs, and ≲ 280 cal/gm energy deposition for the rod ejection accident), and

c. The reactor will be maintained sufficiently subcritical to preclude inadvertent criticality in the shutdown condition.

The most limiting accident for the SDM requirements is based on a main steam line break (MSLB), as described in the accident analysis (Ref. 2). The increased steam flow resulting from a pipe break in the main steam system causes an increased energy removal from the affected steam generator (SG), and consequently the RCS. This results in a reduction of the reactor coolant temperature. The resultant coolant shrinkage causes a reduction in pressure. In the presence of a negative moderator temperature coefficient, this cooldown causes an increase in core reactivity. As RCS temperature decreases, the severity of an MSLB decreases until the MODE 5 value is reached. The most limiting MSLB, with respect to potential fuel damage before a reactor trip occurs, is a ~~guillotine~~ double ended break of a main steam line inside containment initiated at the end of core life. The positive reactivity addition from the moderator temperature decrease will terminate when the affected SG boils dry, thus terminating RCS heat removal and cooldown. Following the MSLB, a post trip return to power may occur; however, no fuel damage occurs as a result of the post trip return to power, and THERMAL POWER does not violate the Safety Limit (SL) requirement of SL 2.1.1. 1

In addition to the limiting MSLB transient, the SDM requirements must also protect against: 2

a. Inadvertent boron dilution,

b. An uncontrolled rod withdrawal from subcritical or low power condition,

BASES

APPLICABLE SAFETY ANALYSES (continued)

c. Startup of an inactive reactor coolant pump (RCP), and

d. Rod ejection.

Each of these events is discussed below.

In the boron dilution analysis, the required SDM defines the reactivity difference between an initial subcritical boron concentration and the corresponding critical boron concentration. These values, in conjunction with the configuration of the RCS and the assumed dilution flow rate, directly affect the results of the analysis. This event is most limiting at the beginning of core life, when critical boron concentrations are highest.

Depending on the system initial conditions and reactivity insertion rate, the uncontrolled rod withdrawal transient is terminated by either a high power level trip or ~~a high pressurizer pressure~~ an overtemperature ΔT trip. In all cases, power level, RCS pressure, linear heat rate, and the DNBR do not exceed allowable limits. 1

The startup of an inactive RCP will not result in a "cold water" criticality, even if the maximum difference in temperature exists between the SG and the core. The maximum positive reactivity addition that can occur due to an inadvertent RCP start is less than half the minimum required SDM. Startup of an idle RCP cannot, therefore, produce a return to power from the hot standby condition.

The ejection of a control rod rapidly adds reactivity to the reactor core, causing both the core power level and heat flux to increase with corresponding increases in reactor coolant temperatures and pressure. The ejection of a rod also produces a time dependent redistribution of core power.

SDM satisfies Criterion 2 of 10 CFR 50.36(c)(2)(ii). Even though it is not directly observed from the control room, SDM is considered an initial condition process variable because it is periodically monitored to ensure that the unit is operating within the bounds of accident analysis assumptions.

LCO

SDM is a core design condition that can be ensured during operation through control rod positioning (control and shutdown banks) and through the soluble boron concentration.

BASES

LCO (continued)

The MSLB (Ref. 2) and the boron dilution (Ref. 3) accidents are the most limiting analyses that establish the SDM value of the LCO. For MSLB accidents, if the LCO is violated, there is a potential to exceed the DNBR limit and to exceed 10 CFR 100, "Reactor Site Criteria," limits (Ref. 4). For the boron dilution accident, if the LCO is violated, the minimum required time assumed for operator action to terminate dilution may no longer be applicable.

APPLICABILITY

In MODE 2 with k_{eff} < 1.0 and in MODES 3, 4, and 5, the SDM requirements are applicable to provide sufficient negative reactivity to meet the assumptions of the safety analyses discussed above. In MODE 6, the shutdown reactivity requirements are given in LCO 3.9.1, "Boron Concentration." In MODES 1 and 2, SDM is ensured by complying with LCO 3.1.5, "Shutdown Bank Insertion Limits," and LCO 3.1.6.

ACTIONS

A.1

If the SDM requirements are not met, boration must be initiated promptly. A Completion Time of 15 minutes is adequate for an operator to correctly align and start the required systems and components. It is assumed that boration will be continued until the SDM requirements are met.

In the determination of the required combination of boration flow rate and boron concentration, there is no unique requirement that must be satisfied. Since it is imperative to raise the boron concentration of the RCS as soon as possible, the boron concentration should be a highly concentrated solution, such as that normally found in the boric acid ~~storage~~ tank, or the ~~borated~~ refueling water storage tank. The operator should borate with the best source available for the plant conditions. (1)

In determining the boration flow rate, the time in core life must be considered. For instance, the most difficult time in core life to increase the RCS boron concentration is at the beginning of cycle when the boron concentration may approach or exceed 2000 ppm. Assuming that a value of 1% Δk/k (1000 pcm) must be recovered and a boration flow rate of ~~[ ]~~ 50 gpm, it is possible to increase the boron concentration of the RCS by INSERT 1 ~~100 ppm in approximately 35 minutes. If a boron worth of 10 pcm/ppm is assumed, this combination of parameters will increase the SDM by 1% Δk/k. These boration parameters of [ ] gpm and [ ] ppm represent typical values and are provided for the purpose of offering a specific example~~. (3)

1

INSERT 1

147 ppm in approximately 46 minutes. If a boron worth of 6.8 pcm/ppm is assumed, this combination will increase the SDM by 1% $\Delta k/k$ or 1000 pcm. These boration parameters represent Sequoyah typical values and are provided for the purpose of offering a specific example.

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BASES

SURVEILLANCE REQUIREMENTS

SR 3.1.1.1

In MODES 1 and 2 with K_{eff} ≥ 1.0, SDM is verified by observing that the requirements of LCO 3.1.5 and LCO 3.1.6 are met. In the event that a rod is known to be untrippable, however, SDM verification must account for the worth of the untrippable rod as well as another rod of maximum worth. 2

MODE 2 with k_{eff} < 1.0 and in

In MODES 3, 4, and 5, the SDM is verified by performing a reactivity balance calculation, considering the listed reactivity effects: 6

a. RCS boron concentration,

b. Control bank position,

c. RCS average temperature,

d. Fuel burnup based on gross thermal energy generation,

e. Xenon concentration,

f. Samarium concentration, and

g. Isothermal temperature coefficient (ITC).

Using the ITC accounts for Doppler reactivity in this calculation because the reactor is subcritical, and the fuel temperature will be changing at the same rate as the RCS.

~~[The Frequency of 24 hours is based on the generally slow change in required boron concentration and the low probability of an accident occurring without the required SDM. This allows time for the operator to collect the required data, which includes performing a boron concentration analysis, and complete the calculation.~~ 4

~~OR~~

The Surveillance Frequency is controlled under the Surveillance Frequency Control Program.

~~-----REVIEWER'S NOTE-----~~
~~Plants controlling Surveillance Frequencies under a Surveillance Frequency Control Program should utilize the appropriate Frequency description, given above, and the appropriate choice of Frequency in the Surveillance Requirement.~~ 5
~~---]~~ 4

BASES

REFERENCES	1.	10 CFR 50, Appendix A, GDC 26.
	2.	FSAR, ~~Chapter [15]~~ Section 15.4.2. (U)
	3.	FSAR, ~~Chapter [15]~~ Section 15.2.4. (U)
	4.	10 CFR 100.

1 3

1 3

B 3.1 REACTIVITY CONTROL SYSTEMS

B 3.1.1 SHUTDOWN MARGIN (SDM)

BASES

BACKGROUND

According to GDC 26 (Ref. 1), the reactivity control systems must be redundant and capable of holding the reactor core subcritical when shut down under cold conditions. Maintenance of the SDM ensures that postulated reactivity events will not damage the fuel.

SDM requirements provide sufficient reactivity margin to ensure that acceptable fuel design limits will not be exceeded for normal shutdown and anticipated operational occurrences (AOOs). As such, the SDM defines the degree of subcriticality that would be obtained immediately following the insertion or scram of all shutdown and control rods, assuming that the single rod cluster assembly of highest reactivity worth is fully withdrawn.

The system design requires that two independent reactivity control systems be provided, and that one of these systems be capable of maintaining the core subcritical under cold conditions. These requirements are provided by the use of movable control assemblies and soluble boric acid in the Reactor Coolant System (RCS). The Control Rod System can compensate for the reactivity effects of the fuel and water temperature changes accompanying power level changes over the range from full load to no load. In addition, the Control Rod System, together with the boration system, provides the SDM during power operation and is capable of making the core subcritical rapidly enough to prevent exceeding acceptable fuel damage limits, assuming that the rod of highest reactivity worth remains fully withdrawn. The soluble boron system can compensate for fuel depletion during operation and all xenon burnout reactivity changes and maintain the reactor subcritical under cold conditions.

During power operation, SDM control is ensured by operating with the shutdown banks fully withdrawn and the control banks within the limits of LCO 3.1.6, "Control Bank Insertion Limits." When the unit is in the shutdown and refueling modes, the SDM requirements are met by means of adjustments to the RCS boron concentration.

APPLICABLE SAFETY ANALYSES

The minimum required SDM is assumed as an initial condition in safety analyses. The safety analysis (Ref. 2) establishes a~~n~~ SDM that ensures specified acceptable fuel design limits are not exceeded for normal operation and AOOs, with the assumption of the highest worth rod stuck out on scram. For MODE 5, the primary safety analysis that relies on the SDM limits is the boron dilution analysis. 2

BASES

APPLICABLE SAFETY ANALYSES (continued)

The acceptance criteria for the SDM requirements are that specified acceptable fuel design limits are maintained. This is done by ensuring that:

a. The reactor can be made subcritical from all operating conditions, transients, and Design Basis Events,

b. The reactivity transients associated with postulated accident conditions are controllable within acceptable limits (departure from nucleate boiling ratio (DNBR), fuel centerline temperature limits for AOOs, and $\lesssim$ 280 cal/gm energy deposition for the rod ejection accident), and

c. The reactor will be maintained sufficiently subcritical to preclude inadvertent criticality in the shutdown condition.

The most limiting accident for the SDM requirements is based on a main steam line break (MSLB), as described in the accident analysis (Ref. 2). The increased steam flow resulting from a pipe break in the main steam system causes an increased energy removal from the affected steam generator (SG), and consequently the RCS. This results in a reduction of the reactor coolant temperature. The resultant coolant shrinkage causes a reduction in pressure. In the presence of a negative moderator temperature coefficient, this cooldown causes an increase in core reactivity. As RCS temperature decreases, the severity of an MSLB decreases until the MODE 5 value is reached. The most limiting MSLB, with respect to potential fuel damage before a reactor trip occurs, is a ~~guillotine~~ double ended break of a main steam line inside containment initiated at the end of core life. The positive reactivity addition from the moderator temperature decrease will terminate when the affected SG boils dry, thus terminating RCS heat removal and cooldown. Following the MSLB, a post trip return to power may occur; however, no fuel damage occurs as a result of the post trip return to power, and THERMAL POWER does not violate the Safety Limit (SL) requirement of SL 2.1.1. 1

In addition to the limiting MSLB transient, the SDM requirement s must also protect against: 2

a. Inadvertent boron dilution,

b. An uncontrolled rod withdrawal from subcritical or low power condition,

BASES

APPLICABLE SAFETY ANALYSES (continued)

c. Startup of an inactive reactor coolant pump (RCP), and

d. Rod ejection.

Each of these events is discussed below.

In the boron dilution analysis, the required SDM defines the reactivity difference between an initial subcritical boron concentration and the corresponding critical boron concentration. These values, in conjunction with the configuration of the RCS and the assumed dilution flow rate, directly affect the results of the analysis. This event is most limiting at the beginning of core life, when critical boron concentrations are highest.

Depending on the system initial conditions and reactivity insertion rate, the uncontrolled rod withdrawal transient is terminated by either a high power level trip or ~~a high pressurizer pressure~~ an overtemperature ΔT trip. In all cases, power level, RCS pressure, linear heat rate, and the DNBR do not exceed allowable limits. 1

The startup of an inactive RCP will not result in a "cold water" criticality, even if the maximum difference in temperature exists between the SG and the core. The maximum positive reactivity addition that can occur due to an inadvertent RCP start is less than half the minimum required SDM. Startup of an idle RCP cannot, therefore, produce a return to power from the hot standby condition.

The ejection of a control rod rapidly adds reactivity to the reactor core, causing both the core power level and heat flux to increase with corresponding increases in reactor coolant temperatures and pressure. The ejection of a rod also produces a time dependent redistribution of core power.

SDM satisfies Criterion 2 of 10 CFR 50.36(c)(2)(ii). Even though it is not directly observed from the control room, SDM is considered an initial condition process variable because it is periodically monitored to ensure that the unit is operating within the bounds of accident analysis assumptions.

LCO

SDM is a core design condition that can be ensured during operation through control rod positioning (control and shutdown banks) and through the soluble boron concentration.

BASES

LCO (continued)

The MSLB (Ref. 2) and the boron dilution (Ref. 3) accidents are the most limiting analyses that establish the SDM value of the LCO. For MSLB accidents, if the LCO is violated, there is a potential to exceed the DNBR limit and to exceed 10 CFR 100, "Reactor Site Criteria," limits (Ref. 4). For the boron dilution accident, if the LCO is violated, the minimum required time assumed for operator action to terminate dilution may no longer be applicable.

APPLICABILITY

In MODE 2 with k_{eff} < 1.0 and in MODES 3, 4, and 5, the SDM requirements are applicable to provide sufficient negative reactivity to meet the assumptions of the safety analyses discussed above. In MODE 6, the shutdown reactivity requirements are given in LCO 3.9.1, "Boron Concentration." In MODES 1 and 2, SDM is ensured by complying with LCO 3.1.5, "Shutdown Bank Insertion Limits," and LCO 3.1.6.

ACTIONS

A.1

If the SDM requirements are not met, boration must be initiated promptly. A Completion Time of 15 minutes is adequate for an operator to correctly align and start the required systems and components. It is assumed that boration will be continued until the SDM requirements are met.

In the determination of the required combination of boration flow rate and boron concentration, there is no unique requirement that must be satisfied. Since it is imperative to raise the boron concentration of the RCS as soon as possible, the boron concentration should be a highly concentrated solution, such as that normally found in the boric acid ~~storage~~ tank, or the ~~borated~~ refueling water storage tank. The operator should borate with the best source available for the plant conditions. 1

In determining the boration flow rate, the time in core life must be considered. For instance, the most difficult time in core life to increase the RCS boron concentration is at the beginning of cycle when the boron concentration may approach or exceed 2000 ppm. Assuming that a value of 1% Δk/k (1000 pcm) must be recovered and a boration flow rate of ~~[ ]~~ 50 gpm, it is possible to increase the boron concentration of the RCS by INSERT 1 ~~100 ppm in approximately 35 minutes. If a boron worth of 10 pcm/ppm is assumed, this combination of parameters will increase the SDM by 1% Δk/k. These boration parameters of [ ] gpm and [ ] ppm represent typical values and are provided for the purpose of offering a specific example~~. 3

1

INSERT 1

156 ppm in approximately 48 minutes. If a boron worth of 6.4 pcm/ppm is assumed, this combination will increase the SDM by 1% $\Delta k/k$ or 1000 pcm. These boration parameters represent Sequoyah typical values and are provided for the purpose of offering a specific example.

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BASES

SURVEILLANCE REQUIREMENTS

SR 3.1.1.1

In MODES 1 and 2 with $K_{eff} \geq 1.0$, SDM is verified by observing that the requirements of LCO 3.1.5 and LCO 3.1.6 are met. In the event that a rod is known to be untrippable, however, SDM verification must account for the worth of the untrippable rod as well as another rod of maximum worth. 2

MODE 2 with k_{eff} < 1.0 and in

In MODES 3, 4, and 5, the SDM is verified by performing a reactivity balance calculation, considering the listed reactivity effects: 6

a. RCS boron concentration,

b. Control bank position,

c. RCS average temperature,

d. Fuel burnup based on gross thermal energy generation,

e. Xenon concentration,

f. Samarium concentration, and

g. Isothermal temperature coefficient (ITC).

Using the ITC accounts for Doppler reactivity in this calculation because the reactor is subcritical, and the fuel temperature will be changing at the same rate as the RCS.

[~~The Frequency of 24 hours is based on the generally slow change in required boron concentration and the low probability of an accident occurring without the required SDM. This allows time for the operator to collect the required data, which includes performing a boron concentration analysis, and complete the calculation.~~ 4

~~OR~~

The Surveillance Frequency is controlled under the Surveillance Frequency Control Program.

~~-----REVIEWER'S NOTE-----~~
~~Plants controlling Surveillance Frequencies under a Surveillance Frequency Control Program should utilize the appropriate Frequency description, given above, and the appropriate choice of Frequency in the Surveillance Requirement.~~ 5
~~----------~~] 4

BASES

REFERENCES

1. 10 CFR 50, Appendix A, GDC 26.

2. FSAR, ~~Chapter [15]~~ Section 15.4.2. U 1 3

3. FSAR, ~~Chapter [15]~~ Section 15.2.4. 1 3

4. 10 CFR 100.

JUSTIFICATION FOR DEVIATIONS
ITS 3.1.1 BASES, SHUTDOWN MARGIN (SDM)

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

2. Editorial changes made for enhanced clarity/consistency.

3. The ISTS contains bracketed information and/or values that are generic to Westinghouse vintage plants. The brackets are removed and the proper plant specific information/value is inserted to reflect the current licensing basis.

4. ISTS SR 3.1.1.1 Bases provides two options for controlling the Frequencies of Surveillance Requirements. SQN is proposing to control the Surveillance Frequencies under the Surveillance Frequency Control Program. Additionally, the Frequency description which is being removed will be included in the Surveillance Frequency Control Program.

5. The Reviewer's Note has been deleted. This information is for the NRC reviewer to be keyed into what is needed to meet this requirement. This Note is not meant to be retained in the final version of the plant specific submittal.

6. Changes are made to be consistent with the Specification.

Specific No Significant Hazards Considerations (NSHCs)

DETERMINATION OF NO SIGNIFICANT HAZARDS CONSIDERATIONS
ITS 3.1.1, SHUTDOWN MARGIN

There are no specific No Significant Hazards Considerations for this Specification.

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ATTACHMENT 2

ITS 3.1.2, CORE REACTIVITY

Current Technical Specification (CTS) Markup and Discussion of Changes (DOCs)

ITS A01 ITS 3.1.2

3/4.1 REACTIVITY CONTROL SYSTEMS

3/4.1.1 BORATION CONTROL

~~SHUTDOWN MARGIN - T_{avg} Greater Than 200°F~~ Core Reactivity A02

LIMITING CONDITION FOR OPERATION

Add proposed LCO 3.1.2 A02

3.1.1.1 The SHUTDOWN MARGIN shall be greater than or equal to 1.6% delta k/k for 4 loop operation. See ITS 3.1.1

Applicability APPLICABILITY: MODES 1, 2* ~~, 3, and 4~~. L01

ACTION:

Add proposed ACTIONS A and B L02

With the SHUTDOWN MARGIN less than 1.6% delta k/k, immediately initiate and continue boration at greater than or equal to 35 gpm of a solution containing greater than or equal to 6120 ppm boron or equivalent until the required SHUTDOWN MARGIN is restored. See ITS 3.1.1

SURVEILLANCE REQUIREMENTS

SR 3.1.2.1 4.1.1.1.1 The SHUTDOWN MARGIN shall be determined to be greater than or equal to 1.6% delta k/k:

a. Within one hour after detection of an inoperable control rod(s) and at least once per 12 hours thereafter while the rod(s) is inoperable. See ITS 3.1.4 If the inoperable control rod is immovable or untrippable, the above required SHUTDOWN MARGIN shall be verified acceptable with an increased allowance for the withdrawn worth of the immovable or untrippable control rod(s). See ITS 3.1.1

b. When in MODE 1 or MODE 2 with K_{eff} greater than or equal to 1.0, at least once per 12 hours by verifying that control bank withdrawal is within the limits of Specification 3.1.3.6.

c. When in MODE 2 with K_{eff} less than 1.0, within 4 hours prior to achieving reactor criticality by verifying that the predicted critical control rod position is within the limits of Specification 3.1.3.6. See ITS 3.1.6

*See Special Test Exception 3.10.1 See ITS 3.1.1

ITS A01 ITS 3.1.2

REACTIVITY CONTROL SYSTEMS

SURVEILLANCE REQUIREMENTS (Continued)

d. Prior to initial operation above 5% RATED THERMAL POWER after each fuel loading, by consideration of the factors of e below, with the control banks at the maximum insertion limit of Specification 3.1.3.6. See ITS 3.1.1

SR 3.1.2.1 e. ~~When in MODES 3 or 4~~, [Prior to entering MODE 1 after refueling and] at least once per 24 hours ~~by consideration of the following factors:~~ L03 LA02

~~1. Reactor coolant system boron concentration,~~

~~2. Control rod position,~~

~~3. Reactor coolant system average temperature,~~

~~4. Fuel burnup based on gross thermal energy generation,~~

~~5. Xenon concentration, and~~

~~6. Samarium concentration.~~

SR 3.1.2.1 4.1.1.1.2 The overall core reactivity balance shall be compared to predicted values to demonstrate agreement within ± 1% delta k/k ~~at least once per 31 Effective Full Power Days (EFPD)~~ [In accordance with the Surveillance Frequency Control Program] L03 LA01. ~~This comparison shall consider at least those factors stated in Specification 4.1.1.1.1.e, above.~~ LA02

SR 3.1.2.1 Note The predicted reactivity values ~~shall~~ [may] be adjusted (normalized) to correspond to the actual core conditions prior to exceeding a fuel burnup of 60 Effective Full Power Days after each fuel loading. L04

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ITS A01 ITS 3.1.2

3/4.1 REACTIVITY CONTROL SYSTEMS

3/4.1.1 BORATION CONTROL

~~SHUTDOWN MARGIN - T_{avg} ≥ 200°F~~ Core Reactivity A02

LIMITING CONDITION FOR OPERATION

Add proposed LCO 3.1.2 A02

3.1.1.1 The SHUTDOWN MARGIN shall be greater than or equal to 1.6% delta k/k for 4 loop operation. See ITS 3.1.1

Applicability APPLICABILITY: MODES 1, 2*~~, 3, and 4~~. L01

ACTION:

Add proposed ACTIONS A and B L02

With the SHUTDOWN MARGIN less than 1.6% delta k/k, immediately initiate and continue boration at greater than or equal to 35 gpm of a solution containing greater than or equal to 6120 ppm boron or equivalent until the required SHUTDOWN MARGIN is restored. See ITS 3.1.1

SURVEILLANCE REQUIREMENTS

SR 3.1.2.1 4.1.1.1.1 The SHUTDOWN MARGIN shall be determined to be greater than or equal to 1.6% delta k/k:

a. Within one hour after detection of an inoperable control rod(s) and at least once per 12 hours thereafter while the rod(s) is inoperable. See ITS 3.1.4 If the inoperable control rod is immovable or untrippable, the above required SHUTDOWN MARGIN shall be verified acceptable with an increased allowance for the withdrawn worth of the immovable or untrippable control rod(s). See ITS Chapter 1.0

b. When in MODE 1 or MODE 2 with K_{eff} greater than or equal to 1.0, at least once per 12 hours by verifying that control bank withdrawal is within the limits of Specification 3.1.3.6.

c. When in MODE 2, with K_{eff} less than 1.0, within 4 hours prior to achieving reactor criticality by verifying that the predicted critical control rod position is within the limits of Specification 3.1.3.6. See ITS 3.1.6

d. Prior to initial operation above 5% RATED THERMAL POWER after each fuel loading, by consideration of the factors of e below, with the control banks at the maximum insertion limit of Specification 3.1.3.6. See ITS 3.1.1

* See Special Test Exception 3.10.1 See ITS 3.1.1

A01

ITS

ITS 3.1.2

REACTIVITY CONTROL SYSTEMS

SURVEILLANCE REQUIREMENTS (Continued)

See ITS 3.1.1

SR 3.1.2.1

e. ~~When in MODES 3 or 4~~, at least once per 24 hours ~~by consideration of the following factors:~~ [Prior to entering MODE 1 after refueling and — L03]

~~1. Reactor coolant system boron concentration,~~

~~2. Control rod position,~~

~~3. Reactor coolant system average temperature,~~ LA02

~~4. Fuel burnup based on gross thermal energy generation,~~

~~5. Xenon concentration, and~~

~~6. Samarium concentration.~~

L03

In accordance with the Surveillance Frequency Control Program — LA01

SR 3.1.2.1

4.1.1.1.2 The overall core reactivity balance shall be compared to predicted values to demonstrate agreement within ± 1% delta k/k ~~at least once per 31 Effective Full Power Days (EFPD)~~. ~~This comparison shall consider at least those factors stated in Specification 4.1.1.1.1.e, above.~~ The predicted reactivity values ~~shall~~ [may — L04] be adjusted (normalized) to correspond to the actual core conditions prior to exceeding a fuel burnup of 60 Effective Full Power Days after each fuel loading. LA02

SR 3.1.2.1 Note

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DISCUSSION OF CHANGES
ITS 3.1.2, CORE REACTIVITY

ADMINISTRATIVE CHANGES

A01 In the conversion of the Sequoyah Nuclear Plant (SQN) Current Technical Specifications (CTS) to the plant specific Improved Technical Specifications (ITS), certain changes (wording preferences, editorial changes, reformatting, revised numbering, etc.) are made to obtain consistency with NUREG - 1431, Rev. 4.0, "Standard Technical Specifications - Westinghouse Plants" (ISTS) and additional Technical Specification Task Force (TSTF) travelers included in this submittal.

These changes are designated as administrative changes and are acceptable because they do not result in technical changes to the CTS.

A02 CTS 4.1.1.1.2 requires the overall core reactivity balance to be compared to predicted values to demonstrate agreement within ± 1% Δk/k. However, this Surveillance is currently part of the SHUTDOWN MARGIN Specification. Additionally, CTS 3.1.1.1 is titled SHUTDOWN MARGIN – T_{avg} Greater Than 200°F. A new LCO, ITS LCO 3.1.2, requires the measured core reactivity to be within ± 1% Δk/k of predicted values. Furthermore, ITS 3.1.2 is titled Core Reactivity. This changes the CTS by having a separate Specification for the Core Reactivity requirement and changing the title.

This change is acceptable because the requirements have not changed. Converting the requirement from a Surveillance in the SHUTDOWN MARGIN specification to an LCO is consistent with the ITS format and content guidance. Any technical changes resulting from this change are discussed in other DOCs. This change is designated as administrative because it does not result in a technical change to the CTS.

MORE RESTRICTIVE CHANGES

None

RELOCATED SPECIFICATIONS

None

REMOVED DETAIL CHANGES

LA01 *(Type 5 – Removal of SR Frequency to the Surveillance Frequency Control Program)* CTS requires the measured core reactivity to be determined to be within ± 1% Δk/k of the predicted value at least every 31 Effective Full Power Days (EFPD). ITS SR 3.1.2.1 requires a similar Surveillance and specifies the periodic Frequency as, "In accordance with the Surveillance Frequency Control Program." This changes the CTS by moving the specified Frequencies for this SR and associated Bases to the Surveillance Frequency Control Program.

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DISCUSSION OF CHANGES
ITS 3.1.2, CORE REACTIVITY

The removal of these details related to Surveillance Requirement Frequencies from the Technical Specifications is acceptable, because this type of information is not necessary to be included in the Technical Specifications to provide adequate protection of public health and safety. The existing Surveillance Frequencies are removed from Technical Specifications and placed under licensee control pursuant to the methodology described in NEI 04-10. A new program (Surveillance Frequency Control Program) is being added to the Administrative Controls section of the Technical Specifications describing the control of Surveillance Frequencies. The surveillance test requirements remain in the Technical Specifications. The control of changes to the Surveillance Frequencies will be in accordance with the Surveillance Frequency Control Program. The Program shall ensure that Surveillance Requirements specified in the Technical Specifications are performed at intervals sufficient to assure the associated Limiting Conditions for Operation are met. This change is designated as a less restrictive removal of detail change, because the Surveillance Frequencies are being removed from the Technical Specifications.

LA02 *(Type 3 – Removing Procedural Details for Meeting TS Requirements or Reporting Requirements)* CTS 4.1.1.1.2 requires comparison of the actual and predicted core reactivity balance and specifically requires consideration of at least those factors stated in Specification 4.1.1.1.1.e. CTS 4.1.1.1.1.e requires determination of SDM and requires the consideration of the following factors: reactor coolant system boron concentration, control rod position, reactor coolant system average temperature, fuel burnup based on gross thermal energy generation, xenon concentration, and samarium concentration. ITS SR 3.1.2.1 requires comparison of the actual and predicted core reactivity, but does not describe the factors that must be considered in the calculation. This information is relocated to the Bases. This changes the CTS by removing details on how the core reactivity balance comparison calculation is performed from the CTS and placing the information in the Bases.

The removal of these details for performing Surveillance Requirements from the Technical Specifications is acceptable because this type of information is not necessary to be included in the Technical Specifications to provide adequate protection of public health and safety. This ITS still retains the requirement that the core reactivity balance comparison be within ± 1% $\Delta k/k$. The details of how this comparison is calculated do not need to appear in the Specification in order for the requirement to apply. Also, this change is acceptable because these types of procedural details will be adequately controlled in the ITS Bases. Changes to the Bases are controlled by the Technical Specification Bases Control Program in Chapter 5. This program provides for the evaluation of changes to ensure the Bases are properly controlled. This change is designated as a less restrictive removal of detail change because procedural details for meeting Technical Specification requirements are being removed from the CTS.

<u>LESS RESTRICTIVE CHANGES</u>

L01 *(Category 2 – Relaxation of Applicability)* CTS 4.1.1.1.2 is applicable in MODES 1, 2, 3, and 4. ITS 3.1.2 is applicable in MODES 1 and 2. This changes the CTS

DISCUSSION OF CHANGES
ITS 3.1.2, CORE REACTIVITY

by reducing the applicable MODES in which the core reactivity requirement must be met.

The purpose of CTS Surveillance 4.1.1.1.2 is to verify the core design by comparing the actual and predicted core reactivity. This change is acceptable because the requirements continue to ensure that the process variables are maintained in the MODES and other specified conditions assumed in the safety analysis and licensing basis. The core reactivity balance can only be determined when the reactor is critical (MODES 1 and 2). Additionally, after performing the Surveillance once after each refueling and after 60 EFPD, the Surveillance Frequency is once per 31 EFPD, which continues to accrue when the reactor is critical. Therefore, reducing the applicable MODES from MODES 1, 2, 3, and 4 to MODES 1 and 2 does not result in a reduction of the verification of this important measure of core design accuracy. This change is designated as less restrictive because the LCO requirements are applicable in fewer operating conditions than in the CTS.

L02 *(Category 4 – Relaxation of Required Action)* CTS 3.1.1.1 does not contain ACTIONS to follow if the core reactivity balance Surveillance is not met. If the core reactivity balance Surveillance is not met, CTS LCO 3.0.3 would be entered. CTS LCO 3.0.3 requires the plant to be in MODE 3 within 7 hours, MODE 4 within 13 hours, and MODE 5 within 37 hours. ITS 3.1.2 contains ACTIONS to follow if the core reactivity LCO is not met. If the LCO is not met, 7 days are provided to re-evaluate the core design and safety analysis, to determine that the reactor core is acceptable for continued operation, and to establish appropriate operating restrictions and SRs. If these actions are not completed within the 7 days, the plant must be placed in MODE 3 within 6 hours. This changes the CTS by providing 7 days to evaluate and provide compensatory measures for not meeting the core reactivity balance requirement and then requiring entry into MODE 3 instead of requiring an immediate shutdown and entry into MODE 5.

The purpose of CTS 4.1.1.1.2 is to verify the accuracy of the core design by comparing the predicted and actual core reactivity throughout core life. This change is acceptable because the Required Actions are used to establish remedial measures that must be taken in response to the degraded conditions in order to minimize risk associated with continued operation while providing time to repair inoperable features. The Required Actions are consistent with safe operation under the specified Condition, considering the operability status of the redundant systems of required features, the capacity and capability of remaining features, a reasonable time for repairs or replacement of required features, and the low probability of a DBA occurring during the repair period. Should the core reactivity balance requirement not be met, time is required to determine the cause of the disagreement and what adjustments may be needed to the operating conditions of the core. The startup physics testing program is used to verify most of the critical core design parameters, such as control rods worth, boron worth, and moderator temperature coefficient. In addition, there is considerable conservatism in the application of these values in the accident analyses. Therefore, allowing a time to evaluate the difference and make any adjustments to the operational controls is acceptable. The 7 day Completion time is reasonable considering the complexity of the evaluations and the time to meet administrative requirements, such as 10 CFR 50.59 safety evaluation

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DISCUSSION OF CHANGES
ITS 3.1.2, CORE REACTIVITY

preparation and approval. If it cannot be determined within 7 days that the core is acceptable for continued operation, the unit must be shutdown. This change is designated as less restrictive because less stringent Required Actions are being applied in the ITS than were applied in the CTS.

L03 *(Category 7 – Relaxation of Surveillance Frequency)* CTS 4.1.1.1.2 requires comparison of the actual and predicted core reactivity balance at least once per 31 Effective Full Power Days (EFPD) and specifically requires consideration of at least those factors stated in Specification 4.1.1.1.1.e. CTS 4.1.1.1.2 also requires the predicted reactivity values to be adjusted (normalized) to correspond to the actual core conditions prior to exceeding a fuel burnup of 60 EFPD after each fuel loading. CTS 4.1.1.1.1.e requires the determination of SDM by considering the reactor coolant system boron concentration, control rod position, reactor coolant system average temperature, fuel burnup based on gross thermal energy generation, xenon concentration, and samarium concentration in MODE 3 or 4. ITS SR 3.1.2.1 requires verifying the measured core reactivity is within ± 1 % Δ k/k of the predicted core reactivity values once prior to entering MODE 1 after each refueling and every 31 EFPD thereafter after 60 EFPD. This changes the CTS by not requiring the periodic, at-power core reactivity comparison until core burnup reaches 60 EFPD. Additionally, it allows the initial verification to be performed in MODE 2.

The purpose of CTS 4.1.1.1.2 is to verify the agreement between the actual and predicted core reactivity. This change is acceptable because the new Surveillance Frequency has been evaluated to ensure it provides an acceptable level of equipment reliability. The CTS and ITS require the predicted core reactivity values to be normalized to the actual values prior to exceeding 60 EFPD of core burnup. This allows sufficient time for core conditions to reach steady state, but prevents operation for a large fraction of the fuel cycle without establishing a benchmark for the design calculations. The required subsequent Frequency of 31 EFPD, following the initial 60 EFPD after fuel loading, is acceptable, based on the slow rate of core reactivity changes resulting from fuel depletion and the presence of other indicators (QPTR, AFD, etc.) for prompt indication of an anomaly. In addition, CTS 4.1.1.1.1.e Frequency has been changed to ensure core reactivity is within limits prior to entering MODE 1 after each refueling. This change has been designated as less restrictive because Surveillances will be performed less frequently and in different MODES of operation under the ITS than under the CTS.

L04 *(Category 6 – Relaxation of Surveillance Requirement Acceptance Criteria)* CTS 4.1.1.1.2 requires, in part, that the predicted reactivity values shall be adjusted (normalized) to correspond to the actual core conditions prior to exceeding a fuel burnup of 60 Effective Full Power Days (EFPD) after each fuel loading. ITS SR 3.1.2.1 contains an SR Note that states the adjustment "may" be performed prior to exceeding a fuel burnup of 60 EFPD after each fuel loading. This changes the CTS by stating that the normalization may be performed prior to 60 EFPD after each fuel loading.

The purpose of adjusting the predicted reactivity values to the core conditions is to allow benchmarking of the design calculations. Making this adjustment 60 EFPD of operation allows sufficient time for the core conditions to reach

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ITS 3.1.2, CORE REACTIVITY

steady state. This change is acceptable because the expectation is to perform the adjusting of the predicted reactivity values to the core conditions. ITS SR 3.1.2.1 still allows the adjustment to take place prior to the 60 EFPD after each fuel loading. This change is designated as less restrictive because less stringent Surveillance Requirements are being applied in the ITS than were applied in the CTS.

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Improved Standard Technical Specifications (ISTS) Markup and Justification for Deviations (JFDs)

3.1 REACTIVITY CONTROL SYSTEMS

3.1.2 Core Reactivity

DOC A02

LCO 3.1.2 The measured core reactivity shall be within ± 1% Δk/k of predicted values.

Applicability

APPLICABILITY: MODES 1 and 2.

ACTIONS

	CONDITION	REQUIRED ACTION	COMPLETION TIME
DOC L02	A. Measured core reactivity not within limit.	A.1 Re-evaluate core design and safety analysis, and determine that the reactor core is acceptable for continued operation. AND A.2 Establish appropriate operating restrictions and SRs.	7 days 7 days
DOC L02	B. Required Action and associated Completion Time not met.	B.1 Be in MODE 3.	6 hours

CTS

SURVEILLANCE REQUIREMENTS

	SURVEILLANCE		FREQUENCY	
4.1.1.1.1.e, 4.1.1.1.2	SR 3.1.2.1	---------------------------NOTE--------------------------------- The predicted reactivity values may be adjusted (normalized) to correspond to the measured core reactivity prior to exceeding a fuel burnup of 60 effective full power days (EFPD) after each fuel loading. --- Verify measured core reactivity is within ± 1% Δk/k of predicted values.	Once prior to entering MODE 1 after each refueling AND --------NOTE-------- Only required after 60 EFPD ----------------------- ~~[31 EFPD thereafter~~ ~~OR~~ In accordance with the Surveillance Frequency Control Program ~~]~~	2 2

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3.1 REACTIVITY CONTROL SYSTEMS

3.1.2 Core Reactivity

DOC A02

LCO 3.1.2 The measured core reactivity shall be within ± 1% Δk/k of predicted values.

Applicability

APPLICABILITY: MODES 1 and 2.

ACTIONS

	CONDITION	REQUIRED ACTION	COMPLETION TIME
DOC L02	A. Measured core reactivity not within limit.	A.1 Re-evaluate core design and safety analysis, and determine that the reactor core is acceptable for continued operation. AND A.2 Establish appropriate operating restrictions and SRs.	7 days 7 days
DOC L02	B. Required Action and associated Completion Time not met.	B.1 Be in MODE 3.	6 hours

CTS

SURVEILLANCE REQUIREMENTS

CTS	SURVEILLANCE		FREQUENCY	
4.1.1.1.1.e, 4.1.1.1.2	SR 3.1.2.1	---------------------------NOTE--------------------------------- The predicted reactivity values may be adjusted (normalized) to correspond to the measured core reactivity prior to exceeding a fuel burnup of 60 effective full power days (EFPD) after each fuel loading. --- Verify measured core reactivity is within ± 1% Δk/k of predicted values.	Once prior to entering MODE 1 after each refueling AND --------NOTE-------- Only required after 60 EFPD ----------------------- [31 EFPD thereafter OR In accordance with the Surveillance Frequency Control Program]	2 2

JUSTIFICATION FOR DEVIATIONS
ITS 3.1.2, CORE REACTIVITY

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

2. ISTS SR 3.1.2.1 provides two options for controlling the Frequencies of Surveillance Requirements. SQN is proposing to control the Surveillance Frequencies under the Surveillance Frequency Control Program.

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Improved Standard Technical Specifications (ISTS) Bases Markup and Bases Justification for Deviations (JFDs)

B 3.1 REACTIVITY CONTROL SYSTEMS

B 3.1.2 Core Reactivity

BASES

BACKGROUND

According to GDC 26, GDC 28, and GDC 29 (Ref. 1), reactivity shall be controllable, such that subcriticality is maintained under cold conditions, and acceptable fuel design limits are not exceeded during normal operation and anticipated operational occurrences. Therefore, reactivity balance is used as a measure of the predicted versus measured core reactivity during power operation. The periodic confirmation of core reactivity is necessary to ensure that Design Basis Accident (DBA) and transient safety analyses remain valid. A large reactivity difference could be the result of unanticipated changes in fuel, control rod worth, or operation at conditions not consistent with those assumed in the predictions of core reactivity, and could potentially result in a loss of SDM or violation of acceptable fuel design limits. Comparing predicted versus measured core reactivity validates the nuclear methods used in the safety analysis and supports the SDM demonstrations (LCO 3.1.1, "SHUTDOWN MARGIN (SDM)") in ensuring the reactor can be brought safely to cold, subcritical conditions.

When the reactor core is critical or in normal power operation, a reactivity balance exists and the net reactivity is zero. A comparison of predicted and measured reactivity is convenient under such a balance, since parameters are being maintained relatively stable under steady state power conditions. The positive reactivity inherent in the core design is balanced by the negative reactivity of the control components, thermal feedback, neutron leakage, and materials in the core that absorb neutrons, such as burnable absorbers producing zero net reactivity. Excess reactivity can be inferred from the boron letdown curve (or critical boron curve), which provides an indication of the soluble boron concentration in the Reactor Coolant System (RCS) versus cycle burnup. Periodic measurement of the RCS boron concentration for comparison with the predicted value with ~~other~~ specific variables ~~fixed~~ (such as rod height, temperature, pressure, and power), provides a convenient method of ensuring that core reactivity is within design expectations and that the calculational models used to generate the safety analysis are adequate. 5

In order to achieve the required fuel cycle energy output, the uranium enrichment, in the new fuel loading and in the fuel remaining from the previous cycle, provides excess positive reactivity beyond that required to sustain steady state operation throughout the cycle. When the reactor is critical at RTP and moderator temperature, the excess positive reactivity is compensated by burnable absorbers (if any), control rods, whatever neutron poisons (mainly xenon and samarium) are present in the fuel, and the RCS boron concentration.

BASES

BACKGROUND (continued)

When the core is producing THERMAL POWER, the fuel is being depleted and excess reactivity is decreasing. As the fuel depletes, the RCS boron concentration is reduced to decrease negative reactivity and maintain constant THERMAL POWER. The boron letdown curve is based on steady state operation at RTP. Therefore, deviations from the predicted boron letdown curve may indicate deficiencies in the design analysis, deficiencies in the calculational models, or abnormal core conditions, and must be evaluated.

APPLICABLE SAFETY ANALYSES

The acceptance criteria for core reactivity are that the reactivity balance limit ensures plant operation is maintained within the assumptions of the safety analyses.

Accurate prediction of core reactivity is either an explicit or implicit assumption in the accident analysis evaluations. Every accident evaluation (Ref. 2) is, therefore, dependent upon accurate evaluation of core reactivity. In particular, SDM and reactivity transients, such as control rod withdrawal accidents or rod ejection accidents, are very sensitive to accurate prediction of core reactivity. These accident analysis evaluations rely on computer codes that have been qualified against available test data, operating plant data, and analytical benchmarks. Monitoring reactivity balance additionally ensures that the nuclear methods provide an accurate representation of the core reactivity.

Design calculations and safety analyses are performed for each fuel cycle for the purpose of predetermining reactivity behavior and the RCS boron concentration requirements for reactivity control during fuel depletion.

The comparison between measured and predicted initial core reactivity provides a normalization for the calculational models used to predict core reactivity. If the measured and predicted RCS boron concentrations for identical core conditions at beginning of cycle ~~(BOC)~~ life (BOL) do not agree, then the assumptions used in the reload cycle design analysis or the calculational models used to predict soluble boron requirements may not be accurate. If reasonable agreement between measured and predicted core reactivity exists at ~~BOC~~ BOL, then the prediction may be normalized to the measured boron concentration. Thereafter, any significant deviations in the measured boron concentration from the predicted boron letdown curve that develop during fuel depletion may be an indication that the calculational model is not adequate for core burnups beyond ~~BOC~~ BOL, or that an unexpected change in core conditions has occurred. 1 1 1

BASES

APPLICABLE SAFETY ANALYSES (continued)

The normalization of predicted RCS boron concentration to the measured value is typically performed after reaching RTP following startup from a refueling outage, with the control rods in their normal positions for power operation. The normalization is performed at ~~BOC~~ BOL conditions, so that core reactivity relative to predicted values can be continually monitored and evaluated as core conditions change during the cycle. 1

Core reactivity satisfies Criterion 2 of 10 CFR 50.36(c)(2)(ii).

LCO

Long term core reactivity behavior is a result of the core physics design and cannot be easily controlled once the core design is fixed. During operation, therefore, the LCO can only be ensured through measurement and tracking, and appropriate actions taken as necessary. Large differences between actual and predicted core reactivity may indicate that the assumptions of the DBA and transient analyses are no longer valid, or that the uncertainties in the Nuclear Design Methodology are larger than expected. A limit on the reactivity balance of ± 1% Δk/k has been established based on engineering judgment. A 1% deviation in reactivity from that predicted is larger than expected for normal operation and should therefore be evaluated.

When measured core reactivity is within 1% Δk/k of the predicted value at steady state thermal conditions, the core is considered to be operating within acceptable design limits. Since deviations from the limit are normally detected by comparing predicted and measured steady state RCS critical boron concentrations, the difference between measured and predicted values would be approximately 100 ppm (depending on the boron worth) before the limit is reached. These values are well within the uncertainty limits for analysis of boron concentration samples, so that spurious violations of the limit due to uncertainty in measuring the RCS boron concentration are unlikely.

APPLICABILITY

The limits on core reactivity must be maintained during MODES 1 and 2 because a reactivity balance must exist when the reactor is critical or producing THERMAL POWER. As the fuel depletes, core conditions are changing, and confirmation of the reactivity balance ensures the core is operating as designed. This Specification does not apply in MODES 3, 4, and 5 because the reactor is shut down and the reactivity balance is not changing.

In MODE 6, fuel loading results in a continually changing core reactivity. Boron concentration requirements (LCO 3.9.1, "Boron Concentration") ensure that fuel movements are performed within the bounds of the safety analysis. A~~n~~ SDM demonstration is required during the first startup following operations that could have altered core reactivity (e.g., fuel movement, control rod replacement, control rod shuffling). 5

BASES

ACTIONS

A.1 and A.2

Should an anomaly develop between measured and predicted core reactivity, an evaluation of the core design and safety analysis must be performed. Core conditions are evaluated to determine their consistency with input to design calculations. Measured core and process parameters are evaluated to determine that they are within the bounds of the safety analysis, and safety analysis calculational models are reviewed to verify that they are adequate for representation of the core conditions. The required Completion Time of 7 days is based on the low probability of a DBA occurring during this period, and allows sufficient time to assess the physical condition of the reactor and complete the evaluation of the core design and safety analysis.

Following evaluations of the core design and safety analysis, the cause of the reactivity anomaly may be resolved. If the cause of the reactivity anomaly is a mismatch in core conditions at the time of RCS boron concentration sampling, then a recalculation of the RCS boron concentration requirements may be performed to demonstrate that core reactivity is behaving as expected. If an unexpected physical change in the condition of the core has occurred, it must be evaluated and corrected, if possible. If the cause of the reactivity anomaly is in the calculation technique, then the calculational models must be revised to provide more accurate predictions. If any of these results are demonstrated, and it is concluded that the reactor core is acceptable for continued operation, then the boron letdown curve may be renormalized and power operation may continue. If operational restriction or additional SRs are necessary to ensure the reactor core is acceptable for continued operation, then they must be defined.

The required Completion Time of 7 days is adequate for preparing whatever operating restrictions or Surveillances that may be required to allow continued reactor operation.

B.1

If the core reactivity cannot be restored to within the 1% Δk/k limit, 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. If the SDM for MODE 3 is not met, then the boration required by SR 3.1.1.1 would occur. The allowed Completion Time is reasonable, based on operating experience, for reaching MODE 3 from full power conditions in an orderly manner and without challenging plant systems.

BASES

SURVEILLANCE REQUIREMENTS

SR 3.1.2.1

Core reactivity is verified by periodic comparisons of measured and predicted RCS boron concentrations. The comparison is made, considering that other core conditions are fixed or stable, including control rod position, moderator temperature, fuel temperature, fuel depletion, xenon concentration, and samarium concentration. The Surveillance is performed prior to entering MODE 1 as an initial check on core conditions and design calculations at BOC BOL. The SR is modified by a Note. The Note indicates that the normalization of predicted core reactivity to the measured value must may take place, if required, within the first 60 effective full power days (EFPD) after each fuel loading. This allows sufficient time for core conditions to reach steady state, but prevents operation for a large fraction of the fuel cycle without establishing a benchmark for the design calculations. [The required subsequent Frequency of 31 EFPD, following the initial 60 EFPD after entering MODE 1, is acceptable, based on the slow rate of core changes due to fuel depletion and the presence of other indicators (QPTR, AFD, etc.) for prompt indication of an anomaly. 1 6 2

OR 2

The Surveillance Frequency is controlled under the Surveillance Frequency Control Program.

-----------------------------------REVIEWER'S NOTE-----------------------------------
Plants controlling Surveillance Frequencies under a Surveillance Frequency Control Program should utilize the appropriate Frequency description, given above, and the appropriate choice of Frequency in the Surveillance Requirement.
--] 3 2

REFERENCES

1. 10 CFR 50, Appendix A, GDC 26, GDC 28, and GDC 29.
2. U FSAR, Chapter [15]. 1 4

B 3.1 REACTIVITY CONTROL SYSTEMS

B 3.1.2 Core Reactivity

BASES

BACKGROUND

According to GDC 26, GDC 28, and GDC 29 (Ref. 1), reactivity shall be controllable, such that subcriticality is maintained under cold conditions, and acceptable fuel design limits are not exceeded during normal operation and anticipated operational occurrences. Therefore, reactivity balance is used as a measure of the predicted versus measured core reactivity during power operation. The periodic confirmation of core reactivity is necessary to ensure that Design Basis Accident (DBA) and transient safety analyses remain valid. A large reactivity difference could be the result of unanticipated changes in fuel, control rod worth, or operation at conditions not consistent with those assumed in the predictions of core reactivity, and could potentially result in a loss of SDM or violation of acceptable fuel design limits. Comparing predicted versus measured core reactivity validates the nuclear methods used in the safety analysis and supports the SDM demonstrations (LCO 3.1.1, "SHUTDOWN MARGIN (SDM)") in ensuring the reactor can be brought safely to cold, subcritical conditions.

When the reactor core is critical or in normal power operation, a reactivity balance exists and the net reactivity is zero. A comparison of predicted and measured reactivity is convenient under such a balance, since parameters are being maintained relatively stable under steady state power conditions. The positive reactivity inherent in the core design is balanced by the negative reactivity of the control components, thermal feedback, neutron leakage, and materials in the core that absorb neutrons, such as burnable absorbers producing zero net reactivity. Excess reactivity can be inferred from the boron letdown curve (or critical boron curve), which provides an indication of the soluble boron concentration in the Reactor Coolant System (RCS) versus cycle burnup. Periodic measurement of the RCS boron concentration for comparison with the predicted value with ~~other~~ [specific] variables ~~fixed~~ (such as rod height, temperature, pressure, and power), provides a convenient method of ensuring that core reactivity is within design expectations and that the calculational models used to generate the safety analysis are adequate. 5

In order to achieve the required fuel cycle energy output, the uranium enrichment, in the new fuel loading and in the fuel remaining from the previous cycle, provides excess positive reactivity beyond that required to sustain steady state operation throughout the cycle. When the reactor is critical at RTP and moderator temperature, the excess positive reactivity is compensated by burnable absorbers (if any), control rods, whatever neutron poisons (mainly xenon and samarium) are present in the fuel, and the RCS boron concentration.

BASES

BACKGROUND (continued)

When the core is producing THERMAL POWER, the fuel is being depleted and excess reactivity is decreasing. As the fuel depletes, the RCS boron concentration is reduced to decrease negative reactivity and maintain constant THERMAL POWER. The boron letdown curve is based on steady state operation at RTP. Therefore, deviations from the predicted boron letdown curve may indicate deficiencies in the design analysis, deficiencies in the calculational models, or abnormal core conditions, and must be evaluated.

APPLICABLE SAFETY ANALYSES

The acceptance criteria for core reactivity are that the reactivity balance limit ensures plant operation is maintained within the assumptions of the safety analyses.

Accurate prediction of core reactivity is either an explicit or implicit assumption in the accident analysis evaluations. Every accident evaluation (Ref. 2) is, therefore, dependent upon accurate evaluation of core reactivity. In particular, SDM and reactivity transients, such as control rod withdrawal accidents or rod ejection accidents, are very sensitive to accurate prediction of core reactivity. These accident analysis evaluations rely on computer codes that have been qualified against available test data, operating plant data, and analytical benchmarks. Monitoring reactivity balance additionally ensures that the nuclear methods provide an accurate representation of the core reactivity.

Design calculations and safety analyses are performed for each fuel cycle for the purpose of predetermining reactivity behavior and the RCS boron concentration requirements for reactivity control during fuel depletion.

The comparison between measured and predicted initial core reactivity provides a normalization for the calculational models used to predict core reactivity. If the measured and predicted RCS boron concentrations for identical core conditions at beginning of cycle ~~(BOC)~~ life (BOL) do not agree, then the assumptions used in the reload cycle design analysis or the calculational models used to predict soluble boron requirements may not be accurate. If reasonable agreement between measured and predicted core reactivity exists at ~~BOC~~ BOL, then the prediction may be normalized to the measured boron concentration. Thereafter, any significant deviations in the measured boron concentration from the predicted boron letdown curve that develop during fuel depletion may be an indication that the calculational model is not adequate for core burnups beyond ~~BOC~~ BOL, or that an unexpected change in core conditions has occurred. 1 1 1

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BASES

APPLICABLE SAFETY ANALYSES (continued)

The normalization of predicted RCS boron concentration to the measured value is typically performed after reaching RTP following startup from a refueling outage, with the control rods in their normal positions for power operation. The normalization is performed at ~~BOC~~ BOL conditions, so that core reactivity relative to predicted values can be continually monitored and evaluated as core conditions change during the cycle. 1

Core reactivity satisfies Criterion 2 of 10 CFR 50.36(c)(2)(ii).

LCO

Long term core reactivity behavior is a result of the core physics design and cannot be easily controlled once the core design is fixed. During operation, therefore, the LCO can only be ensured through measurement and tracking, and appropriate actions taken as necessary. Large differences between actual and predicted core reactivity may indicate that the assumptions of the DBA and transient analyses are no longer valid, or that the uncertainties in the Nuclear Design Methodology are larger than expected. A limit on the reactivity balance of ± 1% $\Delta k/k$ has been established based on engineering judgment. A 1% deviation in reactivity from that predicted is larger than expected for normal operation and should therefore be evaluated.

When measured core reactivity is within 1% $\Delta k/k$ of the predicted value at steady state thermal conditions, the core is considered to be operating within acceptable design limits. Since deviations from the limit are normally detected by comparing predicted and measured steady state RCS critical boron concentrations, the difference between measured and predicted values would be approximately 100 ppm (depending on the boron worth) before the limit is reached. These values are well within the uncertainty limits for analysis of boron concentration samples, so that spurious violations of the limit due to uncertainty in measuring the RCS boron concentration are unlikely.

APPLICABILITY

The limits on core reactivity must be maintained during MODES 1 and 2 because a reactivity balance must exist when the reactor is critical or producing THERMAL POWER. As the fuel depletes, core conditions are changing, and confirmation of the reactivity balance ensures the core is operating as designed. This Specification does not apply in MODES 3, 4, and 5 because the reactor is shut down and the reactivity balance is not changing.

In MODE 6, fuel loading results in a continually changing core reactivity. Boron concentration requirements (LCO 3.9.1, "Boron Concentration") ensure that fuel movements are performed within the bounds of the safety analysis. A~~n~~ SDM demonstration is required during the first startup following operations that could have altered core reactivity (e.g., fuel movement, control rod replacement, control rod shuffling). 5

BASES

ACTIONS

A.1 and A.2

Should an anomaly develop between measured and predicted core reactivity, an evaluation of the core design and safety analysis must be performed. Core conditions are evaluated to determine their consistency with input to design calculations. Measured core and process parameters are evaluated to determine that they are within the bounds of the safety analysis, and safety analysis calculational models are reviewed to verify that they are adequate for representation of the core conditions. The required Completion Time of 7 days is based on the low probability of a DBA occurring during this period, and allows sufficient time to assess the physical condition of the reactor and complete the evaluation of the core design and safety analysis.

Following evaluations of the core design and safety analysis, the cause of the reactivity anomaly may be resolved. If the cause of the reactivity anomaly is a mismatch in core conditions at the time of RCS boron concentration sampling, then a recalculation of the RCS boron concentration requirements may be performed to demonstrate that core reactivity is behaving as expected. If an unexpected physical change in the condition of the core has occurred, it must be evaluated and corrected, if possible. If the cause of the reactivity anomaly is in the calculation technique, then the calculational models must be revised to provide more accurate predictions. If any of these results are demonstrated, and it is concluded that the reactor core is acceptable for continued operation, then the boron letdown curve may be renormalized and power operation may continue. If operational restriction or additional SRs are necessary to ensure the reactor core is acceptable for continued operation, then they must be defined.

The required Completion Time of 7 days is adequate for preparing whatever operating restrictions or Surveillances that may be required to allow continued reactor operation.

B.1

If the core reactivity cannot be restored to within the 1% $\Delta k/k$ limit, 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. If the SDM for MODE 3 is not met, then the boration required by SR 3.1.1.1 would occur. The allowed Completion Time is reasonable, based on operating experience, for reaching MODE 3 from full power conditions in an orderly manner and without challenging plant systems.

BASES

SURVEILLANCE REQUIREMENTS

SR 3.1.2.1

Core reactivity is verified by periodic comparisons of measured and predicted RCS boron concentrations. The comparison is made, considering that other core conditions are fixed or stable, including control rod position, moderator temperature, fuel temperature, fuel depletion, xenon concentration, and samarium concentration. The Surveillance is performed prior to entering MODE 1 as an initial check on core conditions and design calculations at ~~BOC~~ BOL. The SR is modified by a Note. The Note indicates that the normalization of predicted core reactivity to the measured value ~~must~~ may take place, if required, within the first 60 effective full power days (EFPD) after each fuel loading. This allows sufficient time for core conditions to reach steady state, but prevents operation for a large fraction of the fuel cycle without establishing a benchmark for the design calculations. ~~[~~ The required subsequent Frequency ~~of 31 EFPD~~, following the initial 60 EFPD after entering MODE 1, is acceptable, based on the slow rate of core changes due to fuel depletion and the presence of other indicators (QPTR, AFD, etc.) for prompt indication of an anomaly. 1 6 2

~~OR~~ 2

The Surveillance Frequency is controlled under the Surveillance Frequency Control Program.

~~-----------------------------------REVIEWER'S NOTE-----------------------------------~~
~~Plants controlling Surveillance Frequencies under a Surveillance Frequency Control Program should utilize the appropriate Frequency description, given above, and the appropriate choice of Frequency in the Surveillance Requirement.~~
~~--]~~ 3 2

REFERENCES

1. 10 CFR 50, Appendix A, GDC 26, GDC 28, and GDC 29.
2. UFSAR, Chapter ~~[~~15~~]~~. 1 4

JUSTIFICATION FOR DEVIATIONS
ITS 3.1.2 BASES, CORE REACTIVITY

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

2. ISTS SR 3.1.2.1 provides two options for controlling the Frequencies of Surveillance Requirements. SQN is proposing to control the Surveillance Frequencies under the Surveillance Frequency Control Program.

3. The Reviewer's Note has been deleted. This information is for the NRC reviewer to be keyed into what is needed to meet this requirement. This Note is not meant to be retained in the final version of the plant specific submittal.

4. The ISTS contains bracketed information and/or values that are generic to Westinghouse vintage plants. The brackets are removed and the proper plant specific information/value is inserted to reflect the current licensing basis.

5. Editorial changes made for enhanced clarity/consistency.

6. Changes are made to be consistent with changes made to the Specification.

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Specific No Significant Hazards Considerations (NSHCs)

DETERMINATION OF NO SIGNIFICANT HAZARDS CONSIDERATIONS
ITS 3.1.2, CORE REACTIVITY

There are no specific No Significant Hazards Considerations for this Specification.

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ATTACHMENT 3

ITS 3.1.3, MODERATOR TEMPERATURE COEFFICIENT (MTC)

Current Technical Specification (CTS) Markup and Discussion of Changes (DOCs)

ITS A01 ITS 3.1.3

REACTIVITY CONTROL SYSTEMS

MODERATOR TEMPERATURE COEFFICIENT

LIMITING CONDITION FOR OPERATION

LCO 3.1.3 3.1.1.3 The moderator temperature coefficient (MTC) shall be within the limits specified in the COLR. The maximum upper limit shall be less than 0 delta k/k/°F.

Applicability APPLICABILITY: Beginning of cycle life (BOL) limit - MODES 1 and 2* ~~only#~~
End of life cycle (EOL) limit - MODES 1, 2 and 3 ~~only#~~ A02

ACTION:

ACTION A, ACTION B a. With the MTC more positive than the BOL limit specified in the COLR operation in MODES 1 and 2 may proceed provided:

ACTION A, ACTION B 1. Control rod withdrawal limits are established and maintained sufficient to restore the MTC to less positive than the BOL limit specified in the COLR within 24 hours or be in ~~HOT STANDBY~~ [MODE 2 with k_{eff} < 1.0] within the next 6 hours. ~~These withdrawal limits shall be in addition to the insertion limits of Specification 3.1.3.6.~~ A03 A04

2. ~~The control rods are maintained within the withdrawal limits established above until a subsequent calculation verifies that the MTC has been restored to within its limit for the all rods withdrawn condition.~~ L01

ACTION C b. With the MTC more negative than the EOL limit specified in the COLR, be in HOT SHUTDOWN within 12 hours.

Applicability *With K_{eff} greater than or equal to 1.0

~~#See Special Test Exception 3.10.3~~ A02

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REACTIVITY CONTROL SYSTEMS

SURVEILLANCE REQUIREMENTS

SR 3.1.3.1, SR 3.1.3.2

4.1.1.3 The MTC shall be determined to be within its limits during each fuel cycle as follows:

SR 3.1.3.1

a. The MTC shall be measured and compared to the BOL limit specified in the COLR prior to initial operation above 5% of RATED THERMAL POWER, after each fuel loading.

SR 3.1.3.2, SR 3.1.3.2 Notes 1 and 2

b. The MTC shall be measured at any THERMAL POWER and compared to the 300 PPM surveillance limit specified in the COLR (all rods withdrawn, RATED THERMAL POWER condition) within 7 EFPD after reaching an equilibrium boron concentration of 300 ppm. In the event this comparison indicates that MTC is more negative than the 300 ppm surveillance limit specified in the COLR, the MTC shall be remeasured and compared to the EOL MTC limit specified in the COLR at least once per 14 EFPD during the remainder of the fuel cycle.

Add proposed SR 3.1.3.2 Note 3 — L02

A01

ITS

ITS 3.1.3

REACTIVITY CONTROL SYSTEMS

MODERATOR TEMPERATURE COEFFICIENT

LIMITING CONDITION FOR OPERATION

LCO 3.1.3

3.1.1.3 The moderator temperature coefficient (MTC) shall be within the limits specified in the COLR. The maximum upper limit shall be less than 0 delta k/k/°F.

Applicability

APPLICABILITY: Beginning of Cycle life (BOL) Limit - Modes 1 and 2* ~~only#~~
End of Cycle Life (EOL) Limit - Modes 1, 2, and 3 ~~only#~~ A02

ACTION:

ACTION A, ACTION B

a. With the MTC more positive than the BOL limit specified in the COLR operation in Modes 1 and 2 may proceed provided:

ACTION A

ACTION B

1. Control rod withdrawal limits are established and maintained sufficient to restore the MTC to less positive than the BOL limit specified in the COLR within 24 hours or ~~be in HOT STANDBY~~ [MODE 2 with k_{eff} < 1.0] within the next 6 hours. ~~These withdrawal limits shall be in addition to the insertion limits of Specification 3.1.3.6.~~ A03 A04

2. ~~The control rods are maintained within the withdrawal limits established above until a subsequent calculation verifies that the MTC has been restored to within its limit for the all rods withdrawn condition.~~ L01

ACTION C

b. With the MTC more negative than the EOL limit specified in the COLR be in HOT SHUTDOWN within 12 hours.

Applicability

* With k_{eff} greater than or equal to 1.0

~~# See Special Test Exception 3.10.3~~ A02

REACTIVITY CONTROL SYSTEMS

SURVEILLANCE REQUIREMENTS

SR 3.1.3.1, SR 3.1.3.2

4.1.1.3 The MTC shall be determined to be within its limits during each fuel cycle as follows:

SR 3.1.3.1

a. The MTC shall be measured and compared to the BOL limit specified in the COLR prior to initial operation above 5% of RATED THERMAL POWER, after each fuel loading.

SR 3.1.3.2, SR 3.1.3.2 Notes 1 and 2

b. The MTC shall be measured at any THERMAL POWER and compared to the 300 PPM surveillance limit specified in the COLR (all rods withdrawn, RATED THERMAL POWER condition) within 7 EFPD after reaching an equilibrium boron concentration of 300 ppm. In the event this comparison indicates the MTC is more negative than 300 PPM surveillance limit specified in the COLR, the MTC shall be remeasured and compared to the EOL MTC limit specified in the COLR at least once per 14 EFPD during the remainder of the fuel cycle.

Add proposed SR 3.1.3.2 Note 3 (L02)

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DISCUSSION OF CHANGES
ITS 3.1.3, MODERATOR TEMPERATURE COEFFICIENT (MTC)

ADMINISTRATIVE CHANGES

A01 In the conversion of the Sequoyah Nuclear Plant (SQN) Current Technical Specifications (CTS) to the plant specific Improved Technical Specifications (ITS), certain changes (wording preferences, editorial changes, reformatting, revised numbering, etc.) are made to obtain consistency with NUREG - 1431, Rev. 4.0, "Standard Technical Specifications - Westinghouse Plants" (ISTS) and additional Technical Specification Task Force (TSTF) travelers included in this submittal.

These changes are designated as administrative changes and are acceptable because they do not result in technical changes to the CTS.

A02 The Applicability of CTS 3.1.1.3 is modified by footnote # stating "See Special Test Exception 3.10.3." ITS 3.1.3 Applicability does not contain the footnote or a reference to the Special Test Exception. This changes the CTS by not including footnote # in the ITS.

The purpose of the footnote reference is to alert the user that a Special Test Exception exists that may modify the Applicability of the Specification. It is an ITS convention to not include these types of footnotes or cross-references. This change is designated as administrative as it incorporates an ITS convention with no technical change to the CTS.

A03 CTS 3.1.1.3 ACTION a.1 states that if the MTC is more positive than the BOL limit, control rod withdrawal limits must be imposed within 24 hours or the unit must be in HOT STANDBY within the next 6 hours. ITS 3.1.3 ACTION A states that with the MTC not within the BOL limit, establish administrative control rod withdrawal limits within 24 hours or ACTION B requires the unit to be in MODE 2 with $k_{eff} < 1.0$ within the next 6 hours. This changes the CTS by requiring the unit to be in MODE 2 with $k_{eff} < 1.0$ instead of HOT STANDBY (i.e., MODE 3).

This change is acceptable because the requirements have not changed. In accordance with CTS LCO 3.0.1, ACTIONS are only required to be followed while in the MODE of Applicability. The CTS BOL MTC limit is only applicable in MODE 1 and MODE 2 with $k_{eff} \geq 1.0$. Therefore, under the CTS, the unit does not have to enter MODE 3 because the applicability of the ACTION ends when in MODE 2 with $k_{eff} < 1.0$. As a result, there is no difference between the CTS and ITS requirements. This change is designated as administrative because it does not result in a technical change to the CTS.

A04 CTS 3.1.1.3 ACTION a.1 states that if the MTC is more positive than the BOL limit, then control rod withdrawal limits must be established. It also states that these withdrawal limits shall be in addition to the insertion limits of Specification 3.1.3.6. ITS 3.1.3 does not contain this statement. This changes the CTS by not including the statement that the withdrawal limits shall be in addition to the insertion limits of Specification 3.1.3.6.

This change is acceptable because the requirements have not changed. The CTS reference to Specification 3.1.3.6 is an "information only" statement that neither adds, eliminates, or modifies requirements. The ITS convention is to not

DISCUSSION OF CHANGES
ITS 3.1.3, MODERATOR TEMPERATURE COEFFICIENT (MTC)

include these types of statements. This change is designated as administrative because it does not result in a technical change to the CTS.

MORE RESTRICTIVE CHANGES

None

RELOCATED SPECIFICATIONS

None

REMOVED DETAIL CHANGES

None

LESS RESTRICTIVE CHANGES

L01 *(Category 4 – Relaxation of Required Action)* CTS 3.1.1.3 ACTION a.2 states that if the measured MTC is more positive than the BOL limit, then the control rod withdrawal limits established in ACTION a.1 must be maintained until subsequent calculation verifies that the MTC has been restored to within limits for all the rods withdrawn condition. ITS 3.1.3 does not contain a requirement that the control rod withdrawal limits must be maintained until MTC is confirmed to be within its limit by measurement. However, ITS LCO 3.0.2 states that the Required Actions shall be followed until the LCO is met or no longer applicable. The ITS 3.1.3 Bases state that physics calculations may be used to determine the time in cycle life at which the calculated MTC will meet the LCO requirement, and at this point in core life the condition may be exited and the control rod withdrawal limits removed. This changes the CTS by eliminating the requirement to verify the MTC to be within its limit before removing the control rod withdrawal limits.

The purpose of CTS 3.1.1.3 ACTION a.2 is to ensure that the additional operational restrictions required to maintain the MTC within the assumptions in the safety analyses are maintained until the MTC value without the restrictions is within the LCO limits. This change is acceptable because the deleted Action is not necessary to verify that the values used to meet the LCO are consistent with the safety analyses. Thus, appropriate values continue to be tested in a manner and at a Frequency necessary to give confidence that the assumptions in the safety analyses are protected. The measurement of the MTC, boron endpoint, and control rod worth prior to entering MODE 1 is sufficient to verify, the nuclear design so that it can be accurately predicted when the all rods out, full power equilibrium MTC is within the LCO limit. Performing another measurement of beginning of cycle MTC to confirm this prediction is not necessary to give confidence that MTC is within its limit. This change is designated as less restrictive because Actions that are required in the CTS will not be required in the ITS.

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DISCUSSION OF CHANGES
ITS 3.1.3, MODERATOR TEMPERATURE COEFFICIENT (MTC)

L02 *(Category 7 – Relaxation of Surveillance Frequency)* CTS 4.1.1.3.b requires MTC to be determined within limits. MTC shall be measured at any THERMAL POWER within 7 EFPD after reaching an equilibrium boron concentration of 300 ppm. The measured value shall be compared to the 300 ppm Surveillance limit specified in the COLR. In the event this comparison indicates that the MTC is more negative than 300 PPM surveillance limit specified in the COLR, MTC shall be remeasured and compared to the EOL MTC limit specified in the COLR at least once per 14 EFPD during the remainder of the fuel cycle. ITS SR 3.1.3.2 requires verifying MTC is within the EOL limit once each cycle. Additionally, ITS SR 3.1.3.2 is modified by three notes. The first Note states that ITS SR 3.1.3.2 is not required to be performed until 7 EFPD after reaching the equivalent of an equilibrium RTP all rods out (ARO) boron concentration of 300 ppm. The second Note states that if the MTC is more negative than the 300 ppm Surveillance limit (not LCO limit) specified in the COLR, then ITS SR 3.1.3.2 shall be repeated once per 14 EFPD during the remainder of the fuel cycle. The third Note states that ITS SR 3.1.3.2 does not need to be repeated if the MTC measured at the equivalent of equilibrium RTP-ARO boron concentration of ≤ 60 ppm is less negative than the 60 ppm Surveillance limit specified in the COLR. This changes the CTS by eliminating the requirement to verify that MTC is met at least once per 14 EFPD if the measured MTC at the equivalent of equilibrium RTP-ARO boron concentration of ≤ 60 ppm is less negative than the 60 ppm Surveillance limit specified in the COLR.

The purpose of CTS 4.1.1.3.b is to periodically verify that the MTC EOL limit is within limit if the 300 ppm Surveillance limit in the COLR is not met. This change is acceptable because the Surveillance Frequency has been evaluated to ensure it will provide an acceptable level of assurance that the MTC EOL limit is not exceeded. This will help ensure that the MTC EOL limit is not exceeded for the remainder of the cycle. The new 60 ppm Surveillance limit will be incorporated into the COLR. This new limit is conservative. If the measured MTC at 60 ppm is more positive than the 60 ppm Surveillance limit, then the MTC EOL limit will not be exceeded because the gradual manner in which MTC changes with core burnup. This change is designated as less restrictive because Surveillances will be performed less frequently under the ITS than under the CTS.

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Improved Standard Technical Specifications (ISTS) Markup and Justification for Deviations (JFDs)

3.1 REACTIVITY CONTROL SYSTEMS

3.1.3 Moderator Temperature Coefficient (MTC)

3.1.1.3

LCO 3.1.3 The MTC shall be maintained within the limits specified in the COLR. The maximum upper limit shall be [≤ [ ] < 0 Δk/k°F at hot zero power] [that specified in Figure 3.1.3-1]. 1

Applicability

APPLICABILITY: MODE 1 and MODE 2 with k_{eff} ≥ 1.0 for the upper beginning of cycle life (BOL) MTC limit, MODES 1, 2, and 3 for the lower end of cycle life (EOL) MTC limit. 2

ACTIONS

	CONDITION	REQUIRED ACTION	COMPLETION TIME	
ACTION a.1	A. MTC not within upper BOL limit.	A.1 Establish administrative withdrawal limits for control banks to maintain MTC within limit.	24 hours	2
ACTION a.1	B. Required Action and associated Completion Time of Condition A not met.	B.1 Be in MODE 2 with k_{eff} < 1.0.	6 hours	
ACTION b	C. MTC not within lower EOL limit.	C.1 Be in MODE 4.	12 hours	2

SURVEILLANCE REQUIREMENTS

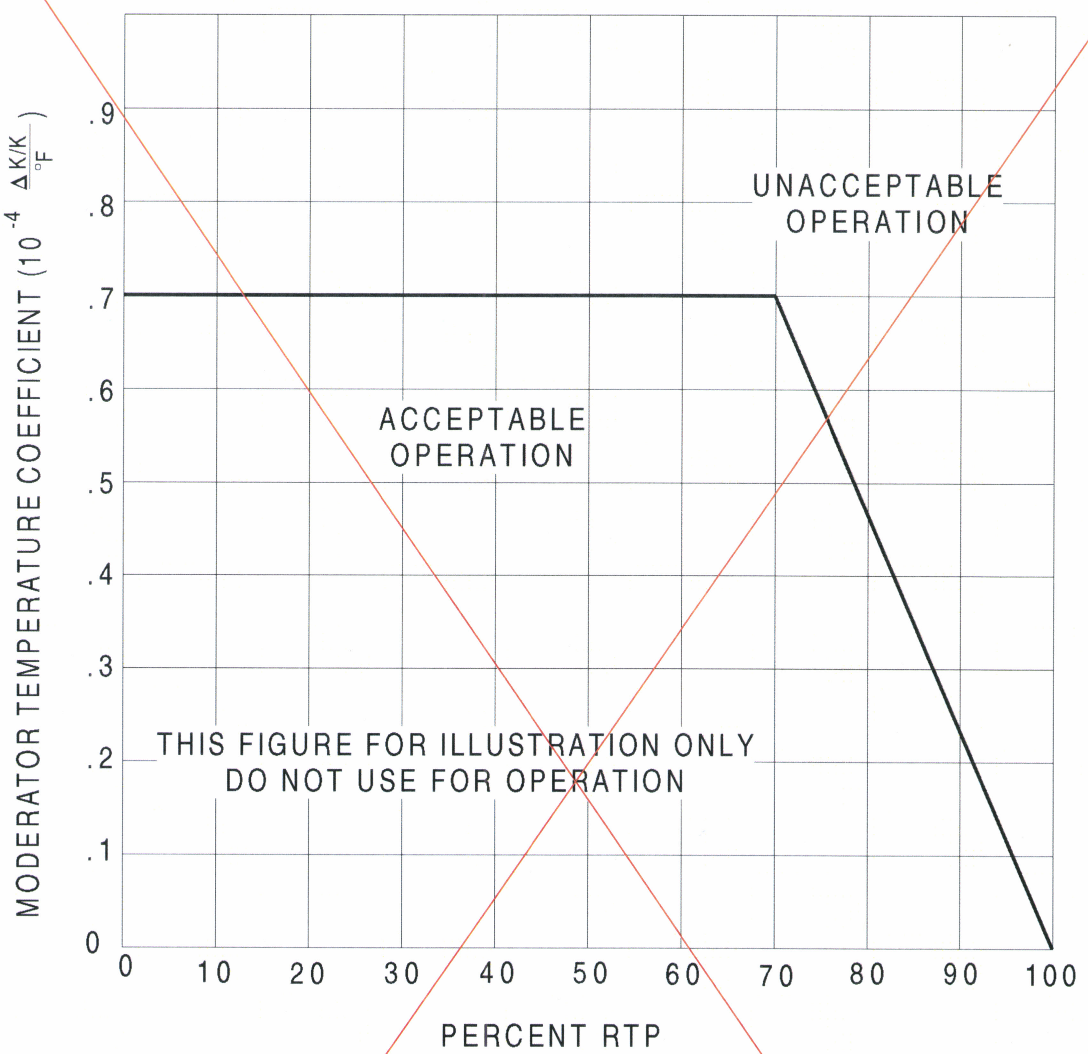
	SURVEILLANCE		FREQUENCY	
4.1.1.3.a	SR 3.1.3.1	Verify MTC is within upper BOL limit.	Prior to entering MODE 1 after each refueling	2

SURVEILLANCE REQUIREMENTS (continued)

	SURVEILLANCE	FREQUENCY	
4.1.1.3.b SR 3.1.3.2	---------------------------NOTES------------------------------- 1. Not required to be performed until 7 effective full power days (EFPD) after reaching the equivalent of an equilibrium RTP all rods out (ARO) boron concentration of 300 ppm. 2. If the MTC is more negative than the 300 ppm Surveillance limit (not LCO limit) specified in the COLR, SR 3.1.3.2 shall be repeated once per 14 EFPD during the remainder of the fuel cycle. 3. SR 3.1.3.2 need not be repeated if the MTC measured at the equivalent of equilibrium RTP-ARO boron concentration of ≤ 60 ppm is less negative than the 60 ppm Surveillance limit specified in the COLR. --- Verify MTC is within ~~lower~~ EOL limit.	Once each cycle	2

CTS

MTC
3.1.3



3

Figure 3.1.3 - 1 (page 1 of 1)
Moderator Temperature Coefficient Vs. Rated Thermal Power

3.1 REACTIVITY CONTROL SYSTEMS

3.1.3 Moderator Temperature Coefficient (MTC)

3.1.1.3

LCO 3.1.3 The MTC shall be maintained within the limits specified in the COLR. The maximum upper limit shall be [≤ [ ] < 0 Δk/k°F at hot zero power] [that specified in Figure 3.1.3-1]. 1

Applicability

APPLICABILITY: MODE 1 and MODE 2 with k_{eff} ≥ 1.0 for the upper beginning of cycle life (BOL) MTC limit, MODES 1, 2, and 3 for the lower end of cycle life (EOL) MTC limit. 2

ACTIONS

	CONDITION	REQUIRED ACTION	COMPLETION TIME	
ACTION a.1	A. MTC not within upper BOL limit.	A.1 Establish administrative withdrawal limits for control banks to maintain MTC within limit.	24 hours	2
ACTION a.1	B. Required Action and associated Completion Time of Condition A not met.	B.1 Be in MODE 2 with k_{eff} < 1.0.	6 hours	
ACTION b	C. MTC not within lower EOL limit.	C.1 Be in MODE 4.	12 hours	2

SURVEILLANCE REQUIREMENTS

	SURVEILLANCE		FREQUENCY	
4.1.1.3.a	SR 3.1.3.1	Verify MTC is within upper BOL limit.	Prior to entering MODE 1 after each refueling	2

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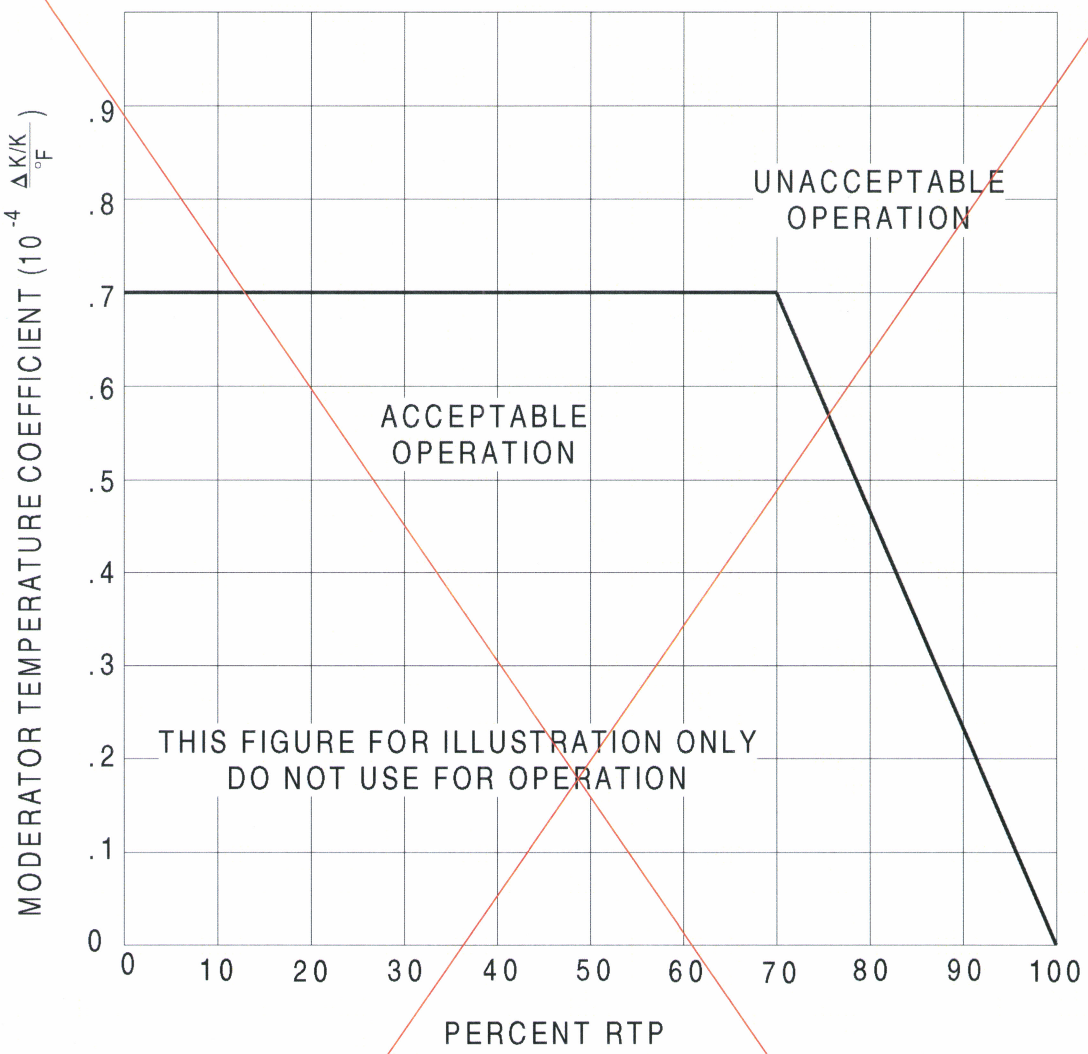
SURVEILLANCE REQUIREMENTS (continued)

	SURVEILLANCE	FREQUENCY
4.1.1.3.b SR 3.1.3.2	-----------------------------NOTES----------------------------- 1. Not required to be performed until 7 effective full power days (EFPD) after reaching the equivalent of an equilibrium RTP all rods out (ARO) boron concentration of 300 ppm. 2. If the MTC is more negative than the 300 ppm Surveillance limit (not LCO limit) specified in the COLR, SR 3.1.3.2 shall be repeated once per 14 EFPD during the remainder of the fuel cycle. 3. SR 3.1.3.2 need not be repeated if the MTC measured at the equivalent of equilibrium RTP-ARO boron concentration of ≤ 60 ppm is less negative than the 60 ppm Surveillance limit specified in the COLR. --- Verify MTC is within ~~lower~~ EOL limit.	Once each cycle 2

CTS

MTC
3.1.3



3

Figure 3.1.3 - 1 (page 1 of 1)
Moderator Temperature Coefficient Vs. Rated Thermal Power

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JUSTIFICATION FOR DEVIATIONS
ITS 3.1.3, MODERATOR TEMPERATURE COEFFICIENT (MTC)

1. The ISTS contains bracketed information and/or values that are generic to Westinghouse vintage plants. The brackets are removed and the proper plant specific information/value is inserted to reflect the current licensing basis.

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

3. ISTS 3.1.3 contains Figure 3.1.3-1 for Moderator Temperature Coefficient Vs Rated Thermal Power. This figure is not maintained in ITS 3.1.3. ITS 3.1.3 lists the maximum upper limit value in the LCO. Therefore, ISTS Figure 3.1.3-1 is not required and has been deleted.

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Improved Standard Technical Specifications (ISTS) Bases Markup and Bases Justification for Deviations (JFDs)

B 3.1 REACTIVITY CONTROL SYSTEMS

B 3.1.3 Moderator Temperature Coefficient (MTC)

BASES

BACKGROUND

According to GDC 11 (Ref. 1), the reactor core and its interaction with the Reactor Coolant System (RCS) must be designed for inherently stable power operation, even in the possible event of an accident. In particular, the net reactivity feedback in the system must compensate for any unintended reactivity increases.

The MTC relates a change in core reactivity to a change in reactor coolant temperature (a positive MTC means that reactivity increases with increasing moderator temperature; conversely, a negative MTC means that reactivity decreases with increasing moderator temperature). The reactor is designed to operate with a negative MTC over the largest possible range of fuel cycle operation. Therefore, a coolant temperature increase will cause a reactivity decrease, so that the coolant temperature tends to return toward its initial value. Reactivity increases that cause a coolant temperature increase will thus be self limiting, and stable power operation will result.

MTC values are predicted at selected burnups during the safety evaluation analysis and are confirmed to be acceptable by measurements. Both initial and reload cores are designed so that the beginning of cycle life (BOL) ~~(BOC)~~ MTC is less than zero when THERMAL POWER is at RTP. The actual value of the MTC is dependent on core characteristics, such as fuel loading and reactor coolant soluble boron concentration. The core design may require additional fixed distributed poisons to yield an MTC at BOL ~~BOC~~ within the range analyzed in the plant accident analysis. The end of cycle life (EOL) ~~(EOC)~~ MTC is also limited by the requirements of the accident analysis. Fuel cycles that are designed to achieve high burnups or that have changes to other characteristics are evaluated to ensure that the MTC does not exceed the EOL ~~EOC~~ limit. 1

The limitations on MTC are provided to ensure that the value of this coefficient remains within the limiting conditions assumed in the UFSAR accident and transient analyses. 1

BASES

BACKGROUND (continued)

If the LCO limits are not met, the unit response during transients may not be as predicted. The core could violate criteria that prohibit a return to criticality, or the departure from nucleate boiling ratio criteria of the approved correlation may be violated, which could lead to a loss of the fuel cladding integrity.

The SRs for measurement of the MTC at the beginning and near the end of the fuel cycle are adequate to confirm that the MTC remains within its limits, since this coefficient changes slowly, due principally to the reduction in RCS boron concentration associated with fuel burnup.

APPLICABLE SAFETY ANALYSES

The acceptance criteria for the specified MTC are:

a. The MTC values must remain within the bounds of those used in the accident analysis (Ref. 2) and

b. The MTC must be such that inherently stable power operations result during normal operation and accidents, such as overheating and overcooling events.

U

The FSAR, Chapter 15 (Ref. 2), contains analyses of accidents that result in both overheating and overcooling of the reactor core. MTC is one of the controlling parameters for core reactivity in these accidents. Both the most positive value and most negative value of the MTC are important to safety, and both values must be bounded. Values used in the analyses consider worst case conditions to ensure that the accident results are bounding (Ref. 3). 1

The consequences of accidents that cause core overheating must be evaluated when the MTC is positive. Such accidents include the rod withdrawal transient from either zero (Ref. 4) or RTP, loss of main feedwater flow, and loss of forced reactor coolant flow. The consequences of accidents that cause core overcooling must be evaluated when the MTC is negative. Such accidents include sudden feedwater flow increase and sudden decrease in feedwater temperature.

BASES

APPLICABLE SAFETY ANALYSES (continued)

In order to ensure a bounding accident analysis, the MTC is assumed to be its most limiting value for the analysis conditions appropriate to each accident. The bounding value is determined by considering rodded and unrodded conditions, whether the reactor is at full or zero power, and whether it is the ~~BOC or EOC life~~ BOL or EOL. The most conservative combination appropriate to the accident is then used for the analysis (Ref. 2). 1

MTC values are bounded in reload safety evaluations assuming steady state conditions at ~~BOC and EOC~~ BOL and EOL. An ~~EOC~~ EOL measurement is conducted at conditions when the RCS boron concentration reaches approximately 300 ppm. The measured value may be extrapolated to project the ~~EOC~~ EOL value, in order to confirm reload design predictions. 1

MTC satisfies Criterion 2 of 10 CFR 50.36(c)(2)(ii). Even though it is not directly observed and controlled from the control room, MTC is considered an initial condition process variable because of its dependence on boron concentration.

LCO

LCO 3.1.3 requires the MTC to be maintained within specified limits of the COLR to ensure that the core operates within the assumptions of the accident analysis. During the reload core safety evaluation, the MTC is analyzed to determine that its values remain within the bounds of the original accident analysis during operation. 4

Assumptions made in safety analyses require that the MTC be less positive than a given upper bound and more positive than a given lower bound. The MTC is most positive at ~~BOC~~ BOL; this upper bound must not be exceeded. This maximum upper limit occurs at ~~BOC~~ BOL, all rods out (ARO), hot zero power conditions. At ~~EOC~~ EOL the MTC takes on its most negative value, when the lower bound becomes important. This LCO exists to ensure that both the upper and lower bounds are not exceeded. 1

During operation, therefore, the conditions of the LCO can only be ensured through measurement. The Surveillance checks at ~~BOC~~ BOL and ~~EOC~~ EOL on MTC provide confirmation that the MTC is behaving as anticipated so that the acceptance criteria are met. 1

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BASES

LCO (continued)

The LCO establishes a maximum positive value that cannot be exceeded. The ~~BOC~~ BOL positive limit and the ~~EOC~~ EOL negative limit are established in the COLR to allow specifying limits for each particular cycle. This permits the unit to take advantage of improved fuel management and changes in unit operating schedule. 1

APPLICABILITY

Technical Specifications place both LCO and SR values on MTC, based on the safety analysis assumptions described above.

In MODE 1, the limits on MTC must be maintained to ensure that any accident initiated from THERMAL POWER operation will not violate the design assumptions of the accident analysis. In MODE 2 with the reactor critical, the ~~upper~~ BOL limit must ~~also~~ be maintained to ensure that startup and subcritical accidents (such as the uncontrolled control rod assembly or group withdrawal) will not violate the assumptions of the accident analysis. The ~~lower~~ EOL MTC limit must be maintained in MODES 2 and 3, in addition to MODE 1, to ensure that cooldown accidents will not violate the assumptions of the accident analysis. In MODES 4, 5, and 6, this LCO is not applicable, since no Design Basis Accidents using the MTC as an analysis assumption are initiated from these MODES. 5 3 5

ACTIONS

A.1

If the ~~BOC~~ BOL MTC limit is violated, administrative withdrawal limits for control banks must be established to maintain the MTC within its limits. The MTC becomes more negative with control bank insertion and decreased boron concentration. A Completion Time of 24 hours provides enough time for evaluating the MTC measurement and computing the required bank withdrawal limits. 1

As cycle burnup is increased, the RCS boron concentration will be reduced. The reduced boron concentration causes the MTC to become more negative. Using physics calculations, the time in cycle life at which the calculated MTC will meet the LCO requirement can be determined. At this point in core life Condition A no longer exists. The unit is no longer in the Required Action, so the administrative withdrawal limits are no longer in effect.

BASES

ACTIONS (continued)

B.1

If the required administrative withdrawal limits at ~~BOC~~ BOL are not established within 24 hours, the unit must be brought to at least MODE 2 with k_{eff} < 1.0 to prevent operation with an MTC that is more positive than that assumed in safety analyses. 1 3

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.

C.1

Exceeding the ~~EOC~~ EOL MTC limit means that the safety analysis assumptions for the ~~EOC~~ EOL accidents that use a bounding negative MTC value may be invalid. If the ~~EOC~~ EOL MTC limit is exceeded, the plant must be brought to a MODE or condition in which the LCO requirements are not applicable. To achieve this status, the unit must be brought to at least MODE 4 within 12 hours. 1

The allowed Completion Time 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

SR 3.1.3.1

This SR requires measurement of the MTC at ~~BOC~~ BOL prior to entering MODE 1 in order to demonstrate compliance with the most positive MTC LCO. Meeting the limit prior to entering MODE 1 ensures that the limit will also be met at higher power levels. 1

The ~~BOC~~ BOL MTC value for ARO will be inferred from isothermal temperature coefficient measurements obtained during the physics tests after refueling. The ARO value can be directly compared to the ~~BOC~~ BOL MTC limit of the LCO. If required, measurement results and predicted design values can be used to establish administrative withdrawal limits for control banks. 1

BASES

SURVEILLANCE REQUIREMENTS (continued)

SR 3.1.3.2

In similar fashion, the LCO demands that the MTC be less negative than the specified value for ~~EOC~~ EOL full power conditions. This measurement may be performed at any THERMAL POWER, but its results must be extrapolated to the conditions of RTP and all banks withdrawn in order to make a proper comparison with the LCO value. Because the RTP MTC value will gradually become more negative with further core depletion and boron concentration reduction, a 300 ppm SR value of MTC should necessarily be less negative than the ~~EOC~~ EOL LCO limit. The 300 ppm SR value is sufficiently less negative than the ~~EOC~~ EOL LCO limit value to ensure that the LCO limit will be met when the 300 ppm Surveillance criterion is met. (1)

SR 3.1.3.2 is modified by three Notes that include the following requirements:

a. The SR is not required to be performed until 7 effective full power days (EFPDs) after reaching the equivalent of an equilibrium RTP all rods out (ARO) boron concentration of 300 ppm.

b. If the 300 ppm Surveillance limit is exceeded, it is possible that the ~~EOC~~ EOL limit on MTC could be reached before the planned ~~EOC~~ EOL. Because the MTC changes slowly with core depletion, the Frequency of 14 effective full power days is sufficient to avoid exceeding the ~~EOC~~ EOL limit. (1)

c. The Surveillance limit for RTP boron concentration of 60 ppm is conservative. If the measured MTC at 60 ppm is more positive than the 60 ppm Surveillance limit, the ~~EOC~~ EOL limit will not be exceeded because of the gradual manner in which MTC changes with core burnup. (1)

REFERENCES

1. 10 CFR 50, Appendix A, GDC 11.

2. U FSAR, Chapter ~~[~~15~~]~~. (1) (2)

3. ~~WCAP 9273-NP-A, "Westinghouse Reload Safety Evaluation Methodology," July 1985~~. BAW 10169P-A, "B&W Safety Analysis Methodology for Recirculating Steam Generator Plants," October 1989 (1)

4. U FSAR, Chapter ~~[~~15.2.1~~]~~. (1) (2)

B 3.1 REACTIVITY CONTROL SYSTEMS

B 3.1.3 Moderator Temperature Coefficient (MTC)

BASES

BACKGROUND

According to GDC 11 (Ref. 1), the reactor core and its interaction with the Reactor Coolant System (RCS) must be designed for inherently stable power operation, even in the possible event of an accident. In particular, the net reactivity feedback in the system must compensate for any unintended reactivity increases.

The MTC relates a change in core reactivity to a change in reactor coolant temperature (a positive MTC means that reactivity increases with increasing moderator temperature; conversely, a negative MTC means that reactivity decreases with increasing moderator temperature). The reactor is designed to operate with a negative MTC over the largest possible range of fuel cycle operation. Therefore, a coolant temperature increase will cause a reactivity decrease, so that the coolant temperature tends to return toward its initial value. Reactivity increases that cause a coolant temperature increase will thus be self limiting, and stable power operation will result.

MTC values are predicted at selected burnups during the safety evaluation analysis and are confirmed to be acceptable by measurements. Both initial and reload cores are designed so that the beginning of cycle [life (BOL)] ~~(BOC)~~ MTC is less than zero when THERMAL POWER is at RTP. The actual value of the MTC is dependent on core characteristics, such as fuel loading and reactor coolant soluble boron concentration. The core design may require additional fixed distributed poisons to yield an MTC at [BOL] ~~BOC~~ within the range analyzed in the plant accident analysis. The end of cycle [life (EOL)] ~~(EOC)~~ MTC is also limited by the requirements of the accident analysis. Fuel cycles that are designed to achieve high burnups or that have changes to other characteristics are evaluated to ensure that the MTC does not exceed the [EOL] ~~EOC~~ limit. 1

The limitations on MTC are provided to ensure that the value of this coefficient remains within the limiting conditions assumed in the [U]FSAR accident and transient analyses. 1

BASES

BACKGROUND (continued)

If the LCO limits are not met, the unit response during transients may not be as predicted. The core could violate criteria that prohibit a return to criticality, or the departure from nucleate boiling ratio criteria of the approved correlation may be violated, which could lead to a loss of the fuel cladding integrity.

The SRs for measurement of the MTC at the beginning and near the end of the fuel cycle are adequate to confirm that the MTC remains within its limits, since this coefficient changes slowly, due principally to the reduction in RCS boron concentration associated with fuel burnup.

APPLICABLE SAFETY ANALYSES

The acceptance criteria for the specified MTC are:

a. The MTC values must remain within the bounds of those used in the accident analysis (Ref. 2) and

b. The MTC must be such that inherently stable power operations result during normal operation and accidents, such as overheating and overcooling events.

The U FSAR, Chapter 15 (Ref. 2), contains analyses of accidents that result in both overheating and overcooling of the reactor core. MTC is one of the controlling parameters for core reactivity in these accidents. Both the most positive value and most negative value of the MTC are important to safety, and both values must be bounded. Values used in the analyses consider worst case conditions to ensure that the accident results are bounding (Ref. 3). 1

The consequences of accidents that cause core overheating must be evaluated when the MTC is positive. Such accidents include the rod withdrawal transient from either zero (Ref. 4) or RTP, loss of main feedwater flow, and loss of forced reactor coolant flow. The consequences of accidents that cause core overcooling must be evaluated when the MTC is negative. Such accidents include sudden feedwater flow increase and sudden decrease in feedwater temperature.

BASES

APPLICABLE SAFETY ANALYSES (continued)

In order to ensure a bounding accident analysis, the MTC is assumed to be its most limiting value for the analysis conditions appropriate to each accident. The bounding value is determined by considering rodded and unrodded conditions, whether the reactor is at full or zero power, and whether it is the ~~BOC or EOC life~~ BOL or EOL. The most conservative combination appropriate to the accident is then used for the analysis (Ref. 2). 1

MTC values are bounded in reload safety evaluations assuming steady state conditions at ~~BOC and EOC~~ BOL and EOL. An ~~EOC~~ EOL measurement is conducted at conditions when the RCS boron concentration reaches approximately 300 ppm. The measured value may be extrapolated to project the ~~EOC~~ EOL value, in order to confirm reload design predictions. 1

MTC satisfies Criterion 2 of 10 CFR 50.36(c)(2)(ii). Even though it is not directly observed and controlled from the control room, MTC is considered an initial condition process variable because of its dependence on boron concentration.

LCO

LCO 3.1.3 requires the MTC to be maintained within specified limits of the COLR to ensure that the core operates within the assumptions of the accident analysis. During the reload core safety evaluation, the MTC is analyzed to determine that its values remain within the bounds of the original accident analysis during operation. 4

Assumptions made in safety analyses require that the MTC be less positive than a given upper bound and more positive than a given lower bound. The MTC is most positive at ~~BOC~~ BOL; this upper bound must not be exceeded. This maximum upper limit occurs at ~~BOC~~ BOL, all rods out (ARO), hot zero power conditions. At ~~EOC~~ EOL the MTC takes on its most negative value, when the lower bound becomes important. This LCO exists to ensure that both the upper and lower bounds are not exceeded. 1

During operation, therefore, the conditions of the LCO can only be ensured through measurement. The Surveillance checks at ~~BOC~~ BOL and ~~EOC~~ EOL on MTC provide confirmation that the MTC is behaving as anticipated so that the acceptance criteria are met. 1

BASES

LCO (continued)

The LCO establishes a maximum positive value that cannot be exceeded. The ~~BOC~~ BOL positive limit and the ~~EOC~~ EOL negative limit are established in the COLR to allow specifying limits for each particular cycle. This permits the unit to take advantage of improved fuel management and changes in unit operating schedule. 1

APPLICABILITY

Technical Specifications place both LCO and SR values on MTC, based on the safety analysis assumptions described above.

In MODE 1, the limits on MTC must be maintained to ensure that any accident initiated from THERMAL POWER operation will not violate the design assumptions of the accident analysis. In MODE 2 with the reactor critical, the ~~upper~~ BOL limit must ~~also~~ be maintained to ensure that startup and subcritical accidents (such as the uncontrolled control rod assembly or group withdrawal) will not violate the assumptions of the accident analysis. The ~~lower~~ EOL MTC limit must be maintained in MODES 2 and 3, in addition to MODE 1, to ensure that cooldown accidents will not violate the assumptions of the accident analysis. In MODES 4, 5, and 6, this LCO is not applicable, since no Design Basis Accidents using the MTC as an analysis assumption are initiated from these MODES. 5 3 5

ACTIONS

A.1

If the ~~BOC~~ BOL MTC limit is violated, administrative withdrawal limits for control banks must be established to maintain the MTC within its limits. The MTC becomes more negative with control bank insertion and decreased boron concentration. A Completion Time of 24 hours provides enough time for evaluating the MTC measurement and computing the required bank withdrawal limits. 1

As cycle burnup is increased, the RCS boron concentration will be reduced. The reduced boron concentration causes the MTC to become more negative. Using physics calculations, the time in cycle life at which the calculated MTC will meet the LCO requirement can be determined. At this point in core life Condition A no longer exists. The unit is no longer in the Required Action, so the administrative withdrawal limits are no longer in effect.

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BASES

ACTIONS (continued)

B.1

If the required administrative withdrawal limits at ~~BOC~~ BOL are not established within 24 hours, the unit must be brought to at least MODE 2 with k_{eff} < 1.0 to prevent operation with an MTC that is more positive than that assumed in safety analyses. 1 3

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.

C.1

Exceeding the ~~EOC~~ EOL MTC limit means that the safety analysis assumptions for the ~~EOC~~ EOL accidents that use a bounding negative MTC value may be invalid. If the ~~EOC~~ EOL MTC limit is exceeded, the plant must be brought to a MODE or condition in which the LCO requirements are not applicable. To achieve this status, the unit must be brought to at least MODE 4 within 12 hours. 1

The allowed Completion Time 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

SR 3.1.3.1

This SR requires measurement of the MTC at ~~BOC~~ BOL prior to entering MODE 1 in order to demonstrate compliance with the most positive MTC LCO. Meeting the limit prior to entering MODE 1 ensures that the limit will also be met at higher power levels. 1

The ~~BOC~~ BOL MTC value for ARO will be inferred from isothermal temperature coefficient measurements obtained during the physics tests after refueling. The ARO value can be directly compared to the ~~BOC~~ BOL MTC limit of the LCO. If required, measurement results and predicted design values can be used to establish administrative withdrawal limits for control banks. 1

BASES

SURVEILLANCE REQUIREMENTS (continued)

SR 3.1.3.2

EOL In similar fashion, the LCO demands that the MTC be less negative than the specified value for ~~EOC~~ full power conditions. This measurement may be performed at any THERMAL POWER, but its results must be extrapolated to the conditions of RTP and all banks withdrawn in order to make a proper comparison with the LCO value. Because the RTP MTC value will gradually become more negative with further core depletion and boron concentration reduction, a 300 ppm SR value of MTC should necessarily be less negative than the EOL ~~EOC~~ LCO limit. The 300 ppm SR value is sufficiently less negative than the EOL ~~EOC~~ LCO limit value to ensure that the LCO limit will be met when the 300 ppm Surveillance criterion is met. (1)

SR 3.1.3.2 is modified by three Notes that include the following requirements:

a. The SR is not required to be performed until 7 effective full power days (EFPDs) after reaching the equivalent of an equilibrium RTP all rods out (ARO) boron concentration of 300 ppm.

b. If the 300 ppm Surveillance limit is exceeded, it is possible that the EOL ~~EOC~~ limit on MTC could be reached before the planned EOL ~~EOC~~. Because the MTC changes slowly with core depletion, the Frequency of 14 effective full power days is sufficient to avoid exceeding the EOL ~~EOC~~ limit. (1)

c. The Surveillance limit for RTP boron concentration of 60 ppm is conservative. If the measured MTC at 60 ppm is more positive than the 60 ppm Surveillance limit, the EOL ~~EOC~~ limit will not be exceeded because of the gradual manner in which MTC changes with core burnup. (1)

REFERENCES

1. 10 CFR 50, Appendix A, GDC 11.

2. U FSAR, Chapter ~~[~~15~~]~~. (1) (2)

3. ~~WCAP 9273-NP-A, "Westinghouse Reload Safety Evaluation Methodology," July 1985~~. BAW 10169P-A, "B&W Safety Analysis Methodology for Recirculating Steam Generator Plants," October 1989 (1)

4. U FSAR, Chapter ~~[~~15.2.1~~]~~. (1) (2)

JUSTIFICATION FOR DEVIATIONS
ITS 3.1.3 BASES, MODERATOR TEMPERATURE COEFFICIENT (MTC)

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

2. The ISTS contains bracketed information and/or values that are generic to Westinghouse vintage plants. The brackets are removed and the proper plant specific information/value is inserted to reflect the current licensing basis.

3. Editorial changes made for enhanced clarity/consistency.

4. Changes are made to be consistent with the Specification.

5. Changes are made to be consistent with changes made to the Specification.

Specific No Significant Hazards Considerations (NSHCs)

DETERMINATION OF NO SIGNIFICANT HAZARDS CONSIDERATIONS
ITS 3.1.3, MODERATOR TEMPERATURE COEFFICIENT (MTC)

There are no specific No Significant Hazards Considerations for this Specification.

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ATTACHMENT 4

ITS 3.1.4, ROD GROUP ALIGNMENT LIMITS

Current Technical Specification (CTS) Markup and Discussion of Changes (DOCs)

REACTIVITY CONTROL SYSTEMS

~~3/4.1.3 MOVABLE CONTROL ASSEMBLIES~~

Rod GROUP ~~HEIGHT~~ Alignment Limits A01

LIMITING CONDITION FOR OPERATION

LCO 3.1.4 3.1.3.1 All full length (shutdown and control) rods shall be OPERABLE and positioned within ± 12 steps (indicated position) of their group step counter demand position.

Applicability APPLICABILITY: MODES 1~~*~~ and 2~~*~~ A02

ACTION:

ACTION A a. With one or more full length rods untrippable, determine that the SHUTDOWN MARGIN requirement of Specification 3.1.1.1 is satisfied within 1 hour [Add proposed Required Action A.1.2] and be in HOT STANDBY within 6 hours. L01

ACTION D b. With more than one full length rod misaligned from the group step counter demand position by more than ± 12 steps (indicated position), [Add proposed Required Action D.1.1 and D.1.2] be in HOT STANDBY within 6 hours. M01

ACTION B c. With one full length rod misaligned from its group step counter demand height by more than ± 12 steps (indicated position), POWER OPERATION may continue provided that within one hour either:

1. The rod is restored within the above alignment requirements, or

2. ~~The remainder of the rods in the group with the misaligned rod are aligned to within ± 12 steps of the misaligned rod while maintaining the rod sequence and insertion limit of specification 3.1.3.6. The THERMAL POWER level shall be restricted pursuant to Specification 3.1.3.6 during subsequent operation, or~~ A03

3. ~~The rod is declared inoperable and~~ the SHUTDOWN MARGIN requirement of Specification 3.1.1.1 is satisfied. [Add proposed Required Action B.2.1.2] POWER OPERATION may then continue provided that: L02 L01

~~*See Special Test Exceptions 3.10.2 and 3.10.3.~~ A02

REACTIVITY CONTROL SYSTEMS

ACTION: (Continued)

ACTION B

a) A reevaluation of ~~each~~ accident analysis ~~of Table 3.1-1~~ is performed within 5 days; this reevaluation shall confirm that the previously analyzed results of these accidents remain valid for the duration of operation under these conditions. LA03

b) The SHUTDOWN MARGIN requirement of Specification 3.1.1.1 is determined at least once per 12 hours.

c) A power distribution map is obtained from the movable incore detectors and $F_Q(Z)$ and $F^N_{\Delta H}$ are verified to be within their limits within 72 hours.

d) The THERMAL POWER level is reduced to less than or equal to 75% of RATED THERMAL POWER within ~~one~~ two hour ~~and within the next 4 hours the high neutron flux trip setpoint is reduced to less than or equal to 85% of RATED THERMAL POWER~~. L03 L04

Add proposed ACTION C M02

SURVEILLANCE REQUIREMENTS

SR 3.1.4.1 4.1.3.1.1 The position of each full length rod shall be determined to be within the group demand limit by verifying the individual rod positions ~~at least once per 12 hours except during time intervals when the Rod Position Deviation Monitor is inoperable, then verify the group positions at least once per 4 hours~~. In accordance with the Surveillance Frequency Control Program LA01 L05

SR 3.1.4.2 4.1.3.1.2 Each full-length rod not fully inserted in the core shall be determined to be trippable by verifying rod freedom of movement by movement of ≥ 10 steps in either direction ~~at least once per 92 days~~. In accordance with the Surveillance Frequency Control Program LA01

ITS A01 ITS 3.1.4

TABLE 3.1-1

ACCIDENT ANALYSES REQUIRING REEVALUATION
IN THE EVENT OF AN INOPERABLE FULL LENGTH ROD

Rod Cluster Control Assembly Insertion Characteristics

Rod Cluster Control Assembly Misalignment

Loss Of Reactor Coolant From Small Ruptured Pipes Or From Cracks In Large Pipes Which Actuates The Emergency Core Cooling System

Single Rod Cluster Control Assembly Withdrawal At Full Power

Major Reactor Coolant System Pipe Ruptures (Loss Of Coolant Accident)

Major Secondary System Pipe Rupture

Rupture of a Control Rod Drive Mechanism Housing (Rod Cluster Control Assembly Ejection)

LA03

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ITS (A01) ITS 3.1.4

REACTIVITY CONTROL SYSTEMS

ROD DROP TIME

LIMITING CONDITION FOR OPERATION

SR 3.1.4.3

3.1.3.4 The individual full length (shutdown and control) rod drop time from the fully withdrawn position~~#~~ (LA02) shall be less than or equal to 2.7 seconds from beginning of decay of stationary gripper coil voltage to dashpot entry with:

a. T_{avg} greater than or equal to ~~541~~ 500°F, and (L06)

b. All reactor coolant pumps operating.

Applicability

APPLICABILITY: MODES 1 and 2

ACTION:

~~a. With the drop time of any full length rod determined to exceed the above limit, restore the rod drop time to within the above limit prior to proceeding to MODE 1 or 2.~~ (A04)

~~b. With the rod drop times within limits but determined with 3 reactor coolant pumps operating, operation may proceed provided THERMAL POWER is restricted to less than or equal to 71% of RATED THERMAL POWER~~ (M03)

Add proposed ACTION A (M04)

SURVEILLANCE REQUIREMENTS

SR 3.1.4.3

4.1.3.4 The rod drop time of full length rods shall be demonstrated through measurement prior to reactor criticality:

a. For all rods following each removal of the reactor vessel head,

~~b. For specifically affected individual rods following any maintenance on or modification to the control rod drive system which could affect the drop time of those specific rods, and~~ (L07)

~~c. At least once per 18 months.~~ (L08)

~~#Fully withdrawn shall be the condition where shutdown and control banks are at a position within the interval of ≥ 222 and ≤ 231 steps withdrawn, inclusive.~~ (LA02)

ITS

A01

ITS 3.1.4

3/4.1 REACTIVITY CONTROL SYSTEMS

3/4.1.1 BORATION CONTROL

SHUTDOWN MARGIN - T_{avg} Greater Than 200°F

LIMITING CONDITION FOR OPERATION

3.1.1.1 The SHUTDOWN MARGIN shall be greater than or equal to 1.6% delta k/k for 4 loop operation.

See ITS 3.1.1

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

ACTION:

With the SHUTDOWN MARGIN less than 1.6% delta k/k, immediately initiate and continue boration at greater than or equal to 35 gpm of a solution containing greater than or equal to 6120 ppm boron or equivalent until the required SHUTDOWN MARGIN is restored.

SURVEILLANCE REQUIREMENTS

~~4.1.1.1.1 The SHUTDOWN MARGIN shall be determined to be greater than or equal to 1.6% delta k/k:~~

L09

~~a. Within one hour after detection of an inoperable control rod(s) and at least once per 12 hours thereafter while the rod(s) is inoperable.~~ If the inoperable control rod is immovable or untrippable, the above required SHUTDOWN MARGIN shall be verified acceptable with an increased allowance for the withdrawn worth of the immovable or untrippable control rod(s).

See ITS Chapter 1.0

b. When in MODE 1 or MODE 2 with K_{eff} greater than or equal to 1.0, at least once per 12 hours by verifying that control bank withdrawal is within the limits of Specification 3.1.3.6.

c. When in MODE 2 with K_{eff} less than 1.0, within 4 hours prior to achieving reactor criticality by verifying that the predicted critical control rod position is within the limits of Specification 3.1.3.6.

See ITS 3.1.1

*See Special Test Exception 3.10.1

See ITS 3.1.1

REACTIVITY CONTROL SYSTEMS

SHUTDOWN MARGIN - T_{avg} Less Than or Equal to 200°F

LIMITING CONDITION FOR OPERATION

3.1.1.2 The SHUTDOWN MARGIN shall be greater than or equal to 1.0% delta k/k. See ITS 3.1.1

APPLICABILITY: MODE 5.

ACTION:

With the SHUTDOWN MARGIN less than 1.0% delta k/k, immediately initiate and continue boration at greater than or equal to 35 gpm of a solution containing greater than or equal to 6120 ppm boron or equivalent until the required SHUTDOWN MARGIN is restored.

SURVEILLANCE REQUIREMENTS

~~4.1.1.2 The SHUTDOWN MARGIN shall be determined to be greater than or equal to 1.0% delta k/k:~~ L09

~~a. Within one hour after detection of an inoperable control rod(s) and at least once per 12 hours thereafter while the rod(s) is inoperable.~~ If the inoperable control rod is immovable or untrippable, the SHUTDOWN MARGIN shall be verified acceptable with an increased allowance for the withdrawn worth of the immovable or untrippable control rod(s). See ITS Chapter 1.0

b. At least once per 24 hours by consideration of the following factors: See ITS 3.1.1

1. Reactor coolant system boron concentration,
2. Control rod position,
3. Reactor coolant system average temperature,
4. Fuel burnup based on gross thermal energy generation,
5. Xenon concentration, and
6. Samarium concentration.

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ITS (A01) ITS 3.1.4

REACTIVITY CONTROL SYSTEMS

~~3/4.1.3 MOVABLE CONTROL ASSEMBLIES~~ Alignment Limits (A01)

Rod GROUP HEIGHT

LIMITING CONDITION FOR OPERATION

LCO 3.1.4 — 3.1.3.1 All full length (shutdown and control) rods shall be OPERABLE and positioned within ± 12 steps (indicated position) of their group step counter demand position.

Applicability — APPLICABILITY: Modes 1~~*~~ and 2~~*~~. (A02)

ACTION:

ACTION A — a. With one or more full length rods untrippable, determine that the SHUTDOWN MARGIN requirement of Specification 3.1.1.1 is satisfied within 1 hour [Add proposed Required Action A.1.2] (L01) and be in HOT STANDBY within 6 hours.

ACTION D — b. With more than one full length rod misaligned from the group step counter demand position by more than ± 12 steps (indicated position), [Add proposed Required Action D.1.1 and D.1.2] (M01) be in HOT STANDBY within 6 hours.

ACTION B — c. With one full length rod misaligned from its group step counter demand height by more than ± 12 steps (indicated position), POWER OPERATION may continue provided that within one hour either:

1. The rod is restored within the above alignment requirements, or

2. ~~The remainder of the rods in the group with the misaligned rod are aligned to within ± 12 steps of the misaligned rod while maintaining the rod sequence and insertion limit of specification 3.1.3.6. The THERMAL POWER level shall be restricted pursuant to Specification 3.1.3.6 during subsequent operation, or~~ (A03)

3. ~~The rod is declared inoperable and~~ (L02) the SHUTDOWN MARGIN requirement of Specification 3.1.1.1 is satisfied. [Add proposed Required Action B.2.1.2] (L01) POWER OPERATION may then continue provided that:

   a) A reevaluation of ~~each~~ accident analysis ~~of Table 3.1-1~~ (LA03) is performed within 5 days; this reevaluation shall confirm that the previously analyzed results of these accidents remain valid for the duration of operation under these conditions.

~~* See Special Test Exceptions 3.10.2 and 3.10.3.~~ (A02)

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REACTIVITY CONTROL SYSTEMS

ACTION: (Continued)

b) The SHUTDOWN MARGIN requirement of Specification 3.1.1.1 is determined at least once per 12 hours.

ACTION B c) A power distribution map is obtained from the movable incore detectors F_Q (Z) and $F^N_{\Delta H}$ are verified to be within their limits within 72 hours.

d) The THERMAL POWER level is reduced to less than or equal to 75% of RATED THERMAL POWER within ~~one~~ two hour ~~and within the next 4 hours the high neutron flux trip setpoint is reduced to less than or equal to 85% of RATED THERMAL POWER~~. L03 L04

Add proposed ACTION C M02

SURVEILLANCE REQUIREMENTS

SR 3.1.4.1 4.1.3.1.1 The position of each full length rod shall be determined to be within the group demand limit by verifying the individual rod positions ~~at least once per 12 hours except during time intervals when the Rod Position Deviation Monitor is inoperable, then verify the group positions at least once per 4 hours~~ In accordance with the Surveillance Frequency Control Program. LA01 L05

SR 3.1.4.2 4.1.3.1.2 Each full-length rod not fully inserted in the core shall be determined to be trippable by verifying rod freedom of movement by movement of ≥ 10 steps in either direction ~~at least once per 92 days~~ In accordance with the Surveillance Frequency Control Program. LA01

ITS A01 ITS 3.1.4

TABLE 3.1-1

ACCIDENT ANALYSES REQUIRING REEVALUATION
IN THE EVENT OF AN INOPERABLE FULL LENGTH ROD

Rod Cluster Control Assembly Insertion Characteristics

Rod Cluster Control Assembly Misalignment

Loss Of Reactor Coolant From Small Ruptured Pipes Or From Cracks In Large Pipes Which Actuates The Emergency Core Cooling System

Single Rod Cluster Control Assembly Withdrawal At Full Power

Major Reactor Coolant System Pipe Ruptures (Loss Of Coolant Accident)

Major Secondary System Pipe Rupture

Rupture of a Control Rod Drive Mechanism Housing (Rod Cluster Control Assembly Ejection)

LA03

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ITS A01 ITS 3.1.4

REACTIVITY CONTROL SYSTEMS

ROD DROP TIME

LIMITING CONDITION FOR OPERATION

LA02

SR 3.1.4.3 3.1.3.4 The individual full length (shutdown and control) rod drop time from the fully withdrawn position# shall be less than or equal to 2.7 seconds from beginning of decay of stationary gripper coil voltage to dashpot entry with:

500 L06

a. T_{avg} greater than or equal to ~~541~~°F, and

b. All reactor coolant pumps operating.

Applicability APPLICABILITY: Modes 1 and 2.

ACTION:

~~a. With the drop time of any full length rod determined to exceed the above limit, restore the rod drop time to within the above limit prior to proceeding to MODE 1 or 2.~~ A04

~~b. With the rod drop times within limits but determined with 3 reactor coolant pumps operating, operation may proceed provided THERMAL POWER is restricted to less than or equal to 71% of RATED THERMAL POWER.~~ M03

Add proposed ACTION A M04

SURVEILLANCE REQUIREMENTS

SR 3.1.4.3 4.1.3.4 The rod drop time of full length rods shall be demonstrated through measurement prior to reactor criticality:

a. For all rods following each removal of the reactor vessel head,

~~b. For specifically affected individual rods following any maintenance on or modification to the control rod drive system which could affect the drop time of those specific rods, and~~ L07

~~c. At least once per 18 months.~~ L08

~~# Fully withdrawn shall be the condition where shutdown and control banks are at a position within the interval of ≥222 and ≤231 steps withdrawn, inclusive.~~ LA02

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ITS A01 ITS 3.1.4

3/4.1 REACTIVITY CONTROL SYSTEMS

3/4.1.1 BORATION CONTROL

SHUTDOWN MARGIN - $T_{avg} \geq 200°F$

LIMITING CONDITION FOR OPERATION

3.1.1.1 The SHUTDOWN MARGIN shall be greater than or equal to 1.6% delta k/k for 4 loop operation. See ITS 3.1.1

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

ACTION:

With the SHUTDOWN MARGIN less than 1.6% delta k/k, immediately initiate and continue boration at greater than or equal to 35 gpm of a solution containing greater than or equal to 6120 ppm boron or equivalent until the required SHUTDOWN MARGIN is restored.

SURVEILLANCE REQUIREMENTS

~~4.1.1.1.1 The SHUTDOWN MARGIN shall be determined to be greater than or equal to 1.6% delta k/k:~~ L09

a. ~~Within one hour after detection of an inoperable control rod(s) and at least once per 12 hours thereafter while the rod(s) is inoperable.~~ If the inoperable control rod is immovable or untrippable, the above required SHUTDOWN MARGIN shall be verified acceptable with an increased allowance for the withdrawn worth of the immovable or untrippable control rod(s). See ITS Chapter 1.0

b. When in MODE 1 or MODE 2 with K_{eff} greater than or equal to 1.0, at least once per 12 hours by verifying that control bank withdrawal is within the limits of Specification 3.1.3.6.

c. When in MODE 2, with K_{eff} less than 1.0, within 4 hours prior to achieving reactor criticality by verifying that the predicted critical control rod position is within the limits of Specification 3.1.3.6. See ITS 3.1.1

d. Prior to initial operation above 5% RATED THERMAL POWER after each fuel loading, by consideration of the factors of e below, with the control banks at the maximum insertion limit of Specification 3.1.3.6.

* See Special Test Exception 3.10.1 See ITS 3.1.1

A01

REACTIVITY CONTROL SYSTEMS

SHUTDOWN MARGIN - T_{avg} Less Than or Equal to 200°F

LIMITING CONDITION FOR OPERATION

3.1.1.2 The SHUTDOWN MARGIN shall be greater than or equal to 1.0% delta k/k.

See ITS 3.1.1

APPLICABILITY: MODE 5.

ACTION:

With the SHUTDOWN MARGIN less than 1.0% delta k/k, immediately initiate and continue boration at greater than or equal to 35 gpm of a solution containing greater than or equal to 6120 ppm boron or equivalent until the required SHUTDOWN MARGIN is restored.

SURVEILLANCE REQUIREMENTS

~~4.1.1.2 The SHUTDOWN MARGIN shall be determined to be greater than or equal to 1.0% delta k/k:~~

L09

~~a. Within one hour after detection of an inoperable control rod(s) and at least once per 12 hours thereafter while the rod(s) is inoperable.~~ If the inoperable control rod is immovable or untrippable, the SHUTDOWN MARGIN shall be verified acceptable with an increased allowance for the withdrawn worth of the immovable or untrippable control rod(s).

See ITS Chapter 1.0

b. At least once per 24 hours by consideration of the following factors:

1. Reactor coolant system boron concentration,
2. Control rod position,
3. Reactor coolant system average temperature,
4. Fuel burnup based on gross thermal energy generation,
5. Xenon concentration, and
6. Samarium concentration.

See ITS 3.1.1

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DISCUSSION OF CHANGES
ITS 3.1.4, ROD GROUP ALIGNMENT LIMITS

ADMINISTRATIVE CHANGES

A01 In the conversion of the Sequoyah Nuclear Plant (SQN) Current Technical Specifications (CTS) to the plant specific Improved Technical Specifications (ITS), certain changes (wording preferences, editorial changes, reformatting, revised numbering, etc.) are made to obtain consistency with NUREG - 1431, Rev. 4.0, "Standard Technical Specifications - Westinghouse Plants" (ISTS) and additional Technical Specification Task Force (TSTF) travelers included in this submittal.

These changes are designated as administrative changes and are acceptable because they do not result in technical changes to the CTS.

A02 CTS 3.1.3.1 Applicability is modified by Footnote * which states "See Special Test Exceptions 3.10.2 and 3.10.3." ITS 3.1.4 Applicability does not contain this Note. This changes the CTS by not including Footnote *.

The purpose of Footnote * is to alert the Technical Specification user that a Special Test Exception exists that may modify the Applicability of this Specification. It is an ITS convention to not include these types of footnotes or cross-references. This change is designated as administrative because it does not result in a technical change to the CTS.

A03 CTS 3.1.3.1 ACTION c.2 states that with one full length rod misaligned from its group step counter demand height by more than ± 12 steps (indicated position), POWER OPERATION may continue provided that within one hour, the remainder of the rods in the group with the misaligned rod are aligned to within ± 12 steps of the misaligned rod while maintaining the rod sequence and insertion limit of specification 3.1.3.6. The THERMAL POWER level shall be restricted pursuant to Specification 3.1.3.6 during subsequent operation. ITS 3.1.4 does not contain a Required Action stating that the remainder of the rods in the group must be aligned with the misaligned rod. This changes the CTS by not including a specific Required Action stating that the remainder of the rods in the group must be aligned with the misaligned rod.

This change is acceptable because the technical requirements have not changed. The moving of the remaining rods to within the LCO limit of the misaligned rod, while complying with all of the other rod position requirements, is simply restoring compliance with the LCO. Restoration of compliance with the LCO is always an available Required Action and it is the convention of the ITS to not state such "restore" options explicitly unless it is the only action or is required for clarity. This change is designated as administrative because it does not result in technical changes to the CTS.

A04 CTS 3.1.3.4 ACTION a states with the drop time of any full length rod determined to exceed the above limit restore the rod drop time to within the above limit prior to proceeding to MODE 1 or 2. ITS 3.1.4 does not have a similar requirement. This changes the CTS by not explicitly requiring, in the ITS 3.1.4 ACTIONS, restoration of the rod drop time prior to proceeding to MODE 1 or 2.

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ITS 3.1.4, ROD GROUP ALIGNMENT LIMITS

CTS 4.0.4 and ITS SR 3.0.4 require verification that Surveillances are met prior to entering the MODE in which they apply. CTS 4.0.4 and ITS SR 3.0.4 also prohibit entering a MODE or condition with the Surveillance not met and while relying on actions. Therefore, since the Applicability of CTS 3.1.3.4 is MODES 1 and 2, the action prohibiting entry into MODES 1 and 2 with the rod drop time requirements not met is redundant to CTS 4.0.4 and ITS 3.0.4. This change is acceptable because the technical requirements have not changed. This change is designated as administrative because it does not result in a technical change to the CTS.

MORE RESTRICTIVE CHANGES

M01 CTS 3.1.3.1 ACTION b states "With more than one full length rod misaligned from the group step counter demand position by more than ± 12 steps (indicated position), be in HOT STANDBY within 6 hours." ITS 3.1.4 ACTION D adds additional requirements (ITS 3.1.4 Required Actions D.1.1 and D.1.2) to verify SHUTDOWN MARGIN is within the limits within 1 hour or to initiate boration to restore the required SHUTDOWN MARGIN to within limits. This changes the CTS by adding two additional Required Actions.

The purpose of CTS 3.1.3.1 ACTION a is to place the unit in a MODE in which the equipment is not required. More than one control rod misaligned from its group average has the potential to reduce the SHUTDOWN MARGIN. Therefore, the SHUTDOWN MARGIN must be evaluated. ITS 3.1.4 adds Required Actions to allow verification that the SHUTDOWN MARGIN is within the limit or to borate to restore the SHUTDOWN MARGIN to within limits. These new Required Actions must be accomplished within 1 hour. The one hour allows the operator adequate time to determine the SHUTDOWN MARGIN. Restoration of the required SHUTDOWN MARGIN, if necessary, requires increasing the RCS boron concentration to provide negative reactivity. The required Completion Time of 1 hour for initiating boration is reasonable, based on the time required for potential xenon redistribution, the low probability of an accident occurring, and the steps required to complete this action. This allows the operator sufficient time to align the required valves and start the boric acid pumps. Boration will continue until the required SHUTDOWN MARGIN is restored. This change is acceptable because it is consistent with the assumptions of the safety analyses to be within the SHUTDOWN MARGIN limit. This change has been designated as more restrictive because it adds explicit actions to verify SHUTDOWN MARGIN or to restore SHUTDOWN MARGIN within limits.

M02 CTS 3.1.3.1 ACTION c requires that with one full length rod misaligned, POWER OPERATION may continue provided certain actions are completed within one hour. If those actions are not complete, CTS 3.0.3 is required to be entered since no further actions are specified. CTS 3.0.3 allows 1 hour to initiate action and 6 additional hours for the unit to be placed in MODE 3. ITS 3.1.4 ACTION C states that if the Required Action and associated Completion Time of Condition B is not met, the unit must be in MODE 3 within 6 hours. This changes the CTS by providing a specific default condition instead of requiring entry into CTS 3.0.3, and thereby reduces the time to reach MODE 3 following discovery of a misaligned rod if Required Actions are not met from 7 hours to 6 hours.

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ITS 3.1.4, ROD GROUP ALIGNMENT LIMITS

The purpose of requiring a shutdown when a rod misalignment cannot be corrected is to bring the unit to a subcritical condition prior to the buildup of an undesirable reactor core power distribution. This change is acceptable because the proposed default condition will require the plant to be in a condition where the rod group alignment limits are no longer applicable. The proposed Completion Time of 6 hours is reasonable, based on operating experience, for reaching MODE 3 from full power in an orderly manner and without challenging unit systems. This change is designated as more restrictive since the 1 hour specified in CTS 3.0.3 no longer applies.

M03 CTS 3.1.3.4 ACTION b provides an allowance for operation to proceed with THERMAL POWER restricted to less than or equal to 71% of RATED THERMAL POWER, with rod drop times within limits but determined with 3 reactor coolant pumps operating. ITS 3.1.4 does not contain a similar allowance. This changes the CTS by not allowing continued operation at reduce power when the rod drop times are determined with only 3 reactor coolant pumps operating.

The purpose of CTS 3.1.3.4 is to ensure the rods insert within the rod drop criteria. This change is acceptable because ITS SR 3.1.4.3 requires verification of the rod drop times be performed with all of the RCPs operating and the average moderator temperature is ≥ 500°F. Therefore, ITS 3.1.4 will not allow the rod drop times to be determined with only 3 reactor coolant pumps operating. This change is designated as more restrictive because an allowance is being removed from the CTS.

M04 CTS 3.1.3.4 ACTION a requires that with the drop time of any full length rod determined to exceed the above limit, restore the rod drop time to within the above limit prior to proceeding to MODE 1 or 2. CTS 3.1.3.4 ACTION b requires that with the rod drop times within limits but determined with 3 reactor coolant pumps operating, operation may proceed provided THERMAL POWER is restricted to less than or equal to 71% of RATED THERMAL POWER. However, no specific actions are stated in CTS 3.1.3.4 when the unit is in MODES 1 and 2 when the drop time is discovered to not be within limits. Therefore, CTS 3.0.3 entry would be required. CTS 3.0.3 allows one hour to prepare for a shutdown and requires the unit to be in HOT STANDBY (MODE 3) within 7 hours. ITS 3.1.4 ACTION A applies with one or more rods inoperable. ITS 3.1.4 ACTION A requires verification that the SDM is within the limits specified in the COLR or initiate boration to restore the SDM to within limit within one hour, and to be in MODE 3 within 6 hours. This changes the CTS by adding new requirements associated with SDM and changing the requirement to be outside of the MODE of Applicability from 7 hours to 6 hours.

The purpose of requiring a shutdown when a drop time of any full length rod is not met is to bring the unit to a subcritical condition. With one or more slow control rod(s) there is a potential to reduce SDM. Therefore, SDM must be evaluated. One hour allows the operator adequate time to determine SDM. Restoration of the required SDM, if necessary, requires increasing the RCS boron concentration to provide negative reactivity. The required Completion Time of 1 hour for initiating boration is reasonable, based on the time required for potential xenon redistribution in the reactor core, the low probability of an

DISCUSSION OF CHANGES
ITS 3.1.4, ROD GROUP ALIGNMENT LIMITS

accident occurring, and the steps required to complete the action. This allows the operator sufficient time to align the required valves and start the boric acid pumps. Boration will continue until the required SDM is restored. In addition, the new time to reach MODE 3 is consistent with the time provided in other specifications. This change is acceptable because it is consistent with the requirements of the assumptions of the safety analyses to be within the SDM limit. The change has been designated as more restrictive because it adds explicit actions to verify SDM or to restore SDM within limits and reduces the time required to be in MODE 3.

RELOCATED SPECIFICATIONS

None

REMOVED DETAIL CHANGES

LA01 *(Type 5 – Removal of SR Frequency to the Surveillance Frequency Control Program)* CTS 4.1.3.1.1 requires that the position of each full length rod shall be determined to be within the group demand limit by verifying the individual rod positions at least once per 12 hours. CTS 4.1.3.1.2 requires each full-length rod not fully inserted in the core shall be determined to be trippable by verifying rod freedom of movement by movement of ≥ 10 steps in either direction at least once per 92 days. ITS SR 3.1.4.1 and SR 3.4.1.2 require similar Surveillances and specify the periodic Frequencies as, "In accordance with the Surveillance Frequency Control Program." This changes the CTS by moving the specified Frequencies for this SR and associated Bases to the Surveillance Frequency Control Program.

The removal of these details related to Surveillance Requirement Frequencies from the Technical Specifications is acceptable, because this type of information is not necessary to be included in the Technical Specifications to provide adequate protection of public health and safety. The existing Surveillance Frequencies are removed from Technical Specifications and placed under licensee control pursuant to the methodology described in NEI 04-10. A new program (Surveillance Frequency Control Program) is being added to the Administrative Controls section of the Technical Specifications describing the control of Surveillance Frequencies. The surveillance test requirements remain in the Technical Specifications. The control of changes to the Surveillance Frequencies will be in accordance with the Surveillance Frequency Control Program. The Program shall ensure that Surveillance Requirements specified in the Technical Specifications are performed at intervals sufficient to assure the associated Limiting Conditions for Operation are met. This change is designated as a less restrictive removal of detail change, because the Surveillance Frequencies are being removed from the Technical Specifications.

LA02 *(Type 1 – Removing Details of System Design and System Description, Including Design Limits)* CTS 3.1.3.4 requires the individual full length (shutdown and control) rod drop time from the fully withdrawn position shall be less than or equal to 2.7 seconds from beginning of decay of stationary gripper coil voltage to

DISCUSSION OF CHANGES
ITS 3.1.4, ROD GROUP ALIGNMENT LIMITS

dashpot entry with T_{avg} greater than or equal to 541°F and all reactor coolant pumps operating. Additionally, it contains a footnote (footnote #) which states "Fully withdrawn shall be the condition where shutdown and control banks are at a position within the interval of $\geq$222 and $\leq$231 steps withdrawn, inclusive." ITS 3.1.4 does not contain the footnote. This changes the CTS by relocating the footnote to the Bases.

The removal of these details, that are related to system design, from the Technical Specifications, is acceptable because this type of information is not necessary to be included in the Technical Specifications to provide adequate protection of public health and safety. The ITS retains the requirement for performing rod drop time testing from the fully withdrawn position. Also, this change is acceptable because the removed information will be adequately controlled in the ITS Bases. Changes to the Bases are controlled by the Technical Specification Bases Control Program in Chapter 5. This program provides for the evaluation of changes to ensure the Bases are properly controlled. This change is designated as a less restrictive removal of detail change because information relating to system design is being removed from the Technical Specifications.

LA03 *(Type 3 – Removing Procedural Details for Meeting TS Requirements or Reporting Requirements)* CTS 3.1.3.1 ACTION c.3.a) states when a rod is misaligned, POWER OPERATION may continue if a reevaluation of each accident analysis in Table 3.1-1 is performed within 5 days. This reevaluation shall confirm that the previously analyzed results of these accidents remain valid for the duration of operation under these conditions. ITS 3.1.4 Required Action B.2.6 states that when one rod is misaligned, re-evaluate the safety analyses and confirm results remain valid for the duration of operation under these conditions. This changes the CTS by moving the accidents listed in Table 3.1-1 to the UFSAR.

The removal of these details from the Technical Specifications is acceptable because this type of information is not necessary to be included in the Technical Specifications to provide adequate protection of public health and safety. The ITS still retains the requirement to re-evaluate the safety analyses and confirm results remain valid for the duration of operation under these conditions. Additionally, this change is acceptable because the removed information will be adequately controlled in the UFSAR. The UFSAR is controlled under 10 CFR 50.59, which ensures changes are properly evaluated. This change is designated as a less restrictive removal of detail change because information relating to procedural detail is being removed from the Technical Specifications.

<u>LESS RESTRICTIVE CHANGES</u>

L01 *(Category 4 – Relaxation of Required Action)* CTS 3.1.3.1 ACTION a states, in part, with one or more full length rods untrippable, determine that the SHUTDOWN MARGIN requirement of Specification 3.1.1.1 is satisfied within 1 hour. CTS 3.1.3.1 ACTION c.3 states, in part, with one full length rod misaligned from its group step counter demand height by more than ± 12 steps (indicated

DISCUSSION OF CHANGES
ITS 3.1.4, ROD GROUP ALIGNMENT LIMITS

position), the rod is declared inoperable and the SHUTDOWN MARGIN requirement of Specification 3.1.1.1 is satisfied within 1 hour. ITS 3.1.4 ACTION A and B requires, within 1 hour, to verify SHUTDOWN MARGIN is within the limits specified in the COLR or to initiate boration to restore SDM to within limits. This changes the CTS by allowing boration to restore SHUTDOWN MARGIN.

The purpose of CTS 3.1.3.1 ACTION a and c.3 is to verify adequate SHUTDOWN MARGIN exists. This change is acceptable because the ITS 3.1.4 Required Actions are used to establish remedial measures that must be taken in response to the degraded conditions in order to minimize risk associated with continued operation while providing time to repair the inoperable features. When a rod is inoperable or misaligned, boration may be required to reestablish compliance with the SHUTDOWN MARGIN requirements. Providing a short period of time to reestablish the SHUTDOWN MARGIN requirement instead of entering ITS LCO 3.0.3 is justified because of the existing conservatisms in the SHUTDOWN MARGIN calculations. This change has been designated as less restrictive because less stringent Required Actions are being applied in the ITS than were applied in the CTS.

L02 *(Category 4 – Relaxation of Required Action)* CTS 3.1.3.1 ACTION c specifies the requirements for one full length rod misaligned from its group step counter demand height by more than the allowed rod alignment. CTS 3.1.3.1 ACTION c.3 requires the affected rod to be declared inoperable. ITS 3.1.4 ACTION B specifies requirements for one rod not within alignment limits and does not require that the rod be declared inoperable. This changes the CTS by deleting the requirement to declare a misaligned rod inoperable.

The purpose of ITS 3.1.4 is to ensure that the shutdown and control rods are capable of performing their safety function of inserting into the core when required. A secondary function of the control rods is to maintain alignment so that the reactor core power distribution is consistent with the safety analyses. This change is acceptable because the LCO requirements continue to ensure that structures, systems, and components are maintained consistent with the safety analyses and licensing basis. In the ITS, rod OPERABILITY is related only to trippability, and a misaligned rod is not considered inoperable if it can be tripped. Misalignment is addressed by the ITS 3.1.4 LCO, but is separate from OPERABILITY. In both cases, trippability and misalignment, the ITS continues to provide appropriate compensatory measures. This change is designated as less restrictive because less stringent Required Actions are being applied in the ITS than were applied in the CTS.

L03 (*Category 4 – Relaxation of Required Action)* CTS 3.1.3.1 ACTION c.3.d) states that with one rod misaligned, reduce the THERMAL POWER level to less than 75% of the RATED THERMAL POWER within one hour. ITS 3.1.4 Required Action B.2.2 requires THERMAL POWER to be reduced to 75% of the RATED THERMAL POWER within two hours. This changes the CTS by changing the Completion Time from one hour to two hours.

The purpose of CTS 3.1.3.1 ACTION c.3.d) is to reduce reactor core power to ensure that the increases in linear heat generation rate due to misalignment of a

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rod does not result in exceeding the design limits. This change is acceptable because the Completion Time is consistent with safe operation under the specified Condition, the capacity and capability of remaining features, and the low probability of a DBA occurring during the allowed Completion Time. The Completion Time of 2 hours gives the operator sufficient time to accomplish an orderly power reduction without challenging the Reactor Trip System. This change is designated as less restrictive because additional time is allowed to restore parameters to within the LCO limits than was allowed in the CTS.

L04 (*Category 4 – Relaxation of Required Action)* CTS 3.1.3.1 ACTION c.3.d) states that with one rod misaligned, reduce the high neutron flux setpoint to less than or equal to 85% of RATED THERMAL POWER within the next 4 hours. ITS 3.1.4 Required Action B.2.2 requires THERMAL POWER to be reduced to ≤ 75% RTP, but does not require the high neutron flux trip setpoint to be reduced. This changes the CTS by eliminating the Required Action to reduce the high neutron flux trip setpoint.

The purpose of CTS 3.1.3.1 ACTION c.3.d) is to reduce reactor core power to ensure that the increases in linear heat generation rate due to misalignment of a rod does not result in exceeding the design limits. This change is acceptable because the Required Actions are used to establish remedial measures that must be taken in response to the degraded conditions in order to minimize risk associated with continued operation while providing time to repair inoperable features. The Required Actions are consistent with safe operation under the specified Condition, the capacity and capability of remaining features, and a low probability of a DBA occurring during the repair period. Lowering the high neutron flux trip setpoint increases the chance of an inadvertent reactor trip due to the changes being made to the Reactor Trip System without providing commensurate amount of added safety. Administrative methods of maintaining reactor power below that allowed by the Required Action are sufficient to protect the core. This change is designated as less restrictive because less stringent Required Actions are being applied in the ITS than were applied in the CTS.

L05 *(Category 7 – Relaxation of Surveillance Frequency)* CTS 4.1.3.1.1 states that the position of each full length rod shall be determined to be within the group demand limit by verifying the individual rod positions at least once per 12 hours except during time intervals when the Rod Position Deviation Monitor is inoperable, then verifying the group positions at least once per 4 hours. ITS SR 3.1.4.1 requires verifying individual rod positions are within alignment limits in accordance with the Surveillance Frequency Control Program. This changes the CTS by eliminating the requirements to verify the individual rod position to be within alignment limits every 4 hours when the Rod Position Deviation Monitor is inoperable. See DOC LA01 for the relocation of the CTS 4.1.3.1.1 Frequency to the Surveillance Frequency Control Program.

The purpose of CTS 4.1.3.1.1 is to periodically verify that the rods are within the alignment limits specified in the LCO. This change is acceptable because the Surveillance Frequency has been evaluated to ensure that it provides an acceptable level of equipment reliability. Increasing the Frequency of rod position verification when the Rod Position Deviation Monitor is inoperable is unnecessary, since an inoperability of the alarm does not increase the probability

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ITS 3.1.4, ROD GROUP ALIGNMENT LIMITS

that the rods are misaligned. The Rod Deviation Monitor, as described in the safety analysis is indication only and is not credited for any automatic action; however, it is there to alert the operator to a dropped rod or misaligned rod by more than 5% span. Its use is not credited in the safety analyses. This change is designated as less restrictive because Surveillances will be performed less frequently under the ITS than under the CTS.

L06 *(Category 1 – Relaxation of LCO Requirements)* CTS 3.1.3.4 requires the individual full length (shutdown and control) rod drop time from the fully withdrawn position shall be less than or equal to 2.7 seconds from beginning of decay of stationary gripper coil voltage to dashpot entry with T_{avg} greater than or equal to 541°F and all reactor coolant pumps operating. ITS SR 3.1.4.3 specifies the rod drop time be verified at an RCS T_{avg} of ≥ 500°F. This changes the CTS by lowering the required temperature at which rod drop time must be verified.

The purpose of CTS 3.1.3.4 is to ensure the rods insert within the rod drop time criteria. The performance of rod drop time tests ensures that the required negative reactivity insertion (amount and rate) from a reactor trip is within the values assumed in the safety analyses. This change will allow rod drop testing to begin earlier during a startup following a refueling outage. The proposed change is acceptable because the specified rod drop time remains unchanged and the proposed 500°F test temperature is conservative compared to the CTS requirement of 541°F. Since the moderator becomes denser as the RCS temperature is decreased, a lower RCS temperature results in slower rod drops due to the density change of the water. However, the limiting rod drop time requirement of the CTS (2.7 seconds) is maintained in the ITS and must still be met. This change is designated as less restrictive because less stringent LCO requirements are being applied in the ITS than were applied in the CTS.

L07 *(Category 5 – Deletion of Surveillance Requirement)* CTS 4.1.3.4.b requires the rod drop time of full length rods shall be demonstrated through measurement prior to reactor criticality for specifically affected individual rods following any maintenance on or modification to the control rod drive system which could affect the drop time of those specific rods. ITS 3.1.4 does not contain this testing requirement. This changes the CTS by not explicitly requiring post-maintenance testing on full length rods.

The purpose of CTS 4.1.3.4.b is to verify OPERABILITY of the control rods following maintenance that could alter their operation. This change is acceptable because the deleted Surveillance Requirement is not necessary to verify that the equipment used to meet the LCO can perform its required functions. Thus, appropriate equipment continues to be tested in a manner and at a Frequency necessary to give confidence that the equipment can perform its assumed safety function. Any time the OPERABILITY of a system or component has been affected by repair, maintenance, modification, or replacement of a component, post-maintenance testing is required to demonstrate the OPERABILITY of the system or component. This is described in the Bases for ITS SR 3.0.1 and required under ITS SR 3.0.1. The OPERABILITY requirements for the rod control system are described in the Bases for ITS 3.1.4. In addition, the requirements of 10 CFR 50, Appendix B, Section XI (Test Control) provide

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adequate controls for test programs to ensure that testing incorporates applicable acceptance criteria. Compliance with 10 CFR 50, Appendix B, is required under the unit operating license. As a result, post-maintenance testing will continue to be performed and an explicit requirement in the Technical Specifications is not necessary. This change is designated as less restrictive because Surveillances which are required in the CTS will not be required in the ITS.

L08 *(Category 5 – Deletion of Surveillance Requirement)* CTS 4.1.3.4 requires drop testing of full length rods to be demonstrated through measurement prior to reactor criticality following each removal of the reactor vessel head and at least once per 18 months. ITS 3.1.4.3 requires the test to be performed prior to criticality after each removal of the reactor head. This changes the CTS by deleting the requirement to perform this test at least once per 18 months.

The purpose of CTS 4.1.3.4 is to ensure the rods insert within the rod drop criteria. This change is acceptable because the deleted Surveillance Requirement is not necessary to verify that the equipment used to meet the LCO can perform its safety function. Thus, appropriate equipment continues to be tested in a manner and at a Frequency necessary to give confidence the equipment can perform its assumed safety function. The requirements in the CTS to perform the test following each removal of the reactor vessel head and at least once per 18 months normally coincide with one another. The head is removed once per 18 months unless there is a need to remove the head prior to the end of the cycle. This change is designated as less restrictive because a Surveillance that was required in the CTS will not be performed in the ITS.

L09 *(Category 5 – Deletion of Surveillance Requirement)* CTS 4.1.1.1.1.a requires the SHUTDOWN MARGIN to be determined to be greater than or equal to 1.6% delta k/k within one hour after detection of an inoperable control rod(s) and at least once per 12 hours thereafter while the rod is inoperable. CTS 4.1.1.2.a requires the SHUTDOWN MARGIN to be determined to be greater than or equal to 1.0% delta k/k within one hour after detection of an inoperable control rod(s) and at least once per 12 hours thereafter while the rod is inoperable. These requirements are applicable in MODES 1, 2, 3, 4, and 5. ITS 3.1.4 Required Action A.1.1 requires the verification of SDM to be within limits within 1 hour. This verification is required in MODES 1 and 2 with one or more control rod(s) inoperable. This changes the CTS by not requiring any explicit SDM verifications for inoperable control rod(s) in MODES 3, 4, and 5 other than the normal verifications specified in ITS SR 3.1.1.1 (once every 24 hours). For MODES 1 and 2 operations, this changes the CTS by not requiring the verification of SDM on a once per 12 hour basis for one or more inoperable rod(s).

The purpose of CTS 4.1.1.1.1.a and CTS 4.1.1.2.a is to provide the appropriate compensatory measures to determine SDM when control rod(s) are inoperable during operations in MODES 1, 2, 3, 4, and 5. The purpose of the ITS 3.1.4 ACTIONS are to provide the appropriate compensatory actions for inoperable control rods in MODES 1 and 2. The purpose of ITS SR 3.1.1.1 is to provide the normal Frequency for verification of SDM regardless of the status of the control rod(s). When the plant is operating in MODES 1 and 2, with one or more rod(s) inoperable, the unit must be in MODE 3 within 6 hours. After reaching MODE 3, ITS 3.1.4 no longer applies therefore it is inappropriate to specify additional

DISCUSSION OF CHANGES
ITS 3.1.4, ROD GROUP ALIGNMENT LIMITS

actions after the unit is outside the Applicability of the Specification. Nevertheless, SDM must still be verified in accordance with ITS SR 3.1.1.1 every 24 hours. This SDM verification must also compensate for the reactivity worth of the control rod that is not fully inserted since it is required by the definition of SDM. Therefore, ITS 3.1.4 ACTIONS provide the appropriate compensatory measures. In MODES 3 and 4, SDM will be monitored in accordance with ITS SR 3.1.1.1 every 24 hours. This change is acceptable since SDM will still be required to be monitored every 24 hours, and based on the definition of SDM the reactivity worth of any rod not capable of being fully inserted must be accounted for in the determination of SDM. Thus, SDM continues to be monitored in a manner and at a Frequency necessary to give confidence that the assumptions in the safety analyses are protected. This change is designated as less restrictive because Surveillances which are required in the CTS will not be required in the ITS.

Improved Standard Technical Specifications (ISTS) Markup and Justification for Deviations (JFDs)

3.1 REACTIVITY CONTROL SYSTEMS

3.1.4 Rod Group Alignment Limits

3.1.3.1 LCO 3.1.4 All shutdown and control rods shall be OPERABLE.

AND

Individual indicated rod positions shall be within 12 steps of their group step counter demand position.

3.1.3.1 Applicability, 3.1.3.4 Applicability APPLICABILITY: MODES 1 and 2.

ACTIONS

	CONDITION	REQUIRED ACTION	COMPLETION TIME
3.1.3.1 ACTION a, 4.1.1.1.1, 4.1.1.2, DOC M04	A. One or more rod(s) inoperable.	A.1.1 Verify SDM to be within the limits specified in the COLR.	1 hour
		OR	
		A.1.2 Initiate boration to restore SDM to within limit.	1 hour
		AND	
		A.2 Be in MODE 3.	6 hours
3.1.3.1 ACTION c	B. One rod not within alignment limits.	B.1 Restore rod to within alignment limits.	1 hour
		OR	
		B.2.1.1 Verify SDM to be within the limits specified in the COLR.	1 hour
		OR	

ACTIONS (continued)

	CONDITION	REQUIRED ACTION	COMPLETION TIME	
3.1.3.1 ACTION c		B.2.1.2 Initiate boration to restore SDM to within limit. AND B.2.2 Reduce THERMAL POWER to ≤ 75% RTP. AND B.2.3 Verify SDM is within the limits specified in the COLR. AND B.2.4 Perform SR 3.2.1.1 ~~and SR 3.2.1.2~~. AND B.2.5 Perform SR 3.2.2.1. AND B.2.6 Re-evaluate safety analyses and confirm results remain valid for duration of operation under these conditions.	1 hour 2 hours Once per 12 hours 72 hours 72 hours 5 days	1
DOC M02	C. Required Action and associated Completion Time of Condition B not met.	C.1 Be in MODE 3.	6 hours	
3.1.3.1 ACTION b	D. More than one rod not within alignment limit.	D.1.1 Verify SDM is within the limits specified in the COLR. OR	1 hour	

ACTIONS (continued)

	CONDITION	REQUIRED ACTION	COMPLETION TIME
3.1.3.1 ACTION b		D.1.2 Initiate boration to restore required SDM to within limit. AND	1 hour
		D.2 Be in MODE 3.	6 hours

SURVEILLANCE REQUIREMENTS

	SURVEILLANCE		FREQUENCY	
4.1.3.1.1	SR 3.1.4.1	Verify individual rod positions within alignment limit.	[12 hours OR In accordance with the Surveillance Frequency Control Program]	2 2
4.1.3.1.2	SR 3.1.4.2	Verify rod freedom of movement (trippability) by moving each rod not fully inserted in the core ≥ 10 steps in either direction.	[92 days OR In accordance with the Surveillance Frequency Control Program]	2 2

SURVEILLANCE REQUIREMENTS (continued)

	SURVEILLANCE	FREQUENCY	
3.1.3.4, 4.1.3.4 SR 3.1.4.3	Verify rod drop time of each rod, from the fully withdrawn position, is ≤ [2.2] 2.7 seconds from the beginning of decay of stationary gripper coil voltage to dashpot entry, with: a. T_{avg} ≥ 500°F and b. All reactor coolant pumps operating.	Prior to criticality after each removal of the reactor head	3

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3.1 REACTIVITY CONTROL SYSTEMS

3.1.4 Rod Group Alignment Limits

3.1.3.1

LCO 3.1.4 All shutdown and control rods shall be OPERABLE.

AND

Individual indicated rod positions shall be within 12 steps of their group step counter demand position.

3.1.3.1 Applicability, 3.1.3.4 Applicability

APPLICABILITY: MODES 1 and 2.

ACTIONS

	CONDITION	REQUIRED ACTION	COMPLETION TIME
3.1.3.1 ACTION a, 4.1.1.1.1, 4.1.1.2, DOC M04	A. One or more rod(s) inoperable.	A.1.1 Verify SDM to be within the limits specified in the COLR. OR A.1.2 Initiate boration to restore SDM to within limit. AND A.2 Be in MODE 3.	1 hour 1 hour 6 hours
3.1.3.1 ACTION c	B. One rod not within alignment limits.	B.1 Restore rod to within alignment limits. OR B.2.1.1 Verify SDM to be within the limits specified in the COLR. OR	1 hour 1 hour

ACTIONS (continued)

	CONDITION	REQUIRED ACTION	COMPLETION TIME	
3.1.3.1 ACTION c		B.2.1.2 Initiate boration to restore SDM to within limit. <u>AND</u> B.2.2 Reduce THERMAL POWER to ≤ 75% RTP. <u>AND</u> B.2.3 Verify SDM is within the limits specified in the COLR. <u>AND</u> B.2.4 Perform SR 3.2.1.1 ~~and SR 3.2.1.2~~. <u>AND</u> B.2.5 Perform SR 3.2.2.1. <u>AND</u> B.2.6 Re-evaluate safety analyses and confirm results remain valid for duration of operation under these conditions.	1 hour 2 hours Once per 12 hours 72 hours 72 hours 5 days	1
DOC M02	C. Required Action and associated Completion Time of Condition B not met.	C.1 Be in MODE 3.	6 hours	
3.1.3.1 ACTION b	D. More than one rod not within alignment limit.	D.1.1 Verify SDM is within the limits specified in the COLR. <u>OR</u>	1 hour	

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ACTIONS (continued)

	CONDITION	REQUIRED ACTION	COMPLETION TIME
3.1.3.1 ACTION b		D.1.2 Initiate boration to restore required SDM to within limit. AND D.2 Be in MODE 3.	1 hour 6 hours

SURVEILLANCE REQUIREMENTS

	SURVEILLANCE		FREQUENCY	
4.1.3.1.1	SR 3.1.4.1	Verify individual rod positions within alignment limit.	[12 hours OR In accordance with the Surveillance Frequency Control Program]	2 2
4.1.3.1.2	SR 3.1.4.2	Verify rod freedom of movement (trippability) by moving each rod not fully inserted in the core ≥ 10 steps in either direction.	[92 days OR In accordance with the Surveillance Frequency Control Program]	2 2

SURVEILLANCE REQUIREMENTS (continued)

	SURVEILLANCE		FREQUENCY	
3.1.3.4, 4.1.3.4	SR 3.1.4.3	Verify rod drop time of each rod, from the fully withdrawn position, is ≤ ~~[2.2]~~ 2.7 seconds from the beginning of decay of stationary gripper coil voltage to dashpot entry, with: a. T_{avg} ≥ 500°F and b. All reactor coolant pumps operating.	Prior to criticality after each removal of the reactor head	3

JUSTIFICATION FOR DEVIATIONS
ITS 3.1.4, ROD GROUP ALIGNMENT LIMITS

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

2. ISTS SR 3.1.4.1 and SR 3.1.4.2 provide two options for controlling the Frequencies of Surveillance Requirements. SQN is proposing to control the Surveillance Frequencies under the Surveillance Frequency Control Program.

3. The ISTS contains bracketed information and/or values that are generic to Westinghouse vintage plants. The brackets are removed and the proper plant specific information/value is inserted to reflect the current licensing basis.

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Improved Standard Technical Specifications (ISTS) Bases Markup and Bases Justification for Deviations (JFDs)

B 3.1 REACTIVITY CONTROL SYSTEMS

~~B 3.3 INSTRUMENTATION~~ 4

B 3.1.4 Rod Group Alignment Limits

BASES

BACKGROUND

The OPERABILITY (i.e., trippability) of the shutdown and control rods is an initial assumption in all safety analyses that assume rod insertion upon reactor trip. Maximum rod misalignment is an initial assumption in the safety analysis that directly affects core power distributions and assumptions of available SDM.

The applicable criteria for these reactivity and power distribution design requirements are 10 CFR 50, Appendix A, GDC 10, "Reactor Design," GDC 26, "Reactivity Control System Redundancy and Capability" (Ref. 1), and 10 CFR 50.46, "Acceptance Criteria for Emergency Core Cooling Systems for Light Water Nuclear Power Plants" (Ref. 2).

Mechanical or electrical failures may cause a control or shutdown rod to become inoperable or to become misaligned from its group. Rod inoperability or misalignment may cause increased power peaking, due to the asymmetric reactivity distribution and a reduction in the total available rod worth for reactor shutdown. Therefore, rod alignment and OPERABILITY are related to core operation in design power peaking limits and the core design requirement of a minimum SDM.

Limits on rod alignment have been established, and all rod positions are monitored and controlled during power operation to ensure that the power distribution and reactivity limits defined by the design power peaking and SDM limits are preserved.

Rod cluster control assemblies (RCCAs), or rods, are moved by their control rod drive mechanisms (CRDMs). Each CRDM moves its RCCA one step (approximately ~~e~~ 5/8 inch) at a time, but at varying rates (steps per minute) depending on the signal output from the Rod Control System. 1

The RCCAs are divided among control banks and shutdown banks. Each bank may be further subdivided into two groups to provide for precise reactivity control. A group consists of two or more RCCAs that are electrically paralleled to step simultaneously. If a bank of RCCAs consists of two groups, the groups are moved in a staggered fashion, but always within one step of each other. ~~All units have~~ Each unit has four control banks and ~~at least two~~ four shutdown banks. 1

The shutdown banks are maintained either in the fully inserted or fully withdrawn position. The control banks are moved in an overlap pattern, using the following withdrawal sequence: When control bank A reaches a predetermined height in the core, control bank B begins to move out with 1

BASES

BACKGROUND (continued)

control bank A. Control bank A stops at the position of maximum withdrawal, and control bank B continues to move out. When control bank B reaches a predetermined height, control bank C begins to move out with control bank B. This sequence continues until control banks A, B, and C are at the fully withdrawn position, and control bank D is approximately halfway withdrawn. The insertion sequence is the opposite of the withdrawal sequence. The control rods are arranged in a radially symmetric pattern, so that control bank motion does not introduce radial asymmetries in the core power distributions. 9

The axial position of shutdown rods and control rods is indicated by two separate and independent systems, ~~which~~ that are the ~~Bank~~ Demand Position Indication System (commonly called group step counters) and the ~~Digital~~ Rod Position Indication ~~(DRPI)~~ System. 8 1

The ~~Bank~~ Demand Position Indication System counts the pulses from the rod control system that moves the rods. There is one step counter for each group of rods. Individual rods in a group ~~all~~ receive the same signal to move and should, therefore, all be at the same position indicated by the group step counter for that group. The ~~Bank~~ Demand Position Indication System is considered highly precise (± 1 step or ± ~~e~~ 5/8 inch). If a rod does not move one step for each demand pulse, the step counter will still count the pulse and incorrectly reflect the position of the rod. 1 8 1

The ~~DRPI~~ Rod Position Indication System provides ~~a highly accurate~~ an indication of actual rod position, but at a lower precision than the step counters. This system is based on inductive analog signals from a series of coils spaced along a hollow tube. ~~To increase the reliability of the system, the inductive coils are connected alternately to data system A or B. Thus, if one data system fails, the DRPI will go on half accuracy.~~ The ~~DRPI~~ Rod Position Indication System is capable of monitoring rod position within at least ± 12 steps ~~with either full accuracy or half accuracy~~. 1 1

APPLICABLE SAFETY ANALYSES

Control rod misalignment accidents are analyzed in the safety analysis (Ref. 3). The acceptance criteria for addressing control rod inoperability or misalignment are that:

a. There be no violations of:

1. Specified acceptable fuel design limits~~, or~~ ;

2. Reactor Coolant System (RCS) pressure boundary integrity~~, and~~ ; 2

b. The core remains subcritical after accident transients.

BASES

APPLICABLE SAFETY ANALYSES (continued)

INSERT 1

~~Two types of misalignment are distinguished. During movement of a control rod group, one rod may stop moving, while the other rods in the group continue. This condition may cause excessive power peaking.~~ ~~The second~~ [A different] type of misalignment occurs if one rod fails to insert upon a reactor trip and remains stuck fully withdrawn. This condition requires an evaluation to determine that sufficient reactivity worth is held in the control rods to meet the SDM requirement, with the maximum worth rod stuck fully withdrawn. 1

INSERT 2 1

Two types of analysis are performed in regard to static rod misalignment (Ref. ~~4~~ [3]). With control banks at their insertion limits, one type of analysis considers the case when any one rod is completely inserted into the core. The second type of analysis considers the case of a completely withdrawn single rod ~~from a~~ [and Control] bank [D is fully] inserted to its insertion limit. Satisfying limits on departure from nucleate boiling ratio in both of these cases bounds the situation when a rod is misaligned from its group by [±] 12 steps. 1

Another type of misalignment occurs if one RCCA fails to insert upon a reactor trip and remains stuck fully withdrawn. This condition is assumed in the evaluation to determine that the required SDM is met with the maximum worth RCCA also fully withdrawn (Ref. ~~5~~ [4]). 1

~~The Required Actions in this LCO ensure that either deviations from the alignment limits will be corrected or that THERMAL POWER will be adjusted so that excessive local linear heat rates (LHRs) will not occur, and that the requirements on SDM and ejected rod worth are preserved.~~ 3

~~Continued operation of the reactor with a misaligned control rod is allowed if the heat flux hot channel factor ($F_Q(Z)$) and the nuclear enthalpy hot channel factor ($F^N_{\Delta H}$) are verified to be within their limits in the COLR and the safety analysis is verified to remain valid. When a control rod is misaligned, the assumptions that are used to determine the rod insertion limits, AFD limits, and quadrant power tilt limits are not preserved. Therefore, the limits may not preserve the design peaking factors, and $F_Q(Z)$ and $F^N_{\Delta H}$ must be verified directly by incore mapping. Bases Section 3.2 (Power Distribution Limits) contains more complete discussions of the relation of $F_Q(Z)$ and $F^N_{\Delta H}$ to the operating limits.~~ 3

Shutdown and control rod OPERABILITY and alignment are directly related to power distributions and SDM, which are initial conditions assumed in safety analyses. Therefore they satisfy Criterion 2 of 10 CFR 50.36(c)(2)(ii).

1 **INSERT 1**

There are three RCCA misalignment accidents which are analyzed. They include one or more dropped RCCAs, a dropped RCCA bank, and a statically misaligned RCCA. (Ref. 4)

1 **INSERT 2**

For the dropped RCCA(s) misalignment accident, a negative reactivity insertion will result. For those dropped RCCA(s) that do not result in a reactor trip, power may be reestablished either by reactivity feedback or control bank withdrawal. Following a dropped rod event in manual rod control, the plant will establish a new equilibrium condition. The equilibrium process without control system interaction is monotonic, thus removing power overshoot as a concern and establishing the automatic rod control mode of operation as the limiting case.

For the dropped RCCA bank misalignment accident, a reactivity insertion of greater than 500 pcm which will be detected by the power range negative neutron flux rate trip circuitry. The reactor is then tripped. The core is not adversely affected during this period since power is decreasing rapidly. Following the reactor trip, normal shutdown procedures are followed to further cool down the plant.

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BASES

LCO

The limits on shutdown or control rod alignments ensure that the assumptions in the safety analysis will remain valid. The requirements on control rod OPERABILITY ensure that upon reactor trip, the assumed reactivity will be available and will be inserted. The control rod OPERABILITY requirements (i.e., trippability) are separate from the alignment requirements, which ensure that the RCCAs and banks maintain the correct power distribution and rod alignment. The rod OPERABILITY requirement is satisfied provided the rod will fully insert in the required rod drop time assumed in the safety analysis. Rod control malfunctions that result in the inability to move a rod (e.g., rod lift coil failures), but that do not impact trippability, do not result in rod inoperability.

The requirement to maintain the rod alignment to within plus or minus 12 steps is conservative. The minimum misalignment assumed in safety analysis is ~~24 steps~~ [10% of span] (~~15~~ [14.4] inches), and in some cases a total misalignment from fully withdrawn to fully inserted is assumed. (1)

Failure to meet the requirements of this LCO may produce unacceptable power peaking factors and [linear heat rates (]LHRs[)], or unacceptable SDMs, ~~all of which~~ [that] may constitute initial conditions inconsistent with the safety analysis. (1) (8)

APPLICABILITY

The requirements on RCCA OPERABILITY and alignment are applicable in MODES 1 and 2 because these are the only MODES in which neutron (or fission) power is generated, and the OPERABILITY (i.e., trippability) and alignment of rods have the potential to affect the safety of the plant. In MODES 3, 4, 5, and 6, the alignment limits do not apply because[, except for control rod OPERABILITY testing,] the control rods are bottomed and the reactor is shut down and not producing fission power. In the shutdown MODES, the OPERABILITY of the shutdown and control rods has the potential to affect the required SDM, but this effect can be compensated for by an increase in the boron concentration of the RCS. See LCO 3.1.1, "SHUTDOWN MARGIN (SDM)," for SDM in MODES 3, 4, and 5 and LCO 3.9.1, "Boron Concentration," for boron concentration requirements during refueling. (1)

ACTIONS

A.1.1 and A.1.2

When one or more rods are inoperable (i.e., untrippable), there is a possibility that the required SDM may be adversely affected. Under these conditions, it is important to determine the SDM, and if it is less than the required value, initiate boration until the required SDM is recovered. The Completion Time of 1 hour is adequate for determining SDM and, if necessary, for initiating emergency boration and restoring SDM.

In this situation, SDM verification must include the worth of the untrippable rod, as well as a rod of maximum worth.

BASES

ACTIONS (continued)

A.2

If the inoperable rod(s) cannot be restored to OPERABLE status, the plant must be brought to a MODE or condition in which the LCO requirements are not applicable. To achieve this status, the unit must be brought to at least MODE 3 within 6 hours.

The allowed Completion Time is reasonable, based on operating experience, for reaching MODE 3 from full power conditions in an orderly manner and without challenging plant systems.

B.1

When a rod becomes misaligned, it can usually be moved and is ~~still~~ trippable. If the rod can be realigned within the Completion Time of 1 hour, local xenon redistribution during this short interval will not be significant, and operation may proceed without further restriction. (8)

An alternative to realigning a single misaligned RCCA to the group average position is to align the remainder of the group to the position of the misaligned RCCA. However, this must be done without violating the bank sequence, overlap, and insertion limits specified in LCO 3.1.5, "Shutdown Bank Insertion Limits," and LCO 3.1.6, "Control Bank Insertion Limits." The Completion Time of 1 hour gives the operator sufficient time to adjust the rod positions in an orderly manner.

B.2.1.1 and B.2.1.2

With a misaligned rod, SDM must be verified to be within limit or boration must be initiated to restore SDM to within limit.

In many cases, realigning the remainder of the group to the misaligned rod may not be desirable. ~~For example, realigning control bank B to a rod that is misaligned 15 steps from the top of the core would require a significant power reduction, since control bank D must be moved fully in and control bank C must be moved in to approximately 100 to 115 steps.~~ (1)

Power operation may continue with one RCCA [misaligned but] trippable [(OPERABLE)] ~~but misaligned~~, provided that SDM is verified within 1 hour. The Completion Time of 1 hour represents the time necessary for determining the actual unit SDM and, if necessary, aligning and starting the necessary systems and components to initiate boration. (8) (4)

BASES

ACTIONS (continued)

B.2.2, B.2.3, B.2.4, B.2.5, and B.2.6

For continued operation with a misaligned rod, RTP must be reduced, SDM must periodically be verified within limits, hot channel factors (F_Q[X,Y,](Z) and ~~$F^N_{\Delta H}$~~[$F_{\Delta H}$(X,Y)]) must be verified within limits, and the safety analyses must be re-evaluated to confirm continued operation is permissible. 1

Reduction of power to 75% RTP ensures that local LHR increases ~~due to~~ [resulting from] a misaligned RCCA will not cause the core design criteria to be exceeded (Ref. ~~7~~[5]). The Completion Time of 2 hours gives the operator sufficient time to accomplish an orderly power reduction without challenging the Reactor Protection System. 1 1

When a rod is known to be misaligned, there is a potential to impact the SDM. Since the core conditions can change with time, periodic verification of SDM is required. A Frequency of 12 hours is sufficient to ensure this requirement continues to be met.

Verifying that F_Q[X,Y,](Z)~~, as approximated by F^C_Q(Z) and F^W_Q(Z),~~ and ~~$F^N_{\Delta H}$~~[$F_{\Delta H}$(X,Y)] are within the required limits ensures that current operation at 75% RTP with a rod misaligned is not resulting in power distributions that may invalidate safety analysis assumptions at full power. The Completion Time of 72 hours allows sufficient time to obtain flux maps of the core power distribution using the incore flux mapping system and to calculate F_Q[X,Y,](Z) and ~~$F^N_{\Delta H}$~~[$F_{\Delta H}$(X,Y)]. 1 1

Once current conditions have been verified acceptable, time is available to perform evaluations of accident analysis to determine that core limits will not be exceeded during a Design Basis Event for the duration of operation under these conditions. The accident analyses presented in [U]FSAR Chapter 15 (Ref. 5) that may be adversely affected will be evaluated to ensure that the analysis results remain valid for the duration of continued operation under these conditions. A Completion Time of 5 days is sufficient time to obtain the required input data and to perform the analysis. 1

C.1

When Required Actions cannot be completed within their Completion Time, the unit must be brought to a MODE ~~or Condition~~ in which the LCO requirements are not applicable. To achieve this status, the unit must be brought to at least MODE ~~2 with K_{eff} < 1.0~~ [3] within 6 hours, which 4 4

BASES

ACTIONS (continued)

obviates concerns about the development of undesirable xenon or power distributions. The allowed Completion Time of 6 hours is reasonable, based on operating experience, for reaching MODE 3 from full power conditions in an orderly manner and without challenging the plant systems.

D.1.1 and D.1.2

More than one control rod becoming misaligned from its group average position is not expected, and has the potential to reduce SDM. Therefore, SDM must be evaluated. One hour allows the operator adequate time to determine SDM. Restoration of the required SDM, if necessary, requires increasing the RCS boron concentration to provide negative reactivity, as described in the Bases ~~or~~ of LCO 3.1.1. The required Completion Time of 1 hour for initiating boration is reasonable, based on the time required for potential xenon redistribution, the low probability of an accident occurring, and the steps required to complete the action. This allows the operator sufficient time to align the required valves and start the boric acid pumps. Boration will continue until the required SDM is restored. 9

D.2

If more than one rod is found to be misaligned or becomes misaligned because of bank movement, the unit conditions fall outside of the accident analysis assumptions. Since automatic ~~bank~~ sequencing of the control banks would continue to cause misalignment, the unit must be brought to a MODE or Condition in which the LCO requirements are not applicable. To achieve this status, the unit must be brought to at least MODE ~~2 with K_{eff} < 1.0~~ 3 within 6 hours. 1 4

The allowed Completion Time is reasonable, based on operating experience, for reaching MODE ~~2 with K_{eff} < 1.0~~ 3 from full power conditions in an orderly manner and without challenging plant systems. 4

SURVEILLANCE REQUIREMENTS

SR 3.1.4.1

~~[~~ Verification that individual rod positions are within alignment limits ~~at a Frequency of 12 hours provides a history that~~ allows the operator to detect a rod that is beginning to deviate from its expected position. ~~The specified Frequency takes into account other rod position information that is continuously available to the operator in the control room, so that during actual rod motion, deviations can immediately be detected.~~ 5

~~OR~~

BASES

SURVEILLANCE REQUIREMENTS (continued)

The Surveillance Frequency is controlled under the Surveillance Frequency Control Program.

~~-------------------------------REVIEWER'S NOTE-------------------------------~~
~~Plants controlling Surveillance Frequencies under a Surveillance Frequency Control Program should utilize the appropriate Frequency description, given above, and the appropriate choice of Frequency in the Surveillance Requirement.~~
~~---]~~ 6 5

SR 3.1.4.2

Verifying each control rod is OPERABLE would require that each rod be tripped. However, in MODES 1 and 2 ~~with K_{eff} ≥ 1.0~~, tripping each control rod would result in radial or axial power tilts, or oscillations. Exercising each individual control rod provides increased confidence that all rods continue to be OPERABLE without exceeding the alignment limit, even if they are not regularly tripped. Moving each control rod by [greater than or equal to] 10 steps [in either direction] will not cause radial or axial power tilts, or oscillations, to occur. ~~[The 92 day Frequency takes into consideration other information available to the operator in the control room and SR 3.1.4.1, which is performed more frequently and adds to the determination of OPERABILITY of the rods.~~ 4 1 5

~~OR~~

The Surveillance Frequency is controlled under the Surveillance Frequency Control Program.

~~-------------------------------REVIEWER'S NOTE-------------------------------~~
~~Plants controlling Surveillance Frequencies under a Surveillance Frequency Control Program should utilize the appropriate Frequency description, given above, and the appropriate choice of Frequency in the Surveillance Requirement.~~
~~---]~~ 6 5

Between required performances of SR 3.1.4.2 (determination of control rod OPERABILITY by movement), if a control rod(s) is discovered to be immovable, but remains trippable, the control rod(s) is considered to be OPERABLE. At any time, if a control rod(s) is immovable, a determination of the trippability (OPERABILITY) of the control rod(s) must be made, and appropriate action taken.

BASES

SURVEILLANCE REQUIREMENTS (continued)

SR 3.1.4.3

Verification of rod drop times allows the operator to determine that the maximum rod drop time permitted is consistent with the assumed rod drop time used in the safety analysis. Measuring rod drop times prior to reactor criticality, after reactor vessel head ~~removal~~ installation, ensures that the reactor internals and rod drive mechanism will not interfere with rod motion or rod drop time, and that no degradation in these systems has occurred that would adversely affect control rod motion or drop time. This testing is performed with all RCPs operating and the average moderator temperature ≥ 500°F to simulate a reactor trip under actual conditions. INSERT 3 (1) (1)

This Surveillance is performed during a plant outage, due to the plant conditions needed to perform the SR and the potential for an unplanned plant transient if the Surveillance were performed with the reactor at power.

REFERENCES

1. 10 CFR 50, Appendix A, GDC 10 and GDC 26.
2. 10 CFR 50.46.
3. FSAR, ~~Chapter [15]~~ Section 15.2.3. (1) (7) U
4. FSAR, ~~Chapter [15]~~ Section 15.4.2. (1) (7)
5. FSAR, Chapter ~~[~~15~~]~~. (1) (7) U
6. ~~FSAR, Chapter [15].~~ (1)
7. ~~FSAR, Chapter [15].~~ (1)

(1) **INSERT 3**

Fully withdrawn shall be the condition where shutdown and control banks are at a position within the interval of ≥ 222 and ≤ 231 steps withdrawn, inclusive.

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[B 3.1 REACTIVITY CONTROL SYSTEMS]
~~B 3.3 INSTRUMENTATION~~ 4

B 3.1.4 Rod Group Alignment Limits

BASES

BACKGROUND

The OPERABILITY (i.e., trippability) of the shutdown and control rods is an initial assumption in all safety analyses that assume rod insertion upon reactor trip. Maximum rod misalignment is an initial assumption in the safety analysis that directly affects core power distributions and assumptions of available SDM.

The applicable criteria for these reactivity and power distribution design requirements are 10 CFR 50, Appendix A, GDC 10, "Reactor Design," GDC 26, "Reactivity Control System Redundancy and Capability" (Ref. 1), and 10 CFR 50.46, "Acceptance Criteria for Emergency Core Cooling Systems for Light Water Nuclear Power Plants" (Ref. 2).

Mechanical or electrical failures may cause a control or shutdown rod to become inoperable or to become misaligned from its group. Rod inoperability or misalignment may cause increased power peaking, due to the asymmetric reactivity distribution and a reduction in the total available rod worth for reactor shutdown. Therefore, rod alignment and OPERABILITY are related to core operation in design power peaking limits and the core design requirement of a minimum SDM.

Limits on rod alignment have been established, and all rod positions are monitored and controlled during power operation to ensure that the power distribution and reactivity limits defined by the design power peaking and SDM limits are preserved.

Rod cluster control assemblies (RCCAs), or rods, are moved by their control rod drive mechanisms (CRDMs). Each CRDM moves its RCCA one step (approximately ~~e~~ [5/8] inch) at a time, but at varying rates (steps per minute) depending on the signal output from the Rod Control System. 1

The RCCAs are divided among control banks and shutdown banks. Each bank may be further subdivided into two groups to provide for precise reactivity control. A group consists of two or more RCCAs that are electrically paralleled to step simultaneously. If a bank of RCCAs consists of two groups, the groups are moved in a staggered fashion, but always within one step of each other. ~~All units have~~ [Each unit has] four control banks and ~~at least two~~ [four] shutdown banks. 1

The shutdown banks are maintained either in the fully inserted or fully withdrawn position. The control banks are moved in an overlap pattern, using the following withdrawal sequence: When Control Bank A reaches a predetermined height in the core, Control Bank B begins to move out with 1

BASES

BACKGROUND (continued)

control bank A. Control bank A stops at the position of maximum withdrawal, and control bank B continues to move out. When control bank B reaches a predetermined height, control bank C begins to move out with control bank B. This sequence continues until control banks A, B, and C are at the fully withdrawn position, and control bank D is approximately halfway withdrawn. The insertion sequence is the opposite of the withdrawal sequence. The control rods are arranged in a radially symmetric pattern, so that control bank motion does not introduce radial asymmetries in the core power distributions. 9

The axial position of shutdown rods and control rods is indicated by two separate and independent systems, ~~which~~ that are the ~~Bank~~ Demand Position Indication System (commonly called group step counters) and the ~~Digital~~ Rod Position Indication ~~(DRPI)~~ System. 8 1

The ~~Bank~~ Demand Position Indication System counts the pulses from the rod control system that moves the rods. There is one step counter for each group of rods. Individual rods in a group ~~all~~ receive the same signal to move and should, therefore, all be at the same position indicated by the group step counter for that group. The ~~Bank~~ Demand Position Indication System is considered highly precise (± 1 step or ± ~~e~~ 5/8 inch). If a rod does not move one step for each demand pulse, the step counter will still count the pulse and incorrectly reflect the position of the rod. 1 8 1

The ~~DRPI~~ Rod Position Indication System provides ~~a highly accurate~~ an indication of actual rod position, but at a lower precision than the step counters. This system is based on inductive analog signals from a series of coils spaced along a hollow tube. ~~To increase the reliability of the system, the inductive coils are connected alternately to data system A or B. Thus, if one data system fails, the DRPI will go on half accuracy.~~ The ~~DRPI~~ Rod Position Indication System is capable of monitoring rod position within at least ± 12 steps ~~with either full accuracy or half accuracy~~. 1 1

APPLICABLE SAFETY ANALYSES

Control rod misalignment accidents are analyzed in the safety analysis (Ref. 3). The acceptance criteria for addressing control rod inoperability or misalignment are that:

a. There be no violations of:

1. Specified acceptable fuel design limits~~, or~~ ;

2. Reactor Coolant System (RCS) pressure boundary integrity~~, and~~ ; 2

b. The core remains subcritical after accident transients.

BASES

APPLICABLE SAFETY ANALYSES (continued)

INSERT 1

Two types of misalignment are distinguished. During movement of a control rod group, one rod may stop moving, while the other rods in the group continue. This condition may cause excessive power peaking. The second type of misalignment occurs if one rod fails to insert upon a reactor trip and remains stuck fully withdrawn. This condition requires an evaluation to determine that sufficient reactivity worth is held in the control rods to meet the SDM requirement, with the maximum worth rod stuck fully withdrawn. 1

A different

INSERT 2 1

Two types of analysis are performed in regard to static rod misalignment (Ref. 4 3). With control banks at their insertion limits, one type of analysis considers the case when any one rod is completely inserted into the core. The second type of analysis considers the case of a completely withdrawn single rod from a and Control bank D is fully inserted to its insertion limit. Satisfying limits on departure from nucleate boiling ratio in both of these cases bounds the situation when a rod is misaligned from its group by ± 12 steps. 1

Another type of misalignment occurs if one RCCA fails to insert upon a reactor trip and remains stuck fully withdrawn. This condition is assumed in the evaluation to determine that the required SDM is met with the maximum worth RCCA also fully withdrawn (Ref. 5 4). 1

The Required Actions in this LCO ensure that either deviations from the alignment limits will be corrected or that THERMAL POWER will be adjusted so that excessive local linear heat rates (LHRs) will not occur, and that the requirements on SDM and ejected rod worth are preserved. 3

Continued operation of the reactor with a misaligned control rod is allowed if the heat flux hot channel factor ($F_Q(Z)$) and the nuclear enthalpy hot channel factor ($F^N_{\Delta H}$) are verified to be within their limits in the COLR and the safety analysis is verified to remain valid. When a control rod is misaligned, the assumptions that are used to determine the rod insertion limits, AFD limits, and quadrant power tilt limits are not preserved. Therefore, the limits may not preserve the design peaking factors, and $F_Q(Z)$ and $F^N_{\Delta H}$ must be verified directly by incore mapping. Bases Section 3.2 (Power Distribution Limits) contains more complete discussions of the relation of $F_Q(Z)$ and $F^N_{\Delta H}$ to the operating limits. 3

Shutdown and control rod OPERABILITY and alignment are directly related to power distributions and SDM, which are initial conditions assumed in safety analyses. Therefore they satisfy Criterion 2 of 10 CFR 50.36(c)(2)(ii).

1

INSERT 1

There are three RCCA misalignment accidents which are analyzed. They include one or more dropped RCCAs, a dropped RCCA bank, and a statically misaligned RCCA. (Ref. 4)

1

INSERT 2

For the dropped RCCA(s) misalignment accident, a negative reactivity insertion will result. For those dropped RCCA(s) that do not result in a reactor trip, power may be reestablished either by reactivity feedback or control bank withdrawal. Following a dropped rod event in manual rod control, the plant will establish a new equilibrium condition. The equilibrium process without control system interaction is monotonic, thus removing power overshoot as a concern and establishing the automatic rod control mode of operation as the limiting case.

For the dropped RCCA bank misalignment accident, a reactivity insertion of greater than 500 pcm which will be detected by the power range negative neutron flux rate trip circuitry. The reactor is then tripped. The core is not adversely affected during this period since power is decreasing rapidly. Following the reactor trip, normal shutdown procedures are followed to further cool down the plant.

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BASES

LCO

The limits on shutdown or control rod alignments ensure that the assumptions in the safety analysis will remain valid. The requirements on control rod OPERABILITY ensure that upon reactor trip, the assumed reactivity will be available and will be inserted. The control rod OPERABILITY requirements (i.e., trippability) are separate from the alignment requirements, which ensure that the RCCAs and banks maintain the correct power distribution and rod alignment. The rod OPERABILITY requirement is satisfied provided the rod will fully insert in the required rod drop time assumed in the safety analysis. Rod control malfunctions that result in the inability to move a rod (e.g., rod lift coil failures), but that do not impact trippability, do not result in rod inoperability.

The requirement to maintain the rod alignment to within plus or minus 12 steps is conservative. The minimum misalignment assumed in safety analysis is ~~24 steps~~ [10% of span] (~~15~~ [14.4] inches), and in some cases a total misalignment from fully withdrawn to fully inserted is assumed. (1)

Failure to meet the requirements of this LCO may produce unacceptable power peaking factors and [linear heat rates (] LHRs [)], or unacceptable SDMs, ~~all of which~~ [that] may constitute initial conditions inconsistent with the safety analysis. (1) (8)

APPLICABILITY

The requirements on RCCA OPERABILITY and alignment are applicable in MODES 1 and 2 because these are the only MODES in which neutron (or fission) power is generated, and the OPERABILITY (i.e., trippability) and alignment of rods have the potential to affect the safety of the plant. In MODES 3, 4, 5, and 6, the alignment limits do not apply because [, except for control rod OPERABILITY testing,] the control rods are bottomed and the reactor is shut down and not producing fission power. In the shutdown MODES, the OPERABILITY of the shutdown and control rods has the potential to affect the required SDM, but this effect can be compensated for by an increase in the boron concentration of the RCS. See LCO 3.1.1, "SHUTDOWN MARGIN (SDM)," for SDM in MODES 3, 4, and 5 and LCO 3.9.1, "Boron Concentration," for boron concentration requirements during refueling. (1)

ACTIONS

A.1.1 and A.1.2

When one or more rods are inoperable (i.e., untrippable), there is a possibility that the required SDM may be adversely affected. Under these conditions, it is important to determine the SDM, and if it is less than the required value, initiate boration until the required SDM is recovered. The Completion Time of 1 hour is adequate for determining SDM and, if necessary, for initiating emergency boration and restoring SDM.

In this situation, SDM verification must include the worth of the untrippable rod, as well as a rod of maximum worth.

BASES

ACTIONS (continued)

A.2

If the inoperable rod(s) cannot be restored to OPERABLE status, the plant must be brought to a MODE or condition in which the LCO requirements are not applicable. To achieve this status, the unit must be brought to at least MODE 3 within 6 hours.

The allowed Completion Time is reasonable, based on operating experience, for reaching MODE 3 from full power conditions in an orderly manner and without challenging plant systems.

B.1

When a rod becomes misaligned, it can usually be moved and is ~~still~~ trippable. If the rod can be realigned within the Completion Time of 1 hour, local xenon redistribution during this short interval will not be significant, and operation may proceed without further restriction. 8

An alternative to realigning a single misaligned RCCA to the group average position is to align the remainder of the group to the position of the misaligned RCCA. However, this must be done without violating the bank sequence, overlap, and insertion limits specified in LCO 3.1.5, "Shutdown Bank Insertion Limits," and LCO 3.1.6, "Control Bank Insertion Limits." The Completion Time of 1 hour gives the operator sufficient time to adjust the rod positions in an orderly manner.

B.2.1.1 and B.2.1.2

With a misaligned rod, SDM must be verified to be within limit or boration must be initiated to restore SDM to within limit.

In many cases, realigning the remainder of the group to the misaligned rod may not be desirable. ~~For example, realigning control bank B to a rod that is misaligned 15 steps from the top of the core would require a significant power reduction, since control bank D must be moved fully in and control bank C must be moved in to approximately 100 to 115 steps.~~ 1

Power operation may continue with one RCCA [misaligned but] trippable [(OPERABLE)] ~~but misaligned~~, provided that SDM is verified within 1 hour. The Completion Time of 1 hour represents the time necessary for determining the actual unit SDM and, if necessary, aligning and starting the necessary systems and components to initiate boration. 8 4

BASES

ACTIONS (continued)

B.2.2, B.2.3, B.2.4, B.2.5, and B.2.6

For continued operation with a misaligned rod, RTP must be reduced, SDM must periodically be verified within limits, hot channel factors (F_Q(X,Y,Z) and $F^N_{\Delta H}$ $F_{\Delta H}$(X,Y)) must be verified within limits, and the safety analyses must be re-evaluated to confirm continued operation is permissible. 1

Reduction of power to 75% RTP ensures that local LHR increases due to resulting from a misaligned RCCA will not cause the core design criteria to be exceeded (Ref. 7 5). The Completion Time of 2 hours gives the operator sufficient time to accomplish an orderly power reduction without challenging the Reactor Protection System. 1 1

When a rod is known to be misaligned, there is a potential to impact the SDM. Since the core conditions can change with time, periodic verification of SDM is required. A Frequency of 12 hours is sufficient to ensure this requirement continues to be met.

Verifying that F_Q(X,Y,Z), as approximated by $F^C_Q(Z)$ and $F^W_Q(Z)$, and $F^N_{\Delta H}$ $F_{\Delta H}$(X,Y) are within the required limits ensures that current operation at 75% RTP with a rod misaligned is not resulting in power distributions that may invalidate safety analysis assumptions at full power. The Completion Time of 72 hours allows sufficient time to obtain flux maps of the core power distribution using the incore flux mapping system and to calculate F_Q(X,Y,Z) and $F^N_{\Delta H}$ $F_{\Delta H}$(X,Y). 1 1

Once current conditions have been verified acceptable, time is available to perform evaluations of accident analysis to determine that core limits will not be exceeded during a Design Basis Event for the duration of operation under these conditions. The accident analyses presented in U FSAR Chapter 15 (Ref. 5) that may be adversely affected will be evaluated to ensure that the analysis results remain valid for the duration of continued operation under these conditions. A Completion Time of 5 days is sufficient time to obtain the required input data and to perform the analysis. 1

C.1

When Required Actions cannot be completed within their Completion Time, the unit must be brought to a MODE or Condition in which the LCO requirements are not applicable. To achieve this status, the unit must be brought to at least MODE 2 with K_{eff} < 1.0 3 within 6 hours, which 4 4

BASES

ACTIONS (continued)

obviates concerns about the development of undesirable xenon or power distributions. The allowed Completion Time of 6 hours is reasonable, based on operating experience, for reaching MODE 3 from full power conditions in an orderly manner and without challenging the plant systems.

D.1.1 and D.1.2

More than one control rod becoming misaligned from its group average position is not expected, and has the potential to reduce SDM. Therefore, SDM must be evaluated. One hour allows the operator adequate time to determine SDM. Restoration of the required SDM, if necessary, requires increasing the RCS boron concentration to provide negative reactivity, as described in the Bases ~~or~~ of LCO 3.1.1. The required Completion Time of 1 hour for initiating boration is reasonable, based on the time required for potential xenon redistribution, the low probability of an accident occurring, and the steps required to complete the action. This allows the operator sufficient time to align the required valves and start the boric acid pumps. Boration will continue until the required SDM is restored. 9

D.2

If more than one rod is found to be misaligned or becomes misaligned because of bank movement, the unit conditions fall outside of the accident analysis assumptions. Since automatic ~~bank~~ sequencing of the control banks would continue to cause misalignment, the unit must be brought to a MODE or Condition in which the LCO requirements are not applicable. To achieve this status, the unit must be brought to at least MODE ~~2 with K_{eff} < 1.0~~ 3 within 6 hours. 1 4

The allowed Completion Time is reasonable, based on operating experience, for reaching MODE ~~2 with K_{eff} < 1.0~~ 3 from full power conditions in an orderly manner and without challenging plant systems. 4

SURVEILLANCE REQUIREMENTS

SR 3.1.4.1

~~[~~ Verification that individual rod positions are within alignment limits ~~at a Frequency of 12 hours provides a history that~~ allows the operator to detect a rod that is beginning to deviate from its expected position. ~~The specified Frequency takes into account other rod position information that is continuously available to the operator in the control room, so that during actual rod motion, deviations can immediately be detected.~~ 5

~~OR~~

BASES

SURVEILLANCE REQUIREMENTS (continued)

The Surveillance Frequency is controlled under the Surveillance Frequency Control Program.

------------------------------REVIEWER'S NOTE------------------------------
Plants controlling Surveillance Frequencies under a Surveillance Frequency Control Program should utilize the appropriate Frequency description, given above, and the appropriate choice of Frequency in the Surveillance Requirement.
--]

6 5

SR 3.1.4.2

Verifying each control rod is OPERABLE would require that each rod be tripped. However, in MODES 1 and 2 with $K_{eff} \geq 1.0$, tripping each control rod would result in radial or axial power tilts, or oscillations. Exercising each individual control rod provides increased confidence that all rods continue to be OPERABLE without exceeding the alignment limit, even if they are not regularly tripped. Moving each control rod by greater than or equal to 10 steps in either direction will not cause radial or axial power tilts, or oscillations, to occur. [The 92 day Frequency takes into consideration other information available to the operator in the control room and SR 3.1.4.1, which is performed more frequently and adds to the determination of OPERABILITY of the rods.

OR

4 1 5

The Surveillance Frequency is controlled under the Surveillance Frequency Control Program.

------------------------------REVIEWER'S NOTE------------------------------
Plants controlling Surveillance Frequencies under a Surveillance Frequency Control Program should utilize the appropriate Frequency description, given above, and the appropriate choice of Frequency in the Surveillance Requirement.
--]

6 5

Between required performances of SR 3.1.4.2 (determination of control rod OPERABILITY by movement), if a control rod(s) is discovered to be immovable, but remains trippable, the control rod(s) is considered to be OPERABLE. At any time, if a control rod(s) is immovable, a determination of the trippability (OPERABILITY) of the control rod(s) must be made, and appropriate action taken.

BASES

SURVEILLANCE REQUIREMENTS (continued)

SR 3.1.4.3

Verification of rod drop times allows the operator to determine that the maximum rod drop time permitted is consistent with the assumed rod drop time used in the safety analysis. Measuring rod drop times prior to reactor criticality, after reactor vessel head ~~removal~~ installation, ensures that the reactor internals and rod drive mechanism will not interfere with rod motion or rod drop time, and that no degradation in these systems has occurred that would adversely affect control rod motion or drop time. This testing is performed with all RCPs operating and the average moderator temperature ≥ 500°F to simulate a reactor trip under actual conditions. INSERT 3 (1) (1)

This Surveillance is performed during a plant outage, due to the plant conditions needed to perform the SR and the potential for an unplanned plant transient if the Surveillance were performed with the reactor at power.

REFERENCES

1. 10 CFR 50, Appendix A, GDC 10 and GDC 26.
2. 10 CFR 50.46.
3. FSAR, ~~Chapter [15]~~ Section 15.2.3. (1) (7)
4. FSAR, ~~Chapter [15]~~ Section 15.4.2. (1) (7)
5. FSAR, Chapter ~~[~~15~~]~~. (1) (7)
6. ~~FSAR, Chapter [15].~~ (1)
7. ~~FSAR, Chapter [15].~~ (1)

(U: references 3 and 4 swapped; U: reference 5)

1 **INSERT 3**

Fully withdrawn shall be the condition where shutdown and control banks are at a position within the interval of ≥ 222 and ≤ 231 steps withdrawn, inclusive.

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JUSTIFICATION FOR DEVIATIONS
ITS 3.1.4 BASES, ROD GROUP ALIGNMENT LIMITS

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

2. These punctuation corrections have been made consistent with the Writer's Guide for the Improved Technical Specifications, TSTF-GG-05-01, Section 5.1.3.

3. ISTS B 3.1.4 Applicable Safety Analyses section contains discussion of the Required Action when the LCO is not met. ITS B 3.1.4 Applicable Safety Analyses section does not contain this discussion. This information is adequately addressed in the Bases for ACTIONS

4. Changes are made to be consistent with the Specification.

5. ISTS SR 3.1.4.1 and SR 3.1.4.2 Bases provides two options for controlling the Frequencies of Surveillance Requirements. SQN is proposing to control the Surveillance Frequencies under the Surveillance Frequency Control Program. Additionally, the Frequency description which is being removed will be included in the Surveillance Frequency Control Program.

6. The Reviewer's Note has been deleted. This information is for the NRC reviewer to be keyed into what is needed to meet this requirement. This Note is not meant to be retained in the final version of the plant specific submittal.

7. The ISTS contains bracketed information and/or values that are generic to Westinghouse vintage plants. The brackets are removed and the proper plant specific information/value is inserted to reflect the current licensing basis.

8. Editorial changes made for enhanced clarity/consistency.

9. Typographical/grammatical error corrected.

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Specific No Significant Hazards Considerations (NSHCs)

DETERMINATION OF NO SIGNIFICANT HAZARDS CONSIDERATIONS
ITS 3.1.4, ROD GROUP ALIGNMENT LIMITS

There are no specific No Significant Hazards Considerations for this Specification.

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ATTACHMENT 5

ITS 3.1.5, SHUTDOWN BANK INSERTION LIMITS

Current Technical Specification (CTS) Markup and Discussion of Changes (DOCs)

A01

ITS — ITS 3.1.5

REACTIVITY CONTROL SYSTEMS

SHUTDOWN ~~ROD~~ BANK INSERTION LIMIT (A02)

LIMITING CONDITION FOR OPERATION

LCO 3.1.5 — 3.1.3.5 ~~All~~ Each shutdown ~~rods~~ bank shall be limited in physical insertion as specified in the COLR. (A02)

Applicability — APPLICABILITY: MODES 1~~*~~ and 2~~*#~~ (A03, M01)

ACTION:

ACTION B / Applicability Note —
a. With a ~~maximum of one shutdown rod~~ one or more shutdown banks inserted beyond the insertion limit specified in the COLR, except for surveillance testing pursuant to Specification 4.1.3.1.2 ~~or when complying with ACTION b of this specification~~, within ~~one~~ two hour either: (L01)

Add proposed Required Actions B.1.1 and B.1.2

1. Restore the ~~rod~~ bank to within the insertion limit specified in the COLR, or

~~2. Declare the rod to be inoperable and apply ACTION 3.1.3.1.c.3.~~

Add proposed ACTION C

ACTION A —
b. With a maximum of one shutdown bank inserted beyond the insertion limit specified in the COLR ~~during surveillance testing pursuant to Specification 4.1.3.1.2~~ and immovable due to malfunctions in the rod control system, POWER OPERATION may continue provided that: (A04)

1. The shutdown bank is inserted no more than 18 steps below the insertion limit as measured by the group step counter demand position indicators,
2. ~~The affected bank is trippable~~, Each control and shutdown rod within the limits of LCO 3.1.4 (A05)
3. ~~Each shutdown and control rod is aligned to within ± 12 steps of its respective group step counter demand position,~~
4. The insertion limits of Specification 3.1.3.6 are met for each control bank,
5. No reactor coolant system boron concentration dilution activities or power level increases are allowed,
6. The SHUTDOWN MARGIN requirement of Specification 3.1.1.1 is determined to be met at least once per 12 hours or upon insertion of the controlling bank more than 5 steps from the initial position, and
7. The shutdown bank is restored to within the insertion limit specified in the COLR within 72 hours.

ACTION C — Otherwise, be in HOT STANDBY within the next 6 hours.

SURVEILLANCE REQUIREMENTS

SR 3.1.5.1 — 4.1.3.5 Each shutdown ~~rod~~ bank shall be determined to be within the insertion limit specified in the COLR: (A02)

~~a. Within 15 minutes prior to withdrawal of any rods in control banks A, B, C or D during an approach to reactor criticality, and~~ (L02)

b. ~~At least once per 12 hours thereafter~~ In accordance with the Surveillance Frequency Control Program. (LA01)

~~*See Special Test Exceptions 3.10.2 and 3.10.3.~~ (A03)

~~#With K_{eff} greater than or equal to 1.0.~~ (M01)

A01

ITS　　　　ITS 3.1.5

REACTIVITY CONTROL SYSTEMS

SHUTDOWN ~~ROD~~ BANK INSERTION LIMIT　　A02

LIMITING CONDITION FOR OPERATION　　A02

LCO 3.1.5　3.1.3.5 ~~All~~ Each shutdown ~~rods~~ bank shall be limited in physical insertion as specified in the COLR:

Applicability　APPLICABILITY: Modes 1~~*~~ and 2~~*#~~.　　A03　M01

ACTION:

ACTION B　a. With a ~~maximum of one shutdown rod~~ one or more shutdown banks inserted beyond the insertion limit specified in the COLR, except for surveillance testing pursuant to Specification 4.1.3.1.2 (Applicability Note) ~~or when complying with ACTION b of this specification~~, within ~~one~~ two hour either:　　L01

Add proposed Required Actions B.1.1 and B.1.2

1. Restore the ~~rod~~ bank to within the insertion limit specified in the COLR, or

~~2. Declare the rod to be inoperable and apply ACTION 3.1.3.1.c.3.~~

Add proposed ACTION C

ACTION A　b. With a maximum of one shutdown bank inserted beyond the insertion limit specified in the COLR ~~during surveillance testing pursuant to Specification 4.1.3.1.2~~ and immovable due to malfunctions in the rod control system, POWER OPERATION may continue provided that:　　A04

1. The shutdown bank is inserted no more than 18 steps below the insertion limit as measured by the group step counter demand position indicators,
2. ~~The affected bank is trippable,~~
3. ~~Each shutdown and control rod is aligned to within ± 12 steps of its respective group step counter demand position,~~ Each control and shutdown rod within the limits of LCO 3.1.4　　A05
4. The insertion limits of Specification 3.1.3.6 are met for each control bank,
5. No reactor coolant system boron concentration dilution activities or power level increases are allowed,
6. The SHUTDOWN MARGIN requirement of Specification 3.1.1.1 is determined to be met at least once per 12 hours or upon insertion of the controlling bank more than 5 steps from the initial position, and
7. The shutdown bank is restored to within the insertion limit specified in the COLR within 72 hours.

ACTION C　Otherwise, be in HOT STANDBY within the next 6 hours.

SURVEILLANCE REQUIREMENTS

SR 3.1.5.1　4.1.3.5 Each shutdown ~~rod~~ bank shall be determined to be within the insertion limit specified in the COLR:　　A02

~~a. Within 15 minutes prior to withdrawal of any rods in control banks A, B, C or D during an approach to reactor criticality, and~~　　L02

b. ~~At least once per 12 hours thereafter.~~ In accordance with the Surveillance Frequency Control Program　　LA01

~~* See Special Test Exceptions 3.10.2 and 3.10.3.~~　　A03

~~# With K_{eff} greater than or equal to 1.0~~　　M01

DISCUSSION OF CHANGES
ITS 3.1.5, SHUTDOWN BANK INSERTION LIMITS

ADMINISTRATIVE CHANGES

A01 In the conversion of the Sequoyah Nuclear Plant (SQN) Current Technical Specifications (CTS) to the plant specific Improved Technical Specifications (ITS), certain changes (wording preferences, editorial changes, reformatting, revised numbering, etc.) are made to obtain consistency with NUREG - 1431, Rev. 4.0, "Standard Technical Specifications - Westinghouse Plants" (ISTS) and additional Technical Specification Task Force (TSTF) travelers included in this submittal.

These changes are designated as administrative changes and are acceptable because they do not result in technical changes to the CTS.

A02 CTS 3.1.3.5 states "All shutdown rods shall be limited in physical insertion as specified in the COLR. Additionally, the title of CTS 3.1.3.5 is "SHUTDOWN ROD INSERTION LIMIT." ITS LCO 3.1.5 states "Each shutdown bank shall be within insertion limits specified in the COLR." Furthermore, ITS 3.1.5 title has been changed to "SHUTDOWN BANK INSERTION LIMIT." This changes the CTS by referring to each bank instead of all rods.

The purpose of CTS 3.1.3.5 is to ensure that sufficient negative reactivity is available to shutdown the reactor and to maintain the SDM. This change is acceptable because the requirements have not changed. ITS 3.1.5 will continue to ensure that sufficient negative reactivity is available to shutdown the reactor and to maintain the SDM. This change is a change in presentation to match the ISTS format. Therefore, this change is designated as an administrative change because it does not result in a technical change to the CTS.

A03 CTS 3.1.3.5 Applicability is modified by a footnote (footnote *) which states "See Special Test Exceptions 3.10.2 and 3.10.3." ITS 3.1.5 Applicability does not contain this footnote or a reference to the Special Test Exceptions. This changes the CTS by not including footnote *.

The purpose of Footnote * is to alert the Technical Specification user that a Special Test Exception exists that may modify the Applicability of this Specification. It is an ITS convention to not include these types of footnotes or cross-references. This change is designated as administrative because it does not result in a technical change to the CTS.

A04 CTS 3.1.3.5 ACTION b states that POWER OPERATION may continue with a maximum of one shutdown bank inserted beyond the insertion limit specified in the COLR during surveillance testing pursuant to Specification 4.1.3.1.2 and immovable due to malfunctions in the rod control system. ITS 3.1.5 ACTION A allows POWER OPERATION to continue with one shutdown bank inserted beyond the insertion limit and immovable due to malfunctions in the rod control system. This changes the CTS by removing the qualification statement "during surveillance testing pursuant to Specification 4.1.3.1.2."

The purpose of CTS 3.1.3.5 ACTION b is to allow time for diagnosis and repair of an inoperable shutdown bank if the failure is external to the control rod drive mechanism. Since the shutdown banks are required to be fully withdrawn in

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DISCUSSION OF CHANGES
ITS 3.1.5, SHUTDOWN BANK INSERTION LIMITS

MODES 1 and 2, the only time the shutdown banks are inserted, in these MODES, are during the performance of the rod freedom of movement test of CTS 4.1.3.1.2 and low power physics testing. Therefore, the statement "during surveillance testing pursuant to Specification 4.1.3.1.2" is not necessary. Furthermore, ITS LCO 3.1.5 is not applicable during the rod freedom of movement test, as stated in the ITS 3.1.5 Applicability Note. Therefore, referencing the SR (ITS SR 3.1.4.2) within the Specification would be confusing. This change is designated as administrative because it does not result in a technical change to the specifications.

A05 CTS 3.1.3.5 ACTION b states, in part, that with a maximum of one shutdown bank inserted beyond the insertion limit, POWER OPERATION may continue provided that the affected bank is trippable and each shutdown and control rod is aligned to within ± 12 steps of its respective group step counter demand position. ITS 3.1.5 Required Action A.2 requires immediate verification that each control and shutdown rod are within the limits of LCO 3.1.4. This changes the CTS by specifically stating that the control and shutdown banks shall be within the limits of LCO 3.1.4.

The purpose of this portion of CTS 3.1.3.5 ACTION b is to verify the requirements of CTS 3.1.3.1 are met. CTS 3.1.3.1 states that all full length (shutdown and control) rods shall be OPERABLE and positioned within ± 12 steps (indicated position) of their group step counter demand position. In CTS 3.1.3.5 ACTION b, verifying that the affected bank is trippable, is verifying that the bank is OPERABLE. Additionally, verifying each shutdown and control rod is aligned to within ± 12 steps of its respective group step counter demand position in CTS 3.1.3.5, is the same as verifying the shutdown and control rods are positioned within ± 12 steps (indicated position) of their group step counter demand position. The ITS 3.1.5 Required Action B.2 statement eliminates any confusion as to what actions are being taken. This change is designated as administrative because it does not result in a technical change to the specifications.

<u>MORE RESTRICTIVE CHANGES</u>

M01 CTS 3.1.3.5 is applicable in MODES 1 and 2 with k_{eff} ≥ 1.0. MODE 2 is modified by CTS 3.1.3.5 footnote #. ITS 3.1.5 is applicable in MODES 1 and 2. This changes the CTS by expanding the Applicability from MODE 2 with the reactor critical to all of MODE 2.

The purpose of CTS 3.1.3.5 is to ensure that the shutdown banks are fully withdrawn prior to withdrawing the control banks in order to ensure that there is sufficient shutdown margin available to quickly shutdown the reactor. This change is acceptable because applying the requirement prior to removing the control banks and bringing the reactor critical ensures that the shutdown margin is available and is consistent with plant operation, in that the shut down banks are completely withdrawn before beginning to withdraw the control banks and approaching criticality. This change is designated as more restrictive because it

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DISCUSSION OF CHANGES
ITS 3.1.5, SHUTDOWN BANK INSERTION LIMITS

increases the conditions under which Technical Specification controls will be applied.

RELOCATED SPECIFICATIONS

None

REMOVED DETAIL CHANGES

LA01 *(Type 5 – Removal of SR Frequency to the Surveillance Frequency Control Program)* CTS 4.1.3.5.b requires verification that each shutdown rod is within the insertion limit specified in the COLR at least once per 12 hours. ITS 3.1.5.1 requires a similar Surveillance and specifies the periodic Frequency as, "In accordance with the Surveillance Frequency Control Program." This changes the CTS by moving the specified Frequencies for this SR and associated Bases to the Surveillance Frequency Control Program.

The removal of these details related to Surveillance Requirement Frequencies from the Technical Specifications is acceptable, because this type of information is not necessary to be included in the Technical Specifications to provide adequate protection of public health and safety. The existing Surveillance Frequencies are removed from Technical Specifications and placed under licensee control pursuant to the methodology described in NEI 04-10. A new program (Surveillance Frequency Control Program) is being added to the Administrative Controls section of the Technical Specifications describing the control of Surveillance Frequencies. The surveillance test requirements remain in the Technical Specifications. The control of changes to the Surveillance Frequencies will be in accordance with the Surveillance Frequency Control Program. The Program shall ensure that Surveillance Requirements specified in the Technical Specifications are performed at intervals sufficient to assure the associated Limiting Conditions for Operation are met. This change is designated as a less restrictive removal of detail change, because the Surveillance Frequencies are being removed from the Technical Specifications.

LESS RESTRICTIVE CHANGES

L01 *(Category 4 – Relaxation of Required Action)* CTS 3.1.3.5 ACTION a provides compensatory actions for a maximum of one shutdown rod inserted beyond the insertion limit specified in the COLR. The actions require within one hour either restore the rod to within the insertion limit specified in the COLR or declare the rod to be inoperable and apply ACTION 3.1.3.1.c.3. For more than one shutdown rod beyond the insertion limit, CTS 3.1.3.5 does not contain a specific requirement; therefore, entry into CTS 3.0.3 is required. ITS 3.1.5 ACTION B provides Required Actions for one or more shutdown banks not within limits. ITS 3.1.5 Required Action B.1 requires either verification the SDM is within the limits specified in the COLR (Required Action B.1.1) or the initiation of boration to restore SDM to within limits (Required Action B.1.2), both within 1 hour. ITS 3.1.5 Required Action B.2 requires restoration of the shutdown banks to

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DISCUSSION OF CHANGES
ITS 3.1.5, SHUTDOWN BANK INSERTION LIMITS

within limits within 2 hours. Additionally, ITS 3.1.5 ACTION C requires if any Required Action and associated Completion Time is not met, the unit must be in MODE 3 within 6 hours. This changes the CTS by allowing more than one shutdown rod to be outside the insertion limits specified in the COLR, provides an additional hour to restore the shutdown bank or shutdown rod to within limits, eliminates the allowance to declare the rod inoperable and to take the ACTIONS of Specification 3.1.3.1, and adds the requirement to verify SDM or to initiate boration within one hour. It also eliminates the requirement to enter CTS 3.0.3 if more than one shutdown rod is inserted beyond the insertion limits.

The purpose of CTS 3.1.3.5 ACTION a is to ensure the shutdown banks are fully withdrawn in order to ensure that there is sufficient margin available to quickly shutdown the reactor. This change is acceptable because the Required Actions are used to establish remedial measures that must be taken in response to the degraded conditions in order to minimize risk associated with continued operation while providing time to repair inoperable features. The Required Actions are consistent with safe operation under the specified Condition, considering that only a small amount of time is provided to establish the required features, and the low probability of a DBA occurring during the repair period. Allowing an additional hour to restore one or more shutdown banks (or more than one shutdown rod) inserted below the insertion limit is appropriate as it may avoid a shutdown, a unit transient, while the rod control system is not in full working order. The ITS requires verification that the shutdown margin requirement is met or actions to restore the shutdown margin to within its limit within 1 hour, so all safety analysis assumptions are being met. This change is designated as less restrictive because less stringent Required Actions are being applied in the ITS than were applied in the CTS.

L02 *(Category 5 – Deletion of Surveillance Requirement)* CTS 4.1.3.5.a requires verification that each shutdown rod is within the insertion limit specified in the COLR within 15 minutes prior to withdrawal of any rods in control banks A, B, C, or D during an approach to reactor criticality. ITS 3.1.5 does not require verification that the shutdown rods are above the insertion limits within 15 minutes prior to control bank withdrawal. This changes the CTS by eliminating the requirement that the shutdown banks be verified to be above the insertion limit within 15 minutes prior to withdrawing control banks A, B, C, and D.

The purpose of CTS 4.1.3.5.a is to verify the shutdown rods are withdrawn above the insertion limit prior to withdrawing the control banks. This change is acceptable because the deleted Surveillance Requirement is not necessary to verify the equipment being used to meet the LCO can perform its required function. Thus, appropriate equipment continues to be tested in a manner and at a Frequency necessary to give confidence the equipment can perform its assumed safety function. Under the ITS Applicability of MODE 2 and the requirement of ITS LCO 3.0.4, the shutdown banks must be above the insertion limit prior to entering the ITS Applicability of MODE 2. However, it is not required to verify compliance within a specified time prior to initial control bank withdrawal. Specifying a time is not necessary to ensure the shutdown banks are above the insertion limit prior to initial control bank withdrawal as long as the shutdown banks are withdrawn before withdrawing the control banks. This change is

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DISCUSSION OF CHANGES
ITS 3.1.5, SHUTDOWN BANK INSERTION LIMITS

designated as less restrictive because a Surveillance which was required in CTS will not be required in the ITS.

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Improved Standard Technical Specifications (ISTS) Markup and Justification for Deviations (JFDs)

3.1 REACTIVITY CONTROL SYSTEMS

3.1.5 Shutdown Bank Insertion Limits

3.1.3.5 LCO 3.1.5 Each shutdown bank shall be within insertion limits specified in the COLR.

Applicability APPLICABILITY: MODES 1 and 2.

ACTION a
---NOTE---
This LCO is not applicable while performing SR 3.1.4.2.

ACTIONS

INSERT 1

CONDITION	REQUIRED ACTION	COMPLETION TIME
ACTION a: ~~A~~ B. One or more shutdown banks not within limits for reasons other than Condition A.	~~A~~ B.1.1 Verify SDM is within the limits specified in the COLR. OR ~~A~~ B.1.2 Initiate boration to restore SDM to within limit. AND ~~A~~ B.2 Restore shutdown bank(s) to within limits.	1 hour (1) 1 hour (1) 2 hours (2) (1)
ACTION b, DOC L01: ~~B~~ C. Required Action and associated Completion Time not met.	~~B~~ C.1 Be in MODE 3.	6 hours (1)

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(1) **INSERT 1**

ACTION b	A. One shutdown bank not within limits and immovable due to malfunctions in the Rod Control System.	A.1 Verify shutdown bank is inserted ≤ 18 steps below the insertion limit as measured by group step counter demand position indicators.	Immediately
		AND	
		A.2 Verify each control and shutdown rod is within limits of LCO 3.1.4, "Rod Group Alignment Limits."	Immediately
		AND	
		A.3 Verify each control bank is within insertion limits of LCO 3.1.6, "Rod Group Insertion Limits.".	Immediately
		AND	
		A.4 Verify no Reactor Coolant System boron dilution activities in progress.	Immediately
		AND	
		A.5 Verify no power level increases.	Immediately
		AND	
		A.6 Verify SDM is within limits specified in the COLR.	Once per 12 hours AND Immediately upon insertion of controlling bank more than 5 steps from the initial position
		AND	
		A.7 Restore shutdown bank to within limits.	72 hours

SURVEILLANCE REQUIREMENTS

	SURVEILLANCE		FREQUENCY	
4.1.3.5	SR 3.1.5.1	Verify each shutdown bank is within the insertion limits specified in the COLR.	[12 hours OR In accordance with the Surveillance Frequency Control Program]	4 4

3.1 REACTIVITY CONTROL SYSTEMS

3.1.5 Shutdown Bank Insertion Limits

3.1.3.5 LCO 3.1.5 Each shutdown bank shall be within insertion limits specified in the COLR.

Applicability APPLICABILITY: MODES 1 and 2.

-----NOTE-----
ACTION a This LCO is not applicable while performing SR 3.1.4.2.

ACTIONS

INSERT 1 ①

CONDITION	REQUIRED ACTION	COMPLETION TIME
ACTION a ~~A~~ B. One or more shutdown banks not within limits for reasons other than Condition A.	~~A~~ B.1.1 Verify SDM is within the limits specified in the COLR.	1 hour ①
	OR	
	~~A~~ B.1.2 Initiate boration to restore SDM to within limit.	1 hour ①
	AND	
	~~A~~ B.2 Restore shutdown bank~~s~~(s) to within limits.	2 hours ② ①
ACTION b, DOC L01 ~~B~~ C. Required Action and associated Completion Time not met.	~~B~~ C.1 Be in MODE 3.	6 hours ①

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CTS 3.1.5

(1) **INSERT 1**

ACTION b	A. One shutdown bank not within limits and immovable due to malfunctions in the Rod Control System.	A.1 Verify shutdown bank is inserted ≤ 18 steps below the insertion limit as measured by group step counter demand position indicators. AND	Immediately
		A.2 Verify each control and shutdown rod is within limits of LCO 3.1.4, "Rod Group Alignment Limits." AND	Immediately
		A.3 Verify each control bank is within insertion limits of LCO 3.1.6, "Rod Group Insertion Limits.". AND	Immediately
		A.4 Verify no Reactor Coolant System boron dilution activities in progress. AND	Immediately
		A.5 Verify no power level increases. AND	Immediately
		A.6 Verify SDM is within limits specified in the COLR. AND	Once per 12 hours AND Immediately upon insertion of controlling bank more than 5 steps from the initial position
		A.7 Restore shutdown bank to within limits.	72 hours

SURVEILLANCE REQUIREMENTS

	SURVEILLANCE	FREQUENCY	
4.1.3.5 SR 3.1.5.1	Verify each shutdown bank is within the insertion limits specified in the COLR.	[12 hours OR In accordance with the Surveillance Frequency Control Program]	4 4

JUSTIFICATION FOR DEVIATIONS
ITS 3.1.5, SHUTDOWN BANK INSERTION LIMITS

1. ISTS 3.1.5 has been modified to include a new ACTION (ITS 3.1.5 ACTION A). ITS 3.1.5 requires entering Condition A when one shutdown bank is inserted beyond the insertion limit and immovable due to a malfunction in the rod control system. ITS 3.1.5 Required Action A.1 requires an immediate verification that the shutdown bank is inserted less than or equal to 18 steps below the insertion limit as measured by the group step counter demand position indicators. ITS 3.1.5 Required Action A.2 requires an immediate verification that each control and shutdown rod is within the limits of LCO 3.1.4. ITS 3.1.5 Required Action A.3 requires an immediate verification that each control bank is within the insertion limits of LCO 3.1.6. ITS 3.1.5 Required Action A.4 requires an immediate verification that there are no reactor coolant system boron dilution concentration activities. ITS 3.1.5 Required Action A.5 requires an immediate verification that there are no power level increases. ITS 3.1.5 Required Action A.6 requires verification that the SDM is within the limits specified in the COLR once per 12 hours and upon insertion of the controlling bank more than 5 steps from the initial position. ITS 3.1.5 Required Action A.7 requires the restoration of the shutdown bank to within limits in 72 hours. This addition is acceptable because it reflects the current licensing basis. Furthermore, ISTS 3.1.5 Condition A (ITS 3.1.5 Condition B) was modified to state it is applicable for reasons other than Condition A, consistent with current licensing. This change was approved in License Amendment 215 for Unit 1 and License Amendment 205 for Unit 2 (ADAMS Accession No. ML013330266). Additionally, due to the addition of ITS 3.1.5 ACTION A, the subsequent ACTIONS were renumbered.

2. Editorial changes made for enhanced clarity/consistency.

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

4. ISTS SR 3.1.5.1 provides two options for controlling the Frequencies of Surveillance Requirements. SQN is proposing to control the Surveillance Frequencies under the Surveillance Frequency Control Program.

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Improved Standard Technical Specifications (ISTS) Bases Markup and Bases Justification for Deviations (JFDs)

B 3.1 REACTIVITY CONTROL SYSTEMS

B 3.1.5 Shutdown Bank Insertion Limits

BASES

BACKGROUND

The insertion limits of the shutdown and control rods are initial assumptions in all safety analyses that assume rod insertion upon reactor trip. The insertion limits directly affect core power and fuel burnup distributions and assumptions of available ejected rod worth, SDM and initial reactivity insertion rate.

The applicable criteria for these reactivity and power distribution design requirements are 10 CFR 50, Appendix A, GDC 10, "Reactor Design," GDC 26, "Reactivity Control System Redundancy and Protection," GDC 28, "Reactivity Limits" (Ref. 1), and 10 CFR 50.46, "Acceptance Criteria for Emergency Core Cooling Systems for Light Water Nuclear Power Reactors" (Ref. 2). Limits on control rod insertion have been established, and all rod positions are monitored and controlled during power operation to ensure that the power distribution and reactivity limits defined by the design power peaking and SDM limits are preserved.

The rod cluster control assemblies (RCCAs) are divided among control banks and shutdown banks. Each bank may be further subdivided into two groups to provide for precise reactivity control. A group consists of two or more RCCAs that are electrically paralleled to step simultaneously. A bank of RCCAs consists of two groups that are moved in a staggered fashion, but always within one step of each other. ~~All plants have~~ Each unit has four control banks and ~~at least two~~ four shutdown banks. See LCO 3.1.4, "Rod Group Alignment Limits," for control and shutdown rod OPERABILITY and alignment requirements, and LCO 3.1.7, "Rod Position Indication," for position indication requirements. 1

The control banks are used for precise reactivity control of the reactor. The positions of the control banks are normally automatically controlled by the Rod Control System, but they can also be manually controlled. They are capable of adding negative reactivity very quickly (compared to borating). The control banks must be maintained above designed insertion limits and are typically near the fully withdrawn position during normal full power operations.

Hence, they are not capable of adding a large amount of positive reactivity. Boration or dilution of the Reactor Coolant System (RCS) compensates for the reactivity changes associated with large changes in RCS temperature. The design calculations are performed with the assumption that the shutdown banks are withdrawn first. The shutdown banks can be fully withdrawn without the core going critical. This provides available negative reactivity in the event of boration errors. The

BASES

BACKGROUND (continued)

shutdown banks are controlled manually by the control room operator. During normal unit operation, the shutdown banks are either fully withdrawn or fully inserted. INSERT 1 The shutdown banks must be ~~completely~~ withdrawn from the core, prior to withdrawing any control banks during an approach to criticality. ~~The shutdown banks are then left in this position until the reactor is shut down.~~ They affect core power and burnup distribution, and add negative reactivity to shut down the reactor upon receipt of a reactor trip signal. 1 1

APPLICABLE SAFETY ANALYSES

On a reactor trip, all RCCAs (shutdown banks and control banks), except the most reactive RCCA, are assumed to insert into the core. The shutdown banks shall be at or above their insertion limits and available to insert the maximum amount of negative reactivity on a reactor trip signal. The control banks may be partially inserted in the core, as allowed by LCO 3.1.6, "Control Bank Insertion Limits." The shutdown bank and control bank insertion limits are established to ensure that a sufficient amount of negative reactivity is available to shut down the reactor and maintain the required SDM (see LCO 3.1.1, "SHUTDOWN MARGIN (SDM)") following a reactor trip from full power. The combination of control banks and shutdown banks (less the most reactive RCCA, which is assumed to be fully withdrawn) is sufficient to take the reactor from full power conditions at rated temperature to zero power, and to maintain the required SDM at rated no load temperature (Ref. 3). The shutdown bank insertion limit also limits the reactivity worth of an ejected shutdown rod.

The acceptance criteria for addressing shutdown and control rod bank insertion limits and inoperability or misalignment is that:

a. There be no violations of:

   1. Specified acceptable fuel design limits or

   2. RCS pressure boundary integrity and

b. The core remains subcritical after accident transients.

As such, the shutdown bank insertion limits affect safety analys~~i~~es involving core reactivity and SDM (Ref. 3). 2

The shutdown bank insertion limits preserve an initial condition assumed in the safety analyses and, as such, satisfy Criterion 2 of 10 CFR 50.36(c)(2)(ii).

1

INSERT 1

They are moved quarterly or following maintenance to ensure trippability but are returned to the withdrawn position when the testing is completed.

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BASES

LCO

The shutdown banks must be within their insertion limits any time the reactor is critical or approaching criticality. This ensures that a sufficient amount of negative reactivity is available to shut down the reactor and maintain the required SDM following a reactor trip.

The shutdown bank insertion limits are defined in the COLR.

APPLICABILITY

The shutdown banks must be within their insertion limits, with the reactor in MODES 1 and 2. This ensures that a sufficient amount of negative reactivity is available to shut down the reactor and maintain the required SDM following a reactor trip. The shutdown banks do not have to be within their insertion limits in MODE 3, unless an approach to criticality is being made. In MODE 3, 4, 5, or 6, the shutdown banks [, except for control rod OPERABILITY testing,] are fully inserted in the core and contribute to the SDM. Refer to LCO 3.1.1 for SDM requirements in [MODE 2 k_{eff} < 1.0,] MODES 3, 4, and 5. LCO 3.9.1, "Boron Concentration," ensures adequate SDM in MODE 6. (1) (3)

The Applicability requirements have been modified by a Note indicating the LCO requirement is suspended during SR 3.1.4.2. This SR verifies the freedom of the rods to move, and requires the shutdown bank to move below the LCO limits, which would normally violate the LCO.

ACTIONS

[INSERT 2]

~~A~~[B].1.1, ~~A~~[B].1.2, and ~~A~~[B].2 (3)

When one or more shutdown banks is not within insertion limits [for reasons other than Condition A], 2 hours is allowed to restore the shutdown banks to within the insertion limits. This is necessary because the available SDM may be significantly reduced, with one or more of the shutdown banks not within their insertion limits. Also, verification of SDM or initiation of boration within 1 hour is required, since the SDM in MODES 1 and 2 is ensured by adhering to the control and shutdown bank insertion limits (see LCO 3.1.1). If shutdown banks are not within their insertion limits, then SDM will be verified by performing a reactivity balance calculation, considering the effects listed in the BASES for SR 3.1.1.1.

The allowed Completion Time of 2 hours provides an acceptable time for evaluating and repairing minor problems without allowing the plant to remain in an unacceptable condition for an extended period of time.

~~B~~[C].1 (3)

If ~~the shutdown banks cannot be restored to within their insertion limits within 2 hours~~ [INSERT 3], the unit must be brought to a MODE where the LCO is not applicable. 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. (3)

2 **INSERT 2**

A.1, A.2, A.3, A.4, A.5, A.6, and A.7

When one shutdown bank is inserted beyond the insertion limit and is immovable due to a malfunction in the rod control system, 72 hours are provided to restore the shutdown banks to within limits. Additionally, immediate verification is required to prove that the shutdown bank is less than or equal to 18 steps below the insertion limit as measured by the group demand position indicators, the individual control rod alignment limits of LCOs 3.1.4 and 3.1.6 are met, there are no reactor coolant system boron dilution activities, and there are no power level increases are taking place. Furthermore, a verification of SDM is required within 12 hours or when the controlling banks are inserted more than 5 steps from the initial position. The requirement to be in compliance with LCOs 3.1.4 and 3.1.6 ensures that the rods are trippable, and power distribution is acceptable during the time allowed to restore the inserted rod. The 12 hour requirement to verify the SDM is within limits ensures the SDM requirements of LCO 3.1.1 are met during the repair period. Furthermore, the requirement to verify the SDM is within limits when a controlling bank is inserted five steps or more also ensures that SDM requirements of LCO 3.1.1 are met during the repair period. If any of these Conditions are not met, Condition C must be applied.

The Completion Time of 72 hours is based on operating experience and provides an acceptable time for evaluating and repairing problems with the rod control system.

2 **INSERT 3**

the Required Action(s) of Condition A or B are not met within the associated Completion Times

BASES

SURVEILLANCE REQUIREMENTS

SR 3.1.5.1

Verification that the shutdown banks are within their insertion limits prior to an approach to criticality ensures that when the reactor is critical, or being taken critical, the shutdown banks will be available to shut down the reactor, and the required SDM will be maintained following a reactor trip. This SR and Frequency ensure that the shutdown banks are withdrawn before the control banks are withdrawn during a unit startup.

[Since the shutdown banks are positioned manually by the control room operator, a verification of shutdown bank position at a Frequency of 12 hours, after the reactor is taken critical, is adequate to ensure that they are within their insertion limits. Also, the 12 hour Frequency takes into account other information available in the control room for the purpose of monitoring the status of shutdown rods.

OR

The Surveillance Frequency is controlled under the Surveillance Frequency Control Program.

-----------------------------------REVIEWER'S NOTE-----------------------------------
Plants controlling Surveillance Frequencies under a Surveillance Frequency Control Program should utilize the appropriate Frequency description, given above, and the appropriate choice of Frequency in the Surveillance Requirement.
--]

4

5

4

REFERENCES

1. 10 CFR 50, Appendix A, GDC 10, GDC 26, and GDC 28.

2. 10 CFR 50.46.

3. U FSAR, Chapter [15]. 1 6

B 3.1 REACTIVITY CONTROL SYSTEMS

B 3.1.5 Shutdown Bank Insertion Limits

BASES

BACKGROUND

The insertion limits of the shutdown and control rods are initial assumptions in all safety analyses that assume rod insertion upon reactor trip. The insertion limits directly affect core power and fuel burnup distributions and assumptions of available ejected rod worth, SDM and initial reactivity insertion rate.

The applicable criteria for these reactivity and power distribution design requirements are 10 CFR 50, Appendix A, GDC 10, "Reactor Design," GDC 26, "Reactivity Control System Redundancy and Protection," GDC 28, "Reactivity Limits" (Ref. 1), and 10 CFR 50.46, "Acceptance Criteria for Emergency Core Cooling Systems for Light Water Nuclear Power Reactors" (Ref. 2). Limits on control rod insertion have been established, and all rod positions are monitored and controlled during power operation to ensure that the power distribution and reactivity limits defined by the design power peaking and SDM limits are preserved.

The rod cluster control assemblies (RCCAs) are divided among control banks and shutdown banks. Each bank may be further subdivided into two groups to provide for precise reactivity control. A group consists of two or more RCCAs that are electrically paralleled to step simultaneously. A bank of RCCAs consists of two groups that are moved in a staggered fashion, but always within one step of each other. ~~All plants have~~ Each unit has four control banks and ~~at least two~~ four shutdown banks. See LCO 3.1.4, "Rod Group Alignment Limits," for control and shutdown rod OPERABILITY and alignment requirements, and LCO 3.1.7, "Rod Position Indication," for position indication requirements. (1)

The control banks are used for precise reactivity control of the reactor. The positions of the control banks are normally automatically controlled by the Rod Control System, but they can also be manually controlled. They are capable of adding negative reactivity very quickly (compared to borating). The control banks must be maintained above designed insertion limits and are typically near the fully withdrawn position during normal full power operations.

Hence, they are not capable of adding a large amount of positive reactivity. Boration or dilution of the Reactor Coolant System (RCS) compensates for the reactivity changes associated with large changes in RCS temperature. The design calculations are performed with the assumption that the shutdown banks are withdrawn first. The shutdown banks can be fully withdrawn without the core going critical. This provides available negative reactivity in the event of boration errors. The

BASES

BACKGROUND (continued)

shutdown banks are controlled manually by the control room operator. During normal unit operation, the shutdown banks are either fully withdrawn or fully inserted. INSERT 1 The shutdown banks must be ~~completely~~ withdrawn from the core, prior to withdrawing any control banks during an approach to criticality. ~~The shutdown banks are then left in this position until the reactor is shut down.~~ They affect core power and burnup distribution, and add negative reactivity to shut down the reactor upon receipt of a reactor trip signal. 1 1

APPLICABLE SAFETY ANALYSES

On a reactor trip, all RCCAs (shutdown banks and control banks), except the most reactive RCCA, are assumed to insert into the core. The shutdown banks shall be at or above their insertion limits and available to insert the maximum amount of negative reactivity on a reactor trip signal. The control banks may be partially inserted in the core, as allowed by LCO 3.1.6, "Control Bank Insertion Limits." The shutdown bank and control bank insertion limits are established to ensure that a sufficient amount of negative reactivity is available to shut down the reactor and maintain the required SDM (see LCO 3.1.1, "SHUTDOWN MARGIN (SDM)") following a reactor trip from full power. The combination of control banks and shutdown banks (less the most reactive RCCA, which is assumed to be fully withdrawn) is sufficient to take the reactor from full power conditions at rated temperature to zero power, and to maintain the required SDM at rated no load temperature (Ref. 3). The shutdown bank insertion limit also limits the reactivity worth of an ejected shutdown rod.

The acceptance criteria for addressing shutdown and control rod bank insertion limits and inoperability or misalignment is that:

a. There be no violations of:

    1. Specified acceptable fuel design limits or

    2. RCS pressure boundary integrity and

b. The core remains subcritical after accident transients.

As such, the shutdown bank insertion limits affect safety analyse~~s~~ involving core reactivity and SDM (Ref. 3). 2

The shutdown bank insertion limits preserve an initial condition assumed in the safety analyses and, as such, satisfy Criterion 2 of 10 CFR 50.36(c)(2)(ii).

1 **INSERT 1**

They are moved quarterly or following maintenance to ensure trippability but are returned to the withdrawn position when the testing is completed.

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BASES

LCO

The shutdown banks must be within their insertion limits any time the reactor is critical or approaching criticality. This ensures that a sufficient amount of negative reactivity is available to shut down the reactor and maintain the required SDM following a reactor trip.

The shutdown bank insertion limits are defined in the COLR.

APPLICABILITY

The shutdown banks must be within their insertion limits, with the reactor in MODES 1 and 2. This ensures that a sufficient amount of negative reactivity is available to shut down the reactor and maintain the required SDM following a reactor trip. The shutdown banks do not have to be within their insertion limits in MODE 3, unless an approach to criticality is being made. In MODE 3, 4, 5, or 6, the shutdown banks [, except for control rod OPERABILITY testing,] are fully inserted in the core and contribute to the SDM. Refer to LCO 3.1.1 for SDM requirements in [MODE 2 k_{eff} < 1.0,] MODES 3, 4, and 5. LCO 3.9.1, "Boron Concentration," ensures adequate SDM in MODE 6. (1) (3)

The Applicability requirements have been modified by a Note indicating the LCO requirement is suspended during SR 3.1.4.2. This SR verifies the freedom of the rods to move, and requires the shutdown bank to move below the LCO limits, which would normally violate the LCO.

ACTIONS

[INSERT 2]

~~A~~ [B].1.1, ~~A~~ [B].1.2, and ~~A~~ [B].2 (3)

When one or more shutdown banks is not within insertion limits [for reasons other than Condition A], 2 hours is allowed to restore the shutdown banks to within the insertion limits. This is necessary because the available SDM may be significantly reduced, with one or more of the shutdown banks not within their insertion limits. Also, verification of SDM or initiation of boration within 1 hour is required, since the SDM in MODES 1 and 2 is ensured by adhering to the control and shutdown bank insertion limits (see LCO 3.1.1). If shutdown banks are not within their insertion limits, then SDM will be verified by performing a reactivity balance calculation, considering the effects listed in the BASES for SR 3.1.1.1.

The allowed Completion Time of 2 hours provides an acceptable time for evaluating and repairing minor problems without allowing the plant to remain in an unacceptable condition for an extended period of time.

(3)

~~B~~ [C].1

If [INSERT 3] ~~the shutdown banks cannot be restored to within their insertion limits within 2 hours~~, the unit must be brought to a MODE where the LCO is not applicable. 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. (3)

(2) **INSERT 2**

A.1, A.2, A.3, A.4, A.5, A.6, and A.7

When one shutdown bank is inserted beyond the insertion limit and is immovable due to a malfunction in the rod control system, 72 hours are provided to restore the shutdown banks to within limits. Additionally, immediate verification is required to prove that the shutdown bank is less than or equal to 18 steps below the insertion limit as measured by the group demand position indicators, the individual control rod alignment limits of LCOs 3.1.4 and 3.1.6 are met, there are no reactor coolant system boron dilution activities, and there are no power level increases are taking place. Furthermore, a verification of SDM is required within 12 hours or when the controlling banks are inserted more than 5 steps from the initial position. The requirement to be in compliance with LCOs 3.1.4 and 3.1.6 ensures that the rods are trippable, and power distribution is acceptable during the time allowed to restore the inserted rod. The 12 hour requirement to verify the SDM is within limits ensures the SDM requirements of LCO 3.1.1 are met during the repair period. Furthermore, the requirement to verify the SDM is within limits when a controlling bank is inserted five steps or more also ensures that SDM requirements of LCO 3.1.1 are met during the repair period. If any of these Conditions are not met, Condition C must be applied.

The Completion Time of 72 hours is based on operating experience and provides an acceptable time for evaluating and repairing problems with the rod control system.

(2) **INSERT 3**

the Required Action(s) of Condition A or B are not met within the associated Completion Times

BASES

SURVEILLANCE REQUIREMENTS

SR 3.1.5.1

Verification that the shutdown banks are within their insertion limits prior to an approach to criticality ensures that when the reactor is critical, or being taken critical, the shutdown banks will be available to shut down the reactor, and the required SDM will be maintained following a reactor trip. This SR and Frequency ensure that the shutdown banks are withdrawn before the control banks are withdrawn during a unit startup.

[Since the shutdown banks are positioned manually by the control room operator, a verification of shutdown bank position at a Frequency of 12 hours, after the reactor is taken critical, is adequate to ensure that they are within their insertion limits. Also, the 12 hour Frequency takes into account other information available in the control room for the purpose of monitoring the status of shutdown rods. (4)

OR

The Surveillance Frequency is controlled under the Surveillance Frequency Control Program.

-------------------------------REVIEWER'S NOTE-------------------------------
Plants controlling Surveillance Frequencies under a Surveillance Frequency Control Program should utilize the appropriate Frequency description, given above, and the appropriate choice of Frequency in the Surveillance Requirement. (5)
---] (4)

REFERENCES

1. 10 CFR 50, Appendix A, GDC 10, GDC 26, and GDC 28.

2. 10 CFR 50.46.

3. U FSAR, Chapter [15]. (1) (6)

JUSTIFICATION FOR DEVIATIONS
ITS 3.1.5 BASES, SHUTDOWN BANK INSERTION LIMITS

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

2. Editorial changes made for enhanced clarity/consistency.

3. Changes are made to be consistent with changes made to the Specification. Additionally, the subsequent ACTIONS have been renumbered.

4. ISTS SR 3.1.5.1 and SR 3.1.5.2 Bases provides two options for controlling the Frequencies of Surveillance Requirements. SQN is proposing to control the Surveillance Frequencies under the Surveillance Frequency Control Program. Additionally, the Frequency description which is being removed will be included in the Surveillance Frequency Control Program.

5. The Reviewer's Note has been deleted. This information is for the NRC reviewer to be keyed into what is needed to meet this requirement. This Note is not meant to be retained in the final version of the plant specific submittal.

6. The ISTS contains bracketed information and/or values that are generic to Westinghouse vintage plants. The brackets are removed and the proper plant specific information/value is inserted to reflect the current licensing basis.

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Specific No Significant Hazards Considerations (NSHCs)

DETERMINATION OF NO SIGNIFICANT HAZARDS CONSIDERATIONS
ITS 3.1.5, SHUTDOWN BANK INSERTION LIMITS

There are no specific No Significant Hazards Considerations for this Specification.

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ATTACHMENT 6

ITS 3.1.6, CONTROL BANK INSERTION LIMITS

Current Technical Specification (CTS) Markup and Discussion of Changes (DOCs)

A01

ITS | ITS 3.1.6

REACTIVITY CONTROL SYSTEMS

CONTROL ~~ROD~~ BANK INSERTION LIMITS (A01)

LIMITING CONDITION FOR OPERATION

LCO 3.1.6 — 3.1.3.6 The control banks shall be limited in physical insertion, sequence, and overlap limits (M01) as specified in the COLR.

Applicability — APPLICABILITY: MODES 1~~*~~ and 2~~*~~#. (A02)

ACTION:

ACTION B — Applicability Note

a. With the control banks inserted beyond the above insertion limits, except for surveillance testing pursuant to Specification 4.1.3.1.2 or when complying with ACTION b of this specification, either:

Add proposed Required Action B.1.1 and B.1.2 (M02)

1. Restore the control banks to within the limits within two hours, or
2. ~~Reduce THERMAL POWER within two hours to less than or equal to that fraction of RATED THERMAL POWER which is allowed by the group position using the insertion limits specified in the COLR, or~~ (A03)

Add proposed ACTION C (M01)

ACTION D — 3. Be in ~~HOT STANDBY~~ MODE 2 with k_{eff} < 1.0 (A04) within 6 hours.

ACTION A

b. With a maximum of one control bank inserted beyond the insertion limit specified in the COLR ~~during surveillance testing pursuant to Specification 4.1.3.1.2~~ (A05) and immovable due to malfunctions in the rod control system, POWER OPERATION## may continue provided that:
1. The control bank is inserted no more than 18 steps below the insertion limit as measured by the group step counter demand position indicators,
2. ~~The affected bank is trippable,~~
3. ~~Each shutdown and control rod is aligned to within ± 12 steps of its respective group step counter demand position,~~ Each control and shutdown rod within the limits of LCO 3.1.4. (A06)
4. The insertion limits of Specification 3.1.3.5 are met for each shutdown bank,
5. No reactor coolant system boron concentration dilution activities or power level increases are allowed,
6. The SHUTDOWN MARGIN requirement of Specification 3.1.1.1 is determined to be met at least once per 12 hours or upon insertion of the controlling bank more than 5 steps from the initial position, and
7. The control bank is restored to within the insertion limit specified in the COLR within 72 hours.

ACTION D — Otherwise, be in ~~HOT STANDBY~~ MODE 2 with k_{eff} < 1.0 (A04) within the next 6 hours.

SURVEILLANCE REQUIREMENTS

SR 3.1.6.2 — 4.1.3.6 The position of each control bank shall be determined to be within the insertion limits ~~at least once per~~ In accordance with the Surveillance Frequency Control Program (LA01) ~~12 hours except during time intervals when the Rod Insertion Limit Monitor is inoperable, then verify the individual rod positions at least once per 4 hours~~ (L01).

Add proposed SR 3.1.6.3 (M01)

~~*See Special Test Exceptions 3.10.2 and 3.10.3.~~ (A02)

Applicability — #With K_{eff} greater than or equal to 1.0.

ACTION A Note — ## Provision for continued POWER OPERATION does not apply to the controlling bank(s) ~~(normally Control Bank D)~~ (LA02) inserted beyond the insertion limit.

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A01

ITS

ITS 3.1.6

3/4.1 REACTIVITY CONTROL SYSTEMS

3/4.1.1 BORATION CONTROL

SHUTDOWN MARGIN - T_{avg} Greater Than 200°F

See ITS 3.1.1

LIMITING CONDITION FOR OPERATION

3.1.1.1 The SHUTDOWN MARGIN shall be greater than or equal to 1.6% delta k/k for 4 loop operation.

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

See ITS 3.1.1

ACTION:

With the SHUTDOWN MARGIN less than 1.6% delta k/k, immediately initiate and continue boration at greater than or equal to 35 gpm of a solution containing greater than or equal to 6120 ppm boron or equivalent until the required SHUTDOWN MARGIN is restored.

See ITS 3.1.1

SURVEILLANCE REQUIREMENTS

4.1.1.1.1 The SHUTDOWN MARGIN shall be determined to be greater than or equal to 1.6% delta k/k:

a. Within one hour after detection of an inoperable control rod(s) and at least once per 12 hours thereafter while the rod(s) is inoperable. If the inoperable control rod is immovable or untrippable, the above required SHUTDOWN MARGIN shall be verified acceptable with an increased allowance for the withdrawn worth of the immovable or untrippable control rod(s).

See ITS 3.1.4

See ITS Chapter 1.0

In accordance with the Surveillance Frequency Control Program LA01

SR 3.1.6.2 b. When in MODE 1 or MODE 2 with K_{eff} greater than or equal to 1.0, ~~at least once per 12 hours~~ by verifying that control bank withdrawal is within the limits of Specification 3.1.3.6.

SR 3.1.6.1 c. When in MODE 2 with K_{eff} less than 1.0, within 4 hours prior to achieving reactor criticality by verifying that the predicted critical control rod position is within the limits of Specification 3.1.3.6.

*See Special Test Exception 3.10.1

See ITS 3.1.1

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A01

ITS

ITS 3.1.6

REACTIVITY CONTROL SYSTEMS

BANK A01

CONTROL ROD INSERTION LIMITS

LIMITING CONDITION FOR OPERATION

, sequence, and overlap limits M01

LCO 3.1.6 3.1.3.6 The control banks shall be limited in physical insertion as specified in the COLR

A02

Applicability APPLICABILITY: Modes 1* and 2*#.

ACTION:

a. With the control banks inserted beyond the above insertion limits, except for surveillance testing pursuant to Specification 4.1.3.1.2 or when complying with ACTION b of this specification, either:

Applicability Note

ACTION B

Add proposed Required Action B.1.1 and B.1.2 M02

1. Restore the control banks to within the limits within two hours, or
2. Reduce THERMAL POWER within two hours to less than or equal to that fraction of RATED THERMAL POWER which is allowed by the group position using the insertion limits specified in the COLR, or A03

Add proposed ACTION C M01

3. Be in HOT STANDBY within 6 hours.

MODE 2 with k_{eff} < 1.0 A04

ACTION D

b. With a maximum of one control bank inserted beyond the insertion limit specified in the COLR during surveillance testing pursuant to Specification 4.1.3.1.2 and immovable due to malfunctions in the rod control system, POWER OPERATION## may continue provided that:

A05

1. The control bank is inserted no more than 18 steps below the insertion limit as measured by the group step counter demand position indicators,

Each control and shutdown rod within the limits of LCO 3.1.4 A06

2. The affected bank is trippable,
3. Each shutdown and control rod is aligned to within ± 12 steps of its respective group step counter demand position,
4. The insertion limits of Specification 3.1.3.5 are met for each shutdown bank,
5. No reactor coolant system boron concentration dilution activities or power level increases are allowed,
6. The SHUTDOWN MARGIN requirement of Specification 3.1.1.1 is determined to be met at least once per 12 hours or upon insertion of the controlling bank more than 5 steps from the initial position, and
7. The control bank is restored to within the insertion limit specified in the COLR within 72 hours.

ACTION A

Otherwise, be in HOT STANDBY within the next 6 hours.

MODE 2 with k_{eff} < 1.0 A04

SURVEILLANCE REQUIREMENTS

In accordance with the Surveillance Frequency Control Program LA01

SR 3.1.6.2 4.1.3.6 The position of each control bank shall be determined to be within the insertion limits at least once per 12 hours except during time intervals when the Rod Insertion Limit Monitor is inoperable, then verify the individual rod positions at least once per 4 hours.

L01

Add proposed SR 3.1.6.3 M01

* See Special Test Exceptions 3.10.2 and 3.10.3.

A02

Applicability # With K_{eff} greater than or equal to 1.0.

ACTION A Note ## Provision for continued POWER OPERATION does not apply to the controlling bank(s) (normally Control Bank D) inserted beyond the insertion limit.

LA02

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A01

ITS — ITS 3.1.6

3/4.1 REACTIVITY CONTROL SYSTEMS

3/4.1.1 BORATION CONTROL

SHUTDOWN MARGIN - $T_{avg} \geq 200°F$ (See ITS 3.1.1)

LIMITING CONDITION FOR OPERATION

3.1.1.1 The SHUTDOWN MARGIN shall be greater than or equal to 1.6% delta k/k for 4 loop operation.

APPLICABILITY: MODES 1, 2*, 3, and 4. (See ITS 3.1.1)

ACTION:

With the SHUTDOWN MARGIN less than 1.6% delta k/k, immediately initiate and continue boration at greater than or equal to 35 gpm of a solution containing greater than or equal to 6120 ppm boron or equivalent until the required SHUTDOWN MARGIN is restored. (See ITS 3.1.1)

SURVEILLANCE REQUIREMENTS

4.1.1.1.1 The SHUTDOWN MARGIN shall be determined to be greater than or equal to 1.6% delta k/k:

a. Within one hour after detection of an inoperable control rod(s) and at least once per 12 hours thereafter while the rod(s) is inoperable. (See ITS 3.1.4) If the inoperable control rod is immovable or untrippable, the above required SHUTDOWN MARGIN shall be verified acceptable with an increased allowance for the withdrawn worth of the immovable or untrippable control rod(s). (See ITS Chapter 1.0)

SR 3.1.6.2 — b. When in MODE 1 or MODE 2 with K_{eff} greater than or equal to 1.0, ~~at least once per 12 hours~~ [In accordance with the Surveillance Frequency Control Program — LA01] by verifying that control bank withdrawal is within the limits of Specification 3.1.3.6.

SR 3.1.6.1 — c. When in MODE 2, with K_{eff} less than 1.0, within 4 hours prior to achieving reactor criticality by verifying that the predicted critical control rod position is within the limits of Specification 3.1.3.6.

d. Prior to initial operation above 5% RATED THERMAL POWER after each fuel loading, by consideration of the factors of e below, with the control banks at the maximum insertion limit of Specification 3.1.3.6. (See ITS 3.1.1)

* See Special Test Exception 3.10.1 (See ITS 3.1.1)

DISCUSSION OF CHANGES
ITS 3.1.6, CONTROL BANK INSERTION LIMITS

ADMINISTRATIVE CHANGES

A01 In the conversion of the Sequoyah Nuclear Plant (SQN) Current Technical Specifications (CTS) to the plant specific Improved Technical Specifications (ITS), certain changes (wording preferences, editorial changes, reformatting, revised numbering, etc.) are made to obtain consistency with NUREG - 1431, Rev. 4.0, "Standard Technical Specifications - Westinghouse Plants" (ISTS) and additional Technical Specification Task Force (TSTF) travelers included in this submittal.

These changes are designated as administrative changes and are acceptable because they do not result in technical changes to the CTS.

A02 CTS 3.1.3.6 Applicability is modified by a footnote (footnote *) that states "See Special Test Exceptions 3.10.2 and 3.10.3." ITS 3.1.6 Applicability does not contain the footnote or a reference to the Special Test Exceptions. This changes the CTS by not including footnote *.

The purpose of Footnote * is to alert the Technical Specification user that a Special Test Exception exists that may modify the Applicability of this Specification. It is an ITS convention to not include these types of footnotes or cross-references. This change is designated as administrative because it does not result in a technical change to the CTS.

A03 CTS 3.1.3.6 ACTION a states that with the control banks beyond the insertion limits, to restore the control bank to within limits within 2 hours or reduce THERMAL POWER within two hours to less than or equal to that fraction of RATED THERMAL POWER which is allowed by the group position using the insertion limits specified in the COLR. ITS 3.1.6 Required Action B.2 requires restoring the control banks to within limits within 2 hours. This changes the CTS by eliminating the explicit statement that compliance with the LCO can be restored in order to exit the ACTION.

This change is acceptable because the requirements have not changed. When THERMAL POWER is reduced, the insertion limits, which are a function of power, are lowered. When the insertion limits are lowered, the control banks, which were previously inserted below the insertion limits, will then come within the new limit. This is the same as the CTS ACTION a option to restore the control banks to within the limit. This change is considered administrative because the technical requirements have not changed.

A04 CTS 3.1.3.6 ACTION a.3 and ACTION b require the unit to be in HOT STANDBY (MODE 3) within 6 hours if ACTION a or b are not met. The CTS Applicability is MODES 1 and 2 with $k_{eff} \geq 1.0$. ITS 3.1.6 ACTION D requires the unit to be in MODE 2 with $k_{eff} < 1.0$. This changes the CTS by requiring the unit to be in MODE 2 with $k_{eff} < 1.0$ instead of HOT STANDBY (MODE 3).

This change is acceptable because the requirements have not changed. In the CTS, ACTIONS are only required to be followed while in the Mode of Applicability. The CTS control bank insertion limits are applicable in MODES 1 and 2 with $k_{eff} \geq 1.0$. Therefore, under the CTS, the unit does not have to enter

DISCUSSION OF CHANGES
ITS 3.1.6, CONTROL BANK INSERTION LIMITS

MODE 3 because the Applicability of the LCO has been exited when in MODE 2 with k_{eff} < 1.0. As a result, there is no difference between the CTS and the ITS requirements. This change is designated as administrative because it does not result in a technical change to the CTS.

A05 CTS 3.1.3.6 ACTION b states that POWER OPERATION may continue with a maximum of one control bank inserted beyond the insertion limit specified in the COLR during surveillance testing pursuant to Specification 4.1.3.1.2 and immovable resulting from malfunctions in the rod control system. ITS 3.1.6 ACTION A allows, in part, POWER OPERATION to continue with one control bank inserted beyond the insertion limit and immovable. This changes the CTS by removing the qualification statement "during surveillance testing pursuant to Specification 4.1.3.1.2."

The purpose of CTS 3.1.3.6 ACTION b is to allow time for diagnosis and repair to an inoperable control bank if the failure is external to the control rod drive mechanism. Since the shutdown banks are required to be fully withdrawn in MODES 1 and 2, the only time the control banks are inserted, in these MODES, are during the performance of the rod freedom test of CTS 4.1.3.1.2. Therefore, the statement "during surveillance testing pursuant to Specification 4.1.3.1.2" is not necessary. Furthermore, ITS LCO 3.1.6 is not applicable during the rod freedom test, as stated in the ITS 3.1.6 Applicability Note. Therefore, referencing the SR (ITS SR 3.1.4.2) within the Specification would be confusing. This change is designated as administrative because it does not result in a technical change to the specifications.

A06 CTS 3.1.3.6 ACTION b states, in part, that with a maximum of one control bank inserted beyond the insertion limit, POWER OPERATION may continue provided that the affected bank is trippable and each shutdown and control rod is aligned to within ± 12 steps of its respective group step counter demand position. ITS 3.1.6 Required Action A.2 requires, in part, verification that each control and shutdown rod is within the limits of LCO 3.1.4. This changes the CTS by specifically stating that the control and shutdown rods shall be verified to be within the limits of LCO 3.1.4.

The purpose of this portion of CTS 3.1.3.6 ACTION b is to verify the requirements of CTS 3.1.3.1 are met. CTS 3.1.3.1 states that all full length (shutdown and control) rods shall be OPERABLE and positioned within ± 12 steps (indicated position) of their group step counter demand position. In CTS 3.1.3.6 ACTION b, verifying that the affected bank is trippable, is verifying that the bank is OPERABLE. Additionally, when the control rod is aligned to within ± 12 steps of its respective group step counter demand position in CTS 3.1.3.6, this is the same as verifying the shutdown and control rods are positioned within ± 12 steps (indicated position) of their group step counter demand position. The ITS 3.1.6 Required Action A.2 statement eliminates any confusion as to what actions are being taken. This change is designated as administrative because it does not result in a technical change to the specifications.

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DISCUSSION OF CHANGES
ITS 3.1.6, CONTROL BANK INSERTION LIMITS

MORE RESTRICTIVE CHANGES

M01 CTS 3.1.3.6 requires the control banks to be limited in physical insertion as specified in the COLR. ITS LCO 3.1.6 requires the control banks to be within insertion, sequence and overlap limits specified in the COLR. ITS 3.1.6 ACTION C provides requirements when not meeting the sequence and overlap requirements. ITS SR 3.1.6.3 requires verification of the sequence and overlap limits every 12 hours. This changes the CTS by adding the requirements on the sequence and overlap limits in addition to the Technical Specifications.

This change is acceptable because the control bank sequence and overlap limits are important assumptions in the core power distribution analyses. The addition of these requirements, ACTIONS, and Surveillance Requirements provides assurance that the core power distribution is maintained within the design predictions. This change is designated as more restrictive because new requirements are added to the CTS.

M02 CTS 3.1.3.6 ACTION a requires, in part, control banks inserted beyond the insertion limits to be restored within 2 hours. ITS 3.1.6 ACTION B contains the same requirements and adds the requirement to either verify the SDM is within limits or initiate boration to restore SDM to within limits within one hour. This changes the CTS by adding the requirement to verify SDM or to initiate boration to restore the SDM within one hour when control banks are below the insertion limits.

This change is acceptable because it verifies that the initial conditions of the accident analyses are maintained. In MODE 1 and MODE 2 with $k_{eff} \geq 1.0$, SDM is ensured by adhering to the control and shutdown bank insertion limits. If the control banks are not within their insertion limits, then SDM must be verified to be within limits or actions must be initiated to restore SDM to within limits. This change is designated as more restrictive because requirements are added to the CTS.

RELOCATED SPECIFICATIONS

None

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DISCUSSION OF CHANGES
ITS 3.1.6, CONTROL BANK INSERTION LIMITS

REMOVED DETAIL CHANGES

LA01 *(Type 5 – Removal of SR Frequency to the Surveillance Frequency Control Program)* CTS 4.1.3.6 requires, in part, the position of each control bank shall be determined to be within the insertion limits at least once per 12 hours. CTS 4.1.1.1.1.b requires, in part, verifying the control bank withdrawal is within limits of Specification 3.1.3.6 at least once per 12 hours. ITS SR 3.1.6.2 requires a similar Surveillance and specifies the periodic Frequency as, "In accordance with the Surveillance Frequency Control Program." This changes the CTS by moving the specified Frequencies for this SR and associated Bases to the Surveillance Frequency Control Program.

The removal of these details related to Surveillance Requirement Frequencies from the Technical Specifications is acceptable, because this type of information is not necessary to be included in the Technical Specifications to provide adequate protection of public health and safety. The existing Surveillance Frequencies are removed from Technical Specifications and placed under licensee control pursuant to the methodology described in NEI 04-10. A new program (Surveillance Frequency Control Program) is being added to the Administrative Controls section of the Technical Specifications describing the control of Surveillance Frequencies. The surveillance test requirements remain in the Technical Specifications. The control of changes to the Surveillance Frequencies will be in accordance with the Surveillance Frequency Control Program. The Program shall ensure that Surveillance Requirements specified in the Technical Specifications are performed at intervals sufficient to assure the associated Limiting Conditions for Operation are met. This change is designated as a less restrictive removal of detail change, because the Surveillance Frequencies are being removed from the Technical Specifications.

LA02 *(Type 1 – Removing Details of System Design and System Description, Including Design Limits)* CTS 3.1.3.6 requires the control banks to be limited in physical insertion as specified in the COLR. CTS 3.1.3.6 ACTION b allows POWER OPERATION to continue with a maximum of one control bank inserted beyond the limit specified in the COLR during the rod freedom of movement surveillance provided the control bank is immovable due to a malfunction of the rod control system and the specified actions are met within the specified times specified. Additionally, footnote ## states the provision for continued POWER OPERATION does not apply to the controlling bank(s) (normally Control Bank D) inserted beyond the insertion limit. ITS LCO 3.1.6 and ACTION A retain the same requirements, but do not specify that Control Bank D is normally the controlling bank. This changes the CTS by relocating the details that Control Bank D is normally the controlling bank to the Bases.

The removal of these details, that are related to system design, from the Technical Specifications, is acceptable because this type of information is not necessary to be included in the Technical Specifications to provide adequate protection of public health and safety. The ITS retains the requirement for the control banks to be within the insertion limits specified in the COLR, as well as the Actions to take when a control bank is not within the limits specified in the COLR. Also, this change is acceptable because the removed information will be adequately controlled in the ITS Bases. Changes to the Bases are controlled by

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DISCUSSION OF CHANGES
ITS 3.1.6, CONTROL BANK INSERTION LIMITS

the Technical Specification Bases Control Program in Chapter 5. This program provides for the evaluation of changes to ensure the Bases are properly controlled. This change is designated as a less restrictive removal of detail change because information relating to system design is being removed from the Technical Specifications.

LESS RESTRICTIVE CHANGES

L01 *(Category 5 – Deletion of Surveillance Requirement)* CTS 4.1.3.6 requires verification that each control rod is within the insertion limit at least once per 12 hours except during time intervals when the Rod Insertion Limit Monitor is inoperable, then it requires verification of the individual rod positions at least once per 4 hours. ITS 3.1.6.2 requires verification that each control bank insertion is within the insertion limits specified in the COLR in accordance with the Surveillance Frequency Control Program. This changes the CTS by eliminating the requirement to verify the control bank insertion to be within limits every 4 hours when the Rod Insertion Limit Monitor is inoperable.

The purpose of CTS 4.1.3.6 is to periodically verify that the rods are within the alignment limit specified in the LCO. This change is acceptable because the Surveillance Frequency has been evaluated to ensure that it provides an acceptable level of equipment reliability. Increasing the Frequency of rod position verification when the Rod Insertion Limit Monitor is inoperable is unnecessary because inoperability of the alarm does not increase the possibility that the control banks are inserted below the limits. The Rod Insertion Limit Monitor alarm is for indication only; its use is not credited in any of the safety analyses. This change is designated as less restrictive because a Surveillance which was required in CTS will not be required in the ITS.

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Improved Standard Technical Specifications (ISTS) Markup and Justification for Deviations (JFDs)

3.1 REACTIVITY CONTROL SYSTEMS

3.1.6 Control Bank Insertion Limits

3.1.3.6

LCO 3.1.6 Control banks shall be within the insertion, sequence, and overlap limits specified in the COLR.

Applicability, Footnote #

APPLICABILITY: MODE 1,
MODE 2 with k_{eff} ≥1.0.

ACTION a

---NOTE---
This LCO is not applicable while performing SR 3.1.4.2.

ACTIONS

INSERT 1 (1)

CONDITION	REQUIRED ACTION	COMPLETION TIME
ACTION a: ~~A~~ B. Control bank insertion limits not met for reasons other than Condition A.	~~A~~ B.1.1 Verify SDM is within the limits specified in the COLR.	1 hour (1)
	OR	
	~~A~~ B.1.2 Initiate boration to restore SDM to within limit.	1 hour (1)
	AND	
	~~A~~ B.2 Restore control bank(s) to within limits.	2 hours (1)
DOC M01: ~~B~~ C. Control bank sequence or overlap limits not met.	~~B~~ C.1.1 Verify SDM is within the limits specified in the COLR.	1 hour (1)
	OR	
	~~B~~ C.1.2 Initiate boration to restore SDM to within limit.	1 hour (1)
	AND	

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(1) **INSERT 1**

ACTION b	A. ------------NOTE------------ Only applicable to control bank(s) that are not a controlling bank. --------------------------------- One control bank not within limits and immovable due to malfunctions in the Rod Control System.	A.1 Verify control bank is inserted ≤ 18 steps below the insertion limit as measured by group step demand position indicators. AND A.2 Verify each control and shutdown rod is within limits of LCO 3.1.4, "Rod Group Alignment Limits." AND A.3 Verify each shutdown bank is within insertion limits of LCO 3.1.5, "Shutdown Bank Insertion Limits." AND A.4 Verify no Reactor Coolant System boron dilution activities. AND A.5 Verify no power level increases. AND A.6 Verify SDM is within limits specified in the COLR. AND A.7 Restore control bank to within limits.	Immediately Immediately Immediately Immediately Immediately Once per 12 hours AND Immediately upon insertion of controlling bank more than 5 steps from the initial position 72 hours

ACTIONS (continued)

	CONDITION	REQUIRED ACTION	COMPLETION TIME	
DOC M01		B.2 [C] Restore control bank sequence and overlap to within limits.	2 hours	1
ACTION a.3, ACTION b	C. [D] Required Action and associated Completion Time not met.	C.1 [D] Be in MODE 2 with k_{eff} < 1.0.	6 hours	1

SURVEILLANCE REQUIREMENTS

	SURVEILLANCE		FREQUENCY	
4.1.1.1.1.c	SR 3.1.6.1	Verify estimated critical control bank position is within the limits specified in the COLR.	Within 4 hours prior to achieving criticality	
4.1.3.6, 4.1.1.1.1.b	SR 3.1.6.2	Verify each control bank insertion is within the insertion limits specified in the COLR.	[12 hours OR In accordance with the Surveillance Frequency Control Program]	3 3
DOC M01	SR 3.1.6.3	Verify sequence and overlap limits specified in the COLR are met for control banks not fully withdrawn from the core.	[12 hours OR In accordance with the Surveillance Frequency Control Program]	3 3

3.1 REACTIVITY CONTROL SYSTEMS

3.1.6 Control Bank Insertion Limits

3.1.3.6

LCO 3.1.6 Control banks shall be within the insertion, sequence, and overlap limits specified in the COLR.

Applicability, Footnote #

APPLICABILITY: MODE 1,
MODE 2 with k_{eff} ≥1.0.

---NOTE---

ACTION a

This LCO is not applicable while performing SR 3.1.4.2.

ACTIONS

CONDITION	REQUIRED ACTION	COMPLETION TIME
INSERT 1		1
ACTION a ~~A~~ B. Control bank insertion limits not met for reasons other than Condition A.	~~A~~ B.1.1 Verify SDM is within the limits specified in the COLR. OR ~~A~~ B.1.2 Initiate boration to restore SDM to within limit. AND ~~A~~ B.2 Restore control bank(s) to within limits.	1 hour 1 1 hour 1 2 hours 1
DOC M01 ~~B~~ C. Control bank sequence or overlap limits not met.	~~B~~ C.1.1 Verify SDM is within the limits specified in the COLR. OR ~~B~~ C.1.2 Initiate boration to restore SDM to within limit. AND	1 hour 1 1 hour 1

(1) **INSERT 1**

ACTION b	A. ------------NOTE------------ Only applicable to control bank(s) that are not a controlling bank. -------------------------------- One control bank not within limits and immovable due to malfunctions in the Rod Control System.	A.1 Verify control bank is inserted ≤ 18 steps below the insertion limit as measured by group step demand position indicators. <u>AND</u> A.2 Verify each control and shutdown rod is within limits of LCO 3.1.4, "Rod Group Alignment Limits." <u>AND</u> A.3 Verify each shutdown bank is within insertion limits of LCO 3.1.5, "Shutdown Bank Insertion Limits." <u>AND</u> A.4 Verify no Reactor Coolant System boron dilution activities. <u>AND</u> A.5 Verify no power level increases. <u>AND</u> A.6 Verify SDM is within limits specified in the COLR. <u>AND</u> A.7 Restore control bank to within limits.	Immediately Immediately Immediately Immediately Immediately Once per 12 hours <u>AND</u> Immediately upon insertion of controlling bank more than 5 steps from the initial position 72 hours

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ACTIONS (continued)

	CONDITION	REQUIRED ACTION		COMPLETION TIME	
DOC M01		B.2 C	Restore control bank sequence and overlap to within limits.	2 hours	1
ACTION a.3, ACTION b	C. D Required Action and associated Completion Time not met.	C.1 D	Be in MODE 2 with k_{eff} < 1.0.	6 hours	1

SURVEILLANCE REQUIREMENTS

	SURVEILLANCE		FREQUENCY	
4.1.1.1.1.c	SR 3.1.6.1	Verify estimated critical control bank position is within the limits specified in the COLR.	Within 4 hours prior to achieving criticality	
4.1.3.6, 4.1.1.1.1.b	SR 3.1.6.2	Verify each control bank insertion is within the insertion limits specified in the COLR.	[12 hours OR In accordance with the Surveillance Frequency Control Program]	3 3
DOC M01	SR 3.1.6.3	Verify sequence and overlap limits specified in the COLR are met for control banks not fully withdrawn from the core.	[12 hours OR In accordance with the Surveillance Frequency Control Program]	3 3

JUSTIFICATION FOR DEVIATIONS
ITS 3.1.6, CONTROL BANK INSERTION LIMITS

1. ISTS 3.1.6 has been modified to include a new ACTION (ITS 3.1.6 ACTION A). ITS 3.1.6 requires entering Condition A when one control bank is inserted beyond the insertion limit and immovable. ITS 3.1.6 Required Action A.1 requires an immediate verification that the control bank is inserted less than or equal to 18 steps below the insertion limit as measured by the group step counter demand position indicators. ITS 3.1.5 Required Action A.2 requires an immediate verification that each control and shutdown rod is within the limits of LCO 3.1.4. ITS 3.1.5 Required Action A.3 requires an immediate verification that each shutdown bank is within the insertion limits of LCO 3.1.5. ITS 3.1.5 Required Action A.4 requires an immediate verification that there are no reactor coolant system boron concentration activities. ITS 3.1.5 Required Action A.5 requires an immediate verification that there are no power level increases. ITS 3.1.6 Required Action A.6 requires verification that the SDM is within the limits specified in the COLR once per 12 hours and upon insertion of the controlling bank more than 5 steps from the initial position. ITS 3.1.6 Required Action A.7 requires the restoration of the shutdown banks to within limits in 72 hours. This addition is acceptable because it reflects the current licensing basis. Furthermore, ISTS 3.1.6 Condition A (ITS 3.1.6 Condition B) was modified to state it is applicable for reasons other than Condition A, consistent with current licensing. This change was approved in License Amendment 215 for Unit 1 and License Amendment 205 for Unit 2 (ADAMS Accession No. ML013330266). Additionally, due to the addition of ITS 3.1.6 ACTION A, the subsequent ACTIONS (ISTS 3.1.5 ACTIONS A, B, and C) were renumbered.

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

3. ISTS SR 3.1.6.2 and SR 3.1.6.3 provide two options for controlling the Frequencies of Surveillance Requirements. SQN is proposing to control the Surveillance Frequencies under the Surveillance Frequency Control Program.

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Improved Standard Technical Specifications (ISTS) Bases Markup and Bases Justification for Deviations (JFDs)

B 3.1 REACTIVITY CONTROL SYSTEMS

B 3.1.6 Control Bank Insertion Limits

BASES

BACKGROUND

The insertion limits of the shutdown and control rods are initial assumptions in ~~all~~ the safety analyses that assume rod insertion upon reactor trip. The insertion limits directly affect core power and fuel burnup distributions and assumptions of available SDM, and initial reactivity insertion rate. 9

The applicable criteria for these reactivity and power distribution design requirements are 10 CFR 50, Appendix A, GDC 10, "Reactor Design," GDC 26, "Reactivity Control System Redundancy and Protection," GDC 28, "Reactivity Limits" (Ref. 1), and 10 CFR 50.46, "Acceptance Criteria for Emergency Core Cooling Systems for Light Water Nuclear Power Reactors" (Ref. 2). Limits on control rod insertion have been established, and all rod positions are monitored and controlled during power operation to ensure that the power distribution and reactivity limits defined by the design power peaking and SDM limits are preserved.

The rod cluster control assemblies (RCCAs) are divided among control banks and shutdown banks. Each bank may be further subdivided into two groups to provide for precise reactivity control. A group consists of two or more RCCAs that are electrically paralleled to step simultaneously. A bank of RCCAs consists of two groups that are moved in a staggered fashion, but always within one step of each other. ~~All plants have~~ Each unit has four control banks and ~~at least two~~ four shutdown banks. See LCO 3.1.4, "Rod Group Alignment Limits," for control and shutdown rod OPERABILITY and alignment requirements, and LCO 3.1.7, "Rod Position Indication," for position indication requirements. 1

The control bank insertion limits are specified in the COLR. ~~An example is provided for information only in Figure B 3.1.6-1.~~ The control banks are required to be at or above the insertion limit lines. 2

~~Figure B 3.1.6-1 also indicates how the control banks are moved in an overlap pattern.~~ Overlap is the distance travelled together by two control banks. The predetermined position of control bank C, at which control bank D will begin to move with bank C on a withdrawal~~, will be at 118 steps for a~~ is shown on the COLR Figure fully withdrawn position ~~of 231 steps~~. The fully withdrawn position is defined in the COLR. 2 1

BACKGROUND (continued)

The control banks are used for precise reactivity control of the reactor. The positions of the control banks are normally controlled automatically by the Rod Control System, but can also be manually controlled. They are capable of adding reactivity very quickly (compared to borating or diluting).

The power density at any point in the core must be limited, so that the fuel design criteria are maintained. Together, LCO 3.1.4, LCO 3.1.5, "Shutdown Bank Insertion Limits," LCO 3.1.6, LCO 3.2.3, "AXIAL FLUX DIFFERENCE (AFD)," and LCO 3.2.4, "QUADRANT POWER TILT RATIO (QPTR)," provide limits on control component operation and on monitored process variables, which ensure that the core operates within the fuel design criteria.

The shutdown and control bank insertion and alignment limits, AFD, and QPTR are process variables that together characterize and control the three dimensional power distribution of the reactor core. Additionally, the control bank insertion limits control the reactivity that could be added in the event of a rod ejection accident, and the shutdown and control bank insertion limits ensure the required SDM is maintained.

Operation within the subject LCO limits will prevent fuel cladding failures that would breach the primary fission product barrier and release fission products to the reactor coolant in the event of a loss of coolant accident (LOCA), loss of flow, ejected rod, or other accident requiring termination by a Reactor Trip System (RTS) trip function.

APPLICABLE SAFETY ANALYSES

The shutdown and control bank insertion limits, AFD, and QPTR LCOs are required to prevent power distributions that could result in fuel cladding failures in the event of a LOCA, loss of flow, ejected rod, or other accident requiring termination by an RTS trip function.

The acceptance criteria for addressing shutdown and control bank insertion limits and inoperability or misalignment are that:

a. There be no violations of:

    1. Specified acceptable fuel design limits or

    2. Reactor Coolant System pressure boundary integrity and

b. The core remains subcritical after accident transients.

BASES

APPLICABLE SAFETY ANALYSES (continued)

As such, the shutdown and control bank insertion limits affect safety analys~~i~~[e]s involving core reactivity and power distributions (Ref. 3). 9

The SDM requirement is ensured by limiting the control and shutdown bank insertion limits so that allowable inserted worth of the RCCAs is such that sufficient reactivity is available in the rods to shut down the reactor to hot zero power with a reactivity margin that assumes the maximum worth RCCA remains fully withdrawn upon trip (Ref. ~~4~~[3]). 1

Operation at the insertion limits or AFD limits may approach the maximum allowable linear heat generation rate or peaking factor with the allowed QPTR present. Operation at the insertion limit may ~~also~~ indicate the maximum ejected RCCA worth could be equal to the limiting value in [the] fuel cycle~~s~~ that ~~have~~ [has] sufficiently high ejected RCCA worths. 9

The control and shutdown bank insertion limits ensure that safety analyses assumptions for SDM, ejected rod worth, and power distribution peaking factors are preserved (Ref. ~~5~~[3]). 1

The insertion limits satisfy Criterion 2 of 10 CFR 50.36(c)(2)(ii), in that they are initial conditions assumed in the safety analys~~i~~[e]s. 9

LCO

The limits on control banks sequence, overlap, and physical insertion, as defined in the COLR, must be maintained because they serve the function of preserving power distribution, ensuring that the SDM is maintained, ensuring that ejected rod worth is maintained, and ensuring adequate negative reactivity insertion is available on trip. The overlap between control banks provides more uniform rates of reactivity insertion and withdrawal and is imposed to maintain acceptable power peaking during control bank motion.

APPLICABILITY

The control bank sequence, overlap, and physical insertion limits shall be maintained with the reactor in MODES 1 and 2 with $k_{eff} \geq 1.0$. These limits must be maintained, since they preserve the assumed power distribution, ejected rod worth, SDM, and reactivity rate insertion assumptions. Applicability in [MODE 2 with $k_{eff} < 1.0$,] MODES 3, 4, and 5 is not required, since neither the power distribution nor ejected rod worth assumptions would be exceeded in these MODES. 3

The applicability requirements have been modified by a Note indicating the LCO requirements are suspended during the performance of SR 3.1.4.2. This SR verifies the freedom of the rods to move, and requires the control bank to move below the LCO limits, which would violate the LCO.

BASES

ACTIONS

INSERT 1 (5)

A.1.1, A.1.2, A.2, B.1.1, B.1.2, and B.2
B B B C C C

When the control banks are outside the acceptable insertion limits, they must be restored to within those limits. This restoration can occur in two ways:

a. Reducing power to be consistent with rod position or

b. Moving rods to be consistent with power.

Also, verification of SDM or initiation of boration to regain SDM is required within 1 hour, since the SDM in MODES 1 and 2 normally ensured by adhering to the control and shutdown bank insertion limits (see LCO 3.1.1, "SHUTDOWN MARGIN (SDM)") has been upset. If control banks are not within their insertion limits, then SDM will be verified by performing a reactivity balance calculation, considering the effects listed in the BASES for SR 3.1.1.1.

Similarly, if the control banks are found to be out of sequence or in the wrong overlap configuration, they must be restored to meet the limits.

Operation beyond the LCO limits is allowed for a short time period in order to take conservative action because the simultaneous occurrence of either a LOCA, loss of flow accident, ejected rod accident, or other accident during this short time period, together with an inadequate power distribution or reactivity capability, has an acceptably low probability.

The allowed Completion Time of 2 hours for restoring the banks to within the insertion, sequence, and overlaps limits provides an acceptable time for evaluating and repairing minor problems without allowing the plant to remain in an unacceptable condition for an extended period of time. (4)

D

C.1

( ) of Condition A, B, or C are not met

If Required Actions A.1 and A.2, or B.1 and B.2 cannot be completed within the associated Completion Times, the plant must be brought to MODE 2 with k_{eff} < 1.0, where the LCO is not applicable. 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. (5) at least (9)

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4 **INSERT 1**

A.1, A.2, A.3, A.4, A.5, A.6, and A.7

When one control bank is inserted beyond the insertion limit and is immovable due to malfunctions in the rod control system, 72 hours are provided to restore the control banks to within limits. Additionally, immediate verification is required to prove that the control bank is less than or equal to 18 steps below the insertion limit as measured by the group demand position indicators, the individual rod alignment limits of LCOs 3.1.4 and 3.1.5 are met, there are no reactor coolant system boron concentration dilution activities, and there are no power level increases taking place. Furthermore, a verification of SDM is required within 12 hours and when the controlling bank is inserted more than 5 steps from the initial position. The requirement to be in compliance with LCOs 3.1.4 and 3.1.5 ensures that the rods are trippable, and power distribution is acceptable during the time allowed to restore the inserted bank. The 12 hour requirement to verify the SDM is within limits ensures the SDM requirements of LCO 3.1.1 are met during the repair period. Furthermore, the requirement to verify the SDM is within limits when a controlling bank is inserted five steps or more also ensures that SDM requirements of LCO 3.1.1 are met during the repair period. If any of these Conditions are not met, Condition D must be applied.

The Condition is modified by a Note that specifies it only applies to control banks inserted beyond the insertion limit that are not controlling banks. A controlling bank is defined as a control bank that is less than fully withdrawn as defined in the COLR, with the exception of fully withdrawn banks that have been inserted for the performance of SR 3.1.4.2 (rod freedom of movement Surveillance).

The Completion Time of 72 hours is based on operating experience and provides an acceptable time for evaluating and repairing problems with the rod control system.

BASES

SURVEILLANCE REQUIREMENTS

SR 3.1.6.1

This Surveillance is required to ensure that the reactor does not achieve criticality with the control banks below their insertion limits.

The estimated critical position (ECP) depends upon a number of factors, one of which is xenon concentration. If the ECP was calculated long before criticality, xenon concentration could change to make the ECP substantially in error. Conversely, determining the ECP immediately before criticality could be an unnecessary burden. There are a number of unit parameters requiring operator attention at that point. Performing the ECP calculation within 4 hours prior to criticality avoids a large error from changes in xenon concentration, but allows the operator some flexibility to schedule the ECP calculation with other startup activities.

SR 3.1.6.2

~~[~~ Verification of the control bank insertion limits ~~at a Frequency of 12 hours~~ is sufficient to detect control banks that may be approaching the insertion limits ~~since, normally, very little rod motion occurs in 12 hours~~. 6 6

~~OR~~

The Surveillance Frequency is controlled under the Surveillance Frequency Control Program.

~~-----REVIEWER'S NOTE-----~~
~~Plants controlling Surveillance Frequencies under a Surveillance Frequency Control Program should utilize the appropriate Frequency description, given above, and the appropriate choice of Frequency in the Surveillance Requirement.~~
~~-----]~~ 7 6

SR 3.1.6.3

When control banks are maintained within their insertion limits as checked by SR 3.1.6.2 above, it is unlikely that their sequence and overlap will not be in accordance with requirements provided in the COLR. ~~[A Frequency of 12 hours is consistent with the insertion limit check above in SR 3.1.6.2.~~ 6

BASES

SURVEILLANCE REQUIREMENTS (continued)

~~OR~~ (6)

The Surveillance Frequency is controlled under the Surveillance Frequency Control Program.

~~-----REVIEWER'S NOTE-----~~
~~Plants controlling Surveillance Frequencies under a Surveillance Frequency Control Program should utilize the appropriate Frequency description, given above, and the appropriate choice of Frequency in the Surveillance Requirement.~~
~~-----]~~ (7) (6)

REFERENCES

1. 10 CFR 50, Appendix A, GDC 10, GDC 26, GDC 28.
2. 10 CFR 50.46.
3. U FSAR, Chapter ~~[~~15~~]~~. (1) (8)
4. ~~FSAR, Chapter [15].~~ (1)
5. ~~FSAR, Chapter [15].~~

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2

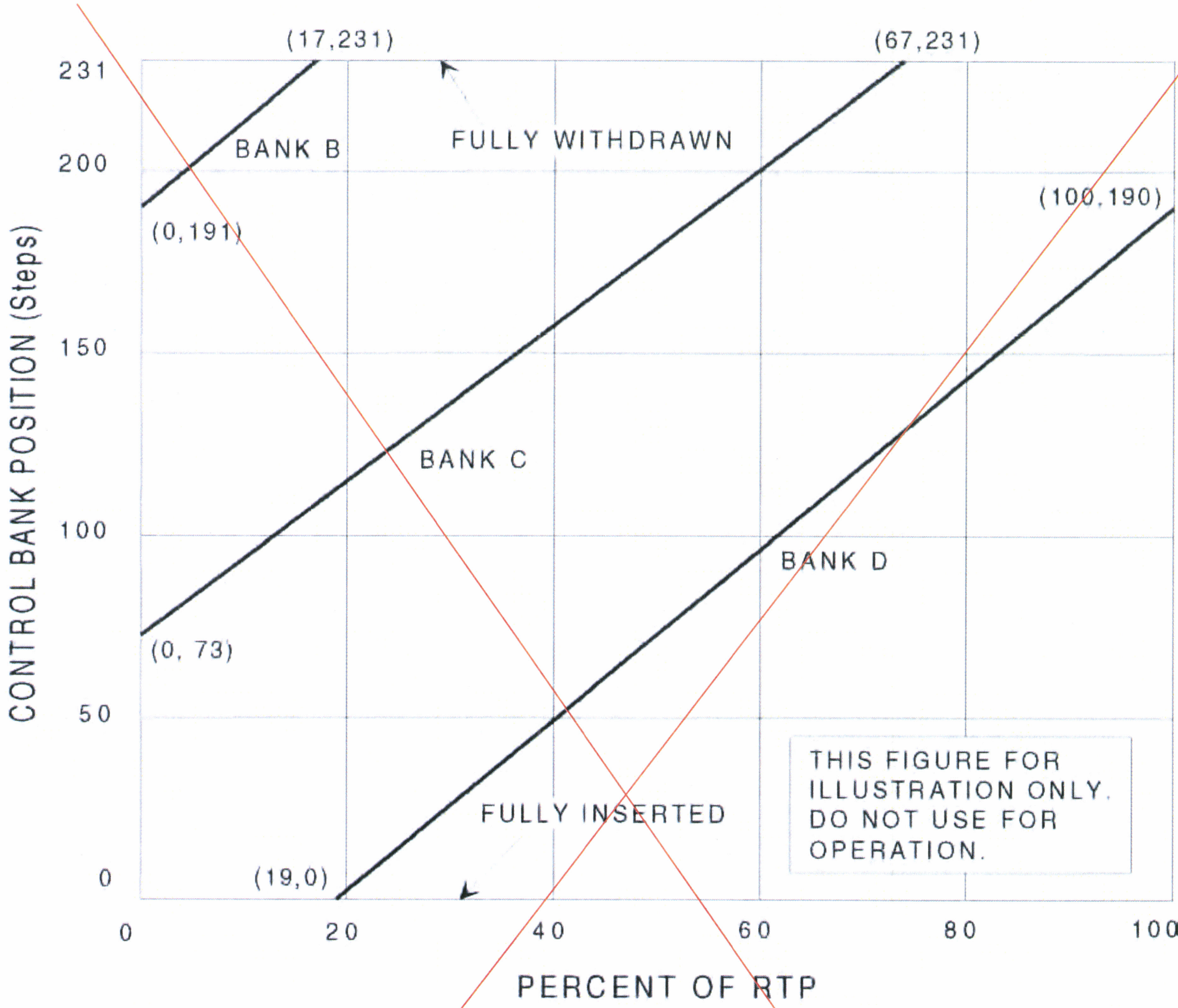

Figure B 3.1.6 (page 1 of 1)
Control Bank Insertion vs. Percent RTP

B 3.1 REACTIVITY CONTROL SYSTEMS

B 3.1.6 Control Bank Insertion Limits

BASES

BACKGROUND

The insertion limits of the shutdown and control rods are initial assumptions in ~~all~~ the safety analyses that assume rod insertion upon reactor trip. The insertion limits directly affect core power and fuel burnup distributions and assumptions of available SDM, and initial reactivity insertion rate. 9

The applicable criteria for these reactivity and power distribution design requirements are 10 CFR 50, Appendix A, GDC 10, "Reactor Design," GDC 26, "Reactivity Control System Redundancy and Protection," GDC 28, "Reactivity Limits" (Ref. 1), and 10 CFR 50.46, "Acceptance Criteria for Emergency Core Cooling Systems for Light Water Nuclear Power Reactors" (Ref. 2). Limits on control rod insertion have been established, and all rod positions are monitored and controlled during power operation to ensure that the power distribution and reactivity limits defined by the design power peaking and SDM limits are preserved.

The rod cluster control assemblies (RCCAs) are divided among control banks and shutdown banks. Each bank may be further subdivided into two groups to provide for precise reactivity control. A group consists of two or more RCCAs that are electrically paralleled to step simultaneously. A bank of RCCAs consists of two groups that are moved in a staggered fashion, but always within one step of each other. ~~All plants have~~ Each unit has four control banks and ~~at least two~~ four shutdown banks. See LCO 3.1.4, "Rod Group Alignment Limits," for control and shutdown rod OPERABILITY and alignment requirements, and LCO 3.1.7, "Rod Position Indication," for position indication requirements. 1

The control bank insertion limits are specified in the COLR. ~~An example is provided for information only in Figure B 3.1.6-1.~~ The control banks are required to be at or above the insertion limit lines. 2

~~Figure B 3.1.6-1 also indicates how the control banks are moved in an overlap pattern.~~ Overlap is the distance travelled together by two control banks. The predetermined position of control bank C, at which control bank D will begin to move with bank C on a withdrawal~~, will be at 118 steps for a~~ is shown on the COLR Figure fully withdrawn ~~position of 231 steps~~. The fully withdrawn position is defined in the COLR. 2 1

BASES

BACKGROUND (continued)

The control banks are used for precise reactivity control of the reactor. The positions of the control banks are normally controlled automatically by the Rod Control System, but can also be manually controlled. They are capable of adding reactivity very quickly (compared to borating or diluting).

The power density at any point in the core must be limited, so that the fuel design criteria are maintained. Together, LCO 3.1.4, LCO 3.1.5, "Shutdown Bank Insertion Limits," LCO 3.1.6, LCO 3.2.3, "AXIAL FLUX DIFFERENCE (AFD)," and LCO 3.2.4, "QUADRANT POWER TILT RATIO (QPTR)," provide limits on control component operation and on monitored process variables, which ensure that the core operates within the fuel design criteria.

The shutdown and control bank insertion and alignment limits, AFD, and QPTR are process variables that together characterize and control the three dimensional power distribution of the reactor core. Additionally, the control bank insertion limits control the reactivity that could be added in the event of a rod ejection accident, and the shutdown and control bank insertion limits ensure the required SDM is maintained.

Operation within the subject LCO limits will prevent fuel cladding failures that would breach the primary fission product barrier and release fission products to the reactor coolant in the event of a loss of coolant accident (LOCA), loss of flow, ejected rod, or other accident requiring termination by a Reactor Trip System (RTS) trip function.

APPLICABLE SAFETY ANALYSES

The shutdown and control bank insertion limits, AFD, and QPTR LCOs are required to prevent power distributions that could result in fuel cladding failures in the event of a LOCA, loss of flow, ejected rod, or other accident requiring termination by an RTS trip function.

The acceptance criteria for addressing shutdown and control bank insertion limits and inoperability or misalignment are that:

a. There be no violations of:

   1. Specified acceptable fuel design limits or

   2. Reactor Coolant System pressure boundary integrity and

b. The core remains subcritical after accident transients.

BASES

APPLICABLE SAFETY ANALYSES (continued)

As such, the shutdown and control bank insertion limits affect safety analys~~i~~es involving core reactivity and power distributions (Ref. 3). 9

The SDM requirement is ensured by limiting the control and shutdown bank insertion limits so that allowable inserted worth of the RCCAs is such that sufficient reactivity is available in the rods to shut down the reactor to hot zero power with a reactivity margin that assumes the maximum worth RCCA remains fully withdrawn upon trip (Ref. ~~4~~ 3). 1

Operation at the insertion limits or AFD limits may approach the maximum allowable linear heat generation rate or peaking factor with the allowed QPTR present. Operation at the insertion limit may ~~also~~ indicate the maximum ejected RCCA worth could be equal to the limiting value in the fuel cycle~~s~~ that ~~have~~ has sufficiently high ejected RCCA worths. 9

The control and shutdown bank insertion limits ensure that safety analyses assumptions for SDM, ejected rod worth, and power distribution peaking factors are preserved (Ref. ~~5~~ 3). 1

The insertion limits satisfy Criterion 2 of 10 CFR 50.36(c)(2)(ii), in that they are initial conditions assumed in the safety analys~~i~~es. 9

LCO

The limits on control banks sequence, overlap, and physical insertion, as defined in the COLR, must be maintained because they serve the function of preserving power distribution, ensuring that the SDM is maintained, ensuring that ejected rod worth is maintained, and ensuring adequate negative reactivity insertion is available on trip. The overlap between control banks provides more uniform rates of reactivity insertion and withdrawal and is imposed to maintain acceptable power peaking during control bank motion.

APPLICABILITY

The control bank sequence, overlap, and physical insertion limits shall be maintained with the reactor in MODES 1 and 2 with $k_{eff} \geq 1.0$. These limits must be maintained, since they preserve the assumed power distribution, ejected rod worth, SDM, and reactivity rate insertion assumptions. Applicability in MODE 2 with $k_{eff} < 1.0$, MODES 3, 4, and 5 is not required, since neither the power distribution nor ejected rod worth assumptions would be exceeded in these MODES. 3

The applicability requirements have been modified by a Note indicating the LCO requirements are suspended during the performance of SR 3.1.4.2. This SR verifies the freedom of the rods to move, and requires the control bank to move below the LCO limits, which would violate the LCO.

BASES

ACTIONS

INSERT 1 (5)

A.1.1, A.1.2, A.2, B.1.1, B.1.2, and B.2

B B B C C C

When the control banks are outside the acceptable insertion limits, they must be restored to within those limits. This restoration can occur in two ways:

a. Reducing power to be consistent with rod position or

b. Moving rods to be consistent with power.

Also, verification of SDM or initiation of boration to regain SDM is required within 1 hour, since the SDM in MODES 1 and 2 normally ensured by adhering to the control and shutdown bank insertion limits (see LCO 3.1.1, "SHUTDOWN MARGIN (SDM)") has been upset. If control banks are not within their insertion limits, then SDM will be verified by performing a reactivity balance calculation, considering the effects listed in the BASES for SR 3.1.1.1.

Similarly, if the control banks are found to be out of sequence or in the wrong overlap configuration, they must be restored to meet the limits.

Operation beyond the LCO limits is allowed for a short time period in order to take conservative action because the simultaneous occurrence of either a LOCA, loss of flow accident, ejected rod accident, or other accident during this short time period, together with an inadequate power distribution or reactivity capability, has an acceptably low probability.

The allowed Completion Time of 2 hours for restoring the banks to within the insertion, sequence, and overlaps limits provides an acceptable time for evaluating and repairing minor problems without allowing the plant to remain in an unacceptable condition for an extended period of time. (4)

D

C.1

( ) of Condition A, B, or C are not met

If Required Actions A.1 and A.2, or B.1 and B.2 cannot be completed within the associated Completion Times, the plant must be brought to MODE 2 with k_{eff} < 1.0, where the LCO is not applicable. 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. (5) at least (9)

4 **INSERT 1**

A.1, A.2, A.3, A.4, A.5, A.6, and A.7

When one control bank is inserted beyond the insertion limit and is immovable due to malfunctions in the rod control system, 72 hours are provided to restore the control banks to within limits. Additionally, immediate verification is required to prove that the control bank is less than or equal to 18 steps below the insertion limit as measured by the group demand position indicators, the individual rod alignment limits of LCOs 3.1.4 and 3.1.5 are met, there are no reactor coolant system boron concentration dilution activities, and there are no power level increases taking place. Furthermore, a verification of SDM is required within 12 hours and when the controlling bank is inserted more than 5 steps from the initial position. The requirement to be in compliance with LCOs 3.1.4 and 3.1.5 ensures that the rods are trippable, and power distribution is acceptable during the time allowed to restore the inserted bank. The 12 hour requirement to verify the SDM is within limits ensures the SDM requirements of LCO 3.1.1 are met during the repair period. Furthermore, the requirement to verify the SDM is within limits when a controlling bank is inserted five steps or more also ensures that SDM requirements of LCO 3.1.1 are met during the repair period. If any of these Conditions are not met, Condition D must be applied.

The Condition is modified by a Note that specifies it only applies to control banks inserted beyond the insertion limit that are not controlling banks. A controlling bank is defined as a control bank that is less than fully withdrawn as defined in the COLR, with the exception of fully withdrawn banks that have been inserted for the performance of SR 3.1.4.2 (rod freedom of movement Surveillance).

The Completion Time of 72 hours is based on operating experience and provides an acceptable time for evaluating and repairing problems with the rod control system.

BASES

SURVEILLANCE REQUIREMENTS

SR 3.1.6.1

This Surveillance is required to ensure that the reactor does not achieve criticality with the control banks below their insertion limits.

The estimated critical position (ECP) depends upon a number of factors, one of which is xenon concentration. If the ECP was calculated long before criticality, xenon concentration could change to make the ECP substantially in error. Conversely, determining the ECP immediately before criticality could be an unnecessary burden. There are a number of unit parameters requiring operator attention at that point. Performing the ECP calculation within 4 hours prior to criticality avoids a large error from changes in xenon concentration, but allows the operator some flexibility to schedule the ECP calculation with other startup activities.

SR 3.1.6.2

[Verification of the control bank insertion limits at a Frequency of 12 hours is sufficient to detect control banks that may be approaching the insertion limits since, normally, very little rod motion occurs in 12 hours. 6 6

OR

The Surveillance Frequency is controlled under the Surveillance Frequency Control Program.

-----REVIEWER'S NOTE-----
Plants controlling Surveillance Frequencies under a Surveillance Frequency Control Program should utilize the appropriate Frequency description, given above, and the appropriate choice of Frequency in the Surveillance Requirement.
-----] 7 6

SR 3.1.6.3

When control banks are maintained within their insertion limits as checked by SR 3.1.6.2 above, it is unlikely that their sequence and overlap will not be in accordance with requirements provided in the COLR. [A Frequency of 12 hours is consistent with the insertion limit check above in SR 3.1.6.2. 6

BASES

SURVEILLANCE REQUIREMENTS (continued)

~~OR~~ 6

The Surveillance Frequency is controlled under the Surveillance Frequency Control Program.

~~-----REVIEWER'S NOTE-----~~
~~Plants controlling Surveillance Frequencies under a Surveillance Frequency Control Program should utilize the appropriate Frequency description, given above, and the appropriate choice of Frequency in the Surveillance Requirement.~~ 7
~~-----~~] 6

REFERENCES

1. 10 CFR 50, Appendix A, GDC 10, GDC 26, GDC 28.
2. 10 CFR 50.46.
3. U FSAR, Chapter [15]. 1 8
4. ~~FSAR, Chapter [15].~~ 1
5. ~~FSAR, Chapter [15].~~

2

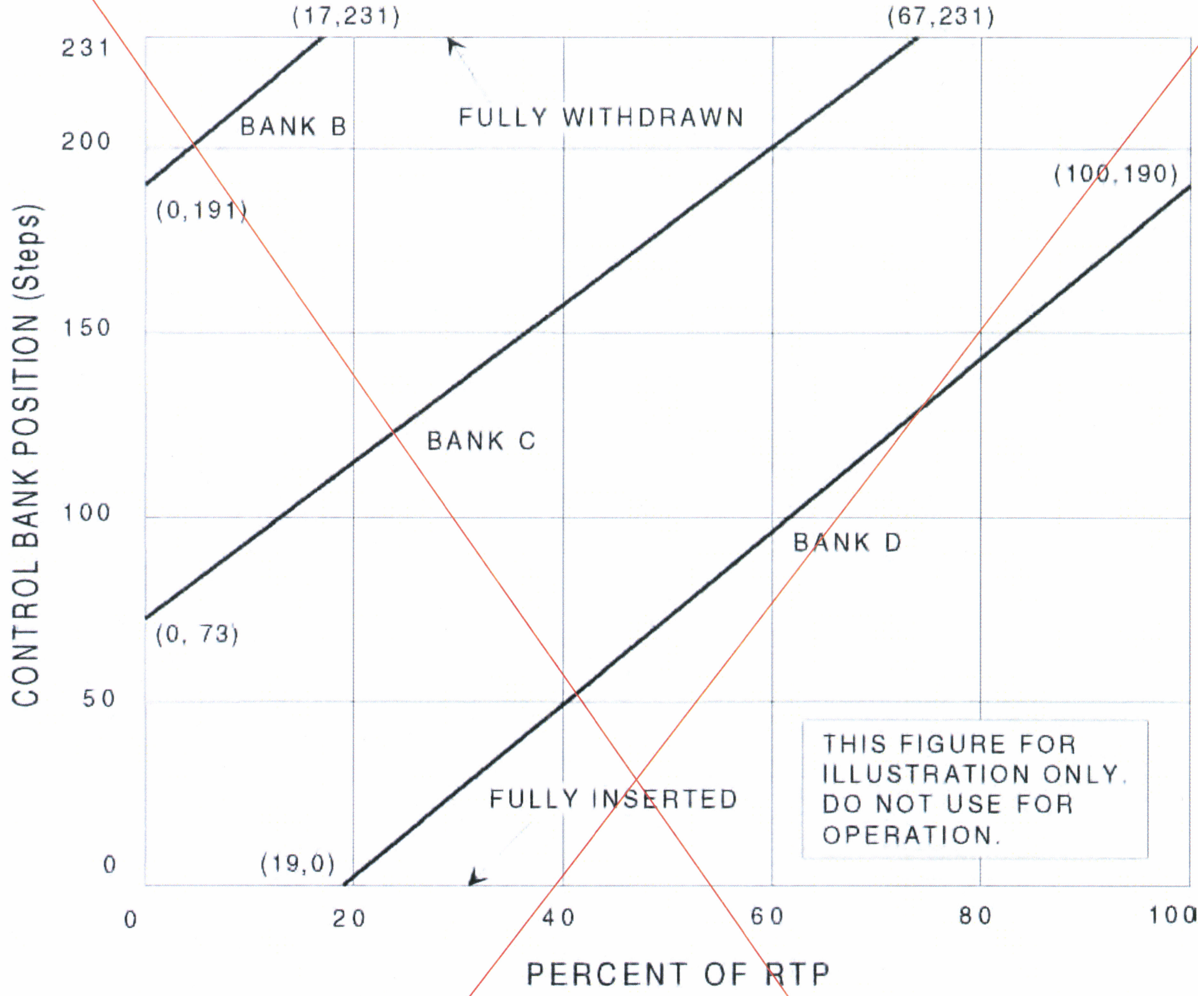

Figure B 3.1.6 (page 1 of 1)
Control Bank Insertion vs. Percent RTP

JUSTIFICATION FOR DEVIATIONS
ITS 3.1.6 BASES, CONTROL BANK INSERTION LIMITS

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

2. ISTS 3.1.6 contains Figure B 3.1.6-1 and states that it is an example provided for information only. ITS 3.1.6 does not include Figure B 3.1.6-1. The control bank insertion limits for Sequoyah Nuclear Plant (SQN) are located in the COLR. Therefore, ISTS Figure B 3.1.6-1 and the references to the ISTS Figure B 3.1.6-1 have been deleted.

3. Changes are made to be consistent with the Specification.

4. Typographical/grammatical error corrected.

5. Changes are made to be consistent with changes made to the Specification.

6. ISTS SR 3.1.6.2 and SR 3.1.6.3 Bases provides two options for controlling the Frequencies of Surveillance Requirements. SQN is proposing to control the Surveillance Frequencies under the Surveillance Frequency Control Program. Additionally, the Frequency description which is being removed will be included in the Surveillance Frequency Control Program.

7. The Reviewer's Note has been deleted. This information is for the NRC reviewer to be keyed into what is needed to meet this requirement. This Note is not meant to be retained in the final version of the plant specific submittal.

8. The ISTS contains bracketed information and/or values that are generic to Westinghouse vintage plants. The brackets are removed and the proper plant specific information/value is inserted to reflect the current licensing basis.

9. Editorial changes made for enhanced clarity/consistency.

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Specific No Significant Hazards Considerations (NSHCs)

DETERMINATION OF NO SIGNIFICANT HAZARDS CONSIDERATIONS
ITS 3.1.6, CONTROL BANK INSERTION LIMITS

There are no specific No Significant Hazards Considerations for this Specification.

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ATTACHMENT 7

ITS 3.1.7, ROD POSITION INDICATION

Current Technical Specification (CTS) Markup and Discussion of Changes (DOCs)

ITS (A01) ITS 3.1.7

REACTIVITY CONTROL SYSTEMS

POSITION INDICATION SYSTEMS - OPERATING

LIMITING CONDITION FOR OPERATION

LCO 3.1.7 — 3.1.3.2 The shutdown and control rod position indication system and the demand position indication system shall be OPERABLE ~~and capable of determining the control rod positions within ± 12 steps.~~ (LA01)

Applicability — APPLICABILITY: MODES 1 and 2.

ACTION:

(L01) Add proposed ACTIONS Note 1

ACTION A

a. With a maximum of one rod position indicator per bank inoperable either:

1. Determine the position of the non-indicating rod(s) indirectly by the movable incore detectors at least once per 12 hours and immediately after any motion of the non-indicating rod which exceeds 24 steps in one direction since the last determination of the rod's position, or

2.* a) Determine the position of the non-indicating rod indirectly by the movable incore detectors within 8 hours and once every 31 days thereafter and within 8 hours if rod control system parameters indicate unintended movement, and

b) Review the parameters of the rod control system for indications of unintended rod movement for the rod with an inoperable position indicator within 16 hours and once per 8 hours thereafter, and

c) Determine the position of the non-indicating rod indirectly by the movable incore detectors within 8 hours if the rod with an inoperable position indicator is moved greater than 12 steps and prior to increasing THERMAL POWER above 50% RATED THERMAL POWER and within 8 hours of reaching 100% RATED THERMAL POWER, or

3. Reduce THERMAL POWER to less than 50% of RATED THERMAL POWER within 8 hours.

(M01) Add proposed ACTION D

ACTION B

b. With more than one rod position indicator per bank inoperable either:

1. Determine the position of the non-indicating rod(s) indirectly by the movable incore detectors at least once per 12 hours, and immediately after any motion of the non-indicating rod which exceeds 24 steps in one direction since the last determination of the rod's position, and

Required Action A.2 Note

* Rod position monitoring by Actions 2.a), 2.b), and 2.c) may only be applied to one inoperable rod position indicator ~~and shall only be allowed: (1) until the end of the current cycle, or (2) until an entry into MODE 5 of sufficient duration, whichever occurs first, when the repair of the inoperable rod position indication can safely be performed. Actions 2.a), 2.b), and 2.c) shall not be allowed after the plant has been in MODE 5 or other plant condition, for a sufficient period of time, in which the repair of the inoperable rod position indication could have safely been performed.~~

(A02) Add proposed ACTIONS Note 2

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A01

ITS ITS 3.1.7

REACTIVITY CONTROL SYSTEMS

POSITION INDICATION SYSTEM - OPERATING

ACTION B

2. Place the control rods under manual control, and monitor and record Reactor Coolant System average temperature (T_{avg}) at least once per hour, and

3. Restore the rod position indicators to OPERABLE status within 24 hours such that a maximum of one rod position indicator per bank is inoperable, or

ACTION D

4. Be in HOT STANDBY within the next 6 hours.

ACTION C

c. With a maximum of one demand position indicator per bank inoperable either:

1. Verify that all rod position indicators for the affected bank are OPERABLE and that the most withdrawn rod and the least withdrawn rod of the bank are within a maximum of 12 steps of each other at least once per 12 hours, or

2. Reduce THERMAL POWER to less than 50% of RATED THERMAL POWER within 8 hours.

Add proposed ACTION D — M01

SURVEILLANCE REQUIREMENTS

~~4.1.3.2 Each rod position indicator shall be determined to be OPERABLE by verifying that the demand position indication system and the rod position indication system agree within 12 steps at least once per 12 hours except during time intervals when the Rod Position Deviation Monitor is inoperable, then compare the demand position indication system and the rod position indication system at least once per 4 hours~~.

Add proposed SR 3.1.7.1 — M02

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ITS (A01) ITS 3.1.7

~~REACTIVITY CONTROL SYSTEMS~~

~~POSITION INDICATION SYSTEM - SHUTDOWN~~

~~LIMITING CONDITION FOR OPERATION~~

~~3.1.3.3 This specification is deleted.~~

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A01

ITS ITS 3.1.7

REACTIVITY CONTROL SYSTEMS

POSITION INDICATION SYSTEMS - OPERATING

LIMITING CONDITION FOR OPERATION

LCO 3.1.7 3.1.3.2 The shutdown and control rod position indication system and the demand position indication system shall be OPERABLE ~~and capable of determining the control rod positions within ± 12 steps~~. LA01

Applicability APPLICABILITY: Modes 1 and 2.

ACTION: L01 Add proposed ACTIONS Note 1

ACTION A

a. With a maximum of one rod position indicator per bank inoperable either:

1. Determine the position of the non-indicating rod(s) indirectly by the movable incore detectors at least once per 12 hours and immediately after any motion of the non-indicating rod which exceeds 24 steps in one direction since the last determination of the rod's position, or

2.* a) Determine the position of the non-indicating rod indirectly by the movable incore detectors within 8 hours and once every 31 days thereafter and within 8 hours if rod control system parameters indicate unintended movement, and

b) Review the parameters of the rod control system for indications of unintended rod movement for the rod with an inoperable position indicator within 16 hours and once per 8 hours thereafter, and

c) Determine the position of the non-indicating rod indirectly by the movable incore detectors within 8 hours if the rod with an inoperable position indicator is moved greater than 12 steps and prior to increasing THERMAL POWER above 50% RATED THERMAL POWER and within 8 hours of reaching 100% RATED THERMAL POWER, or

3. Reduce THERMAL POWER TO less than 50% of RATED THERMAL POWER within 8 hours.

M01 Add proposed ACTION D

ACTION B

b. With more than one rod position indicator per bank inoperable either:

1. Determine the position of the non-indicating rod(s) indirectly by the movable incore detectors at least once per 12 hours, and immediately after any motion of the non-indicating rod which exceeds 24 steps in one direction since the last determination of the rod's position, and

Required Action A.2 Note

* Rod position monitoring by Actions 2.a), 2.b), and 2.c) may only be applied to one inoperable rod position indicator ~~and shall only be allowed: (1) until the end of the current cycle, or (2) until an entry into MODE 5 of sufficient duration, whichever occurs first, when the repair of the inoperable rod position indication can safely be performed. Actions 2.a), 2.b), and 2.c) shall not be allowed after the plant has been in MODE 5 or other plant condition, for a sufficient period of time, in which the repair of the inoperable rod position indication could have safely been performed.~~

Add proposed ACTIONS Note 2 A02

A01

REACTIVITY CONTROL SYSTEMS

POSITION INDICATION SYSTEMS - OPERATING

ACTION B

2. Place the control rods under manual control, and monitor and record Reactor Coolant System average temperature (T_{avg}) at least once per hour, and

3. Restore the rod position indicators to OPERABLE status within 24 hours such that a maximum of one rod position indicator per bank is inoperable, or

ACTION D

4. Be in HOT STANDBY within the next 6 hours.

ACTION C

c. With a maximum of one demand position indicator per bank inoperable either:

1. Verify that all rod position indicators for the affected bank are OPERABLE and that the most withdrawn rod and the least withdrawn rod of the bank are within a maximum of 12 steps of each other at least once per 12 hours, or

2. Reduce THERMAL POWER to less than 50% of RATED THERMAL POWER within 8 hours.

Add proposed ACTION D — M01

SURVEILLANCE REQUIRMENTS

~~4.1.3.2 Each rod position indicator shall be determined to be OPERABLE by verifying that the demand position indication system and the rod position indication system agree within 12 steps at least once per 12 hours except during time intervals when the Rod Position Deviation Monitor is inoperable, then compare the demand position indication system and the rod position indication system at least once per 4 hours.~~

Add proposed SR 3.1.7.1 — M02

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REACTIVITY CONTROL SYSTEMS

POSITION INDICATION SYSTEM-SHUTDOWN

LIMITING CONDITION FOR OPERATION

3.1.3.3 This specification is deleted.

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DISCUSSION OF CHANGES
ITS 3.1.7, ROD POSITION INDICATION

ADMINISTRATIVE CHANGES

A01 In the conversion of the Sequoyah Nuclear Plant (SQN) Current Technical Specifications (CTS) to the plant specific Improved Technical Specifications (ITS), certain changes (wording preferences, editorial changes, reformatting, revised numbering, etc.) are made to obtain consistency with NUREG - 1431, Rev. 4.0, "Standard Technical Specifications - Westinghouse Plants" (ISTS) and additional Technical Specification Task Force (TSTF) travelers included in this submittal.

These changes are designated as administrative changes and are acceptable because they do not result in technical changes to the CTS.

A02 CTS 3.1.3.2 Note * applies to Actions 2.a, 2.b, and 2.c and may be only applied to one inoperable rod position indicator. In this condition, the inoperable rod position indicator shall only be allowed until either the end of the current cycle, or until an entry into MODE 5 of sufficient duration, whichever occurs first, when the repair of the inoperable rod position indication can safely be performed. Actions 2.a, 2.b, and 2.c shall not be allowed after the plant has been in MODE 5 or other plant condition, for a sufficient period of time, in which the repair of the inoperable rod position indication could have safely been performed. ITS 3.1.7 ACTIONS Note 2 states that LCO 3.0.4.a and b are not applicable for Required Actions A.2.1 and A.2.2 following startup from a refueling outage, or following entry into MODE 5 of sufficient duration to safely repair an inoperable rod position indication. This changes the CTS by rewording the allowance for one rod position indicator inoperable to be consistent with ITS terminology.

This change is designated as an administrative change since the change does not result in a technical change to the CTS.

MORE RESTRICTIVE CHANGES

M01 CTS 3.1.3.2 ACTION a and c do not contain an ACTION to follow if the provided ACTIONS cannot be met. Therefore, CTS 3.0.3 would be entered, which would allow 1 hour to initiate a shutdown and 7 hours to be in HOT STANDBY. ITS 3.1.7 ACTION D requires if the Required Actions and associated Completion Time of ACTION A or C are not met, to be in MODE 3 within 6 hours. This changes the CTS by eliminating the one hour to initiate a shutdown and consequently allows one hour less for the unit to be in MODE 3.

This change is acceptable because it provides an appropriate compensatory measure for the described conditions. If any Required Action and associated Completion Time cannot be met, the unit must be placed in a MODE in which the LCO does not apply. The LCO is applicable in MODES 1 and 2. Requiring a shutdown to MODE 3 is appropriate in this condition. The one hour allowed by CTS 3.0.3 to prepare for a shutdown is not needed because the operators have had time to prepare for the shutdown while attempting to follow the Required Actions and associated Completion Times. This change is designated as more restrictive because it allows less time to shutdown than is allowed in the CTS.

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DISCUSSION OF CHANGES
ITS 3.1.7, ROD POSITION INDICATION

M02 CTS 4.1.3.2 requires that each rod position indicator shall be determined to be OPERABLE by verifying that the demand position indication system and the rod position indication system agree within 12 steps at least once per 12 hours except during time intervals when the Rod Position Deviation Monitor is inoperable, then compare the demand position indication system and the rod position indication system at least once per 4 hours. ITS 3.1.7 does not contain this requirement because it is duplicative of CTS 4.1.3.1.1 (ITS SR 3.1.4.1). A new Surveillance has been added (ITS SR 3.1.7.1) to verify each RPI agrees within 12 steps of the group demand position for the full indicated range of rod travel, once prior to criticality after each removal of the reactor head. This changes the CTS by adding a new Surveillance Requirement.

The purpose of ITS SR 3.1.7.1 is to provide additional assurance that the rod position indication system is operating correctly. This change is acceptable because it provides additional assurance that the rod position indication channels are OPERABLE. This change is designated as more restrictive because it adds a new Surveillance Requirement to the CTS.

RELOCATED SPECIFICATIONS

None

REMOVED DETAIL CHANGES

LA01 *(Type 1 – Removing Details of System Design and System Description, Including Design Limits)* CTS LCO 3.1.3.2 requires the shutdown and control rod position indication system and the demand position indication system to be OPERABLE and capable of determining the control rod positions within ± 12 steps. ITS LCO 3.1.7 requires the analog Rod Position Indication System and the Demand Position Indication System to be OPERABLE but the details of what constitutes an OPERABLE system are moved to the Bases. This changes the CTS by removing the details of what constitutes an OPERABLE system to the Bases.

The removal of these details, which are related to system design, from the Technical Specifications, is acceptable because this type of information is not necessary to be included in the Technical Specifications to provide adequate protection of public health and safety. The ITS retains the requirement that the Rod Position Indication System and Demand Position Indication System be OPERABLE. The details on the capability requirements of the systems do not need to appear in the specification in order for the requirement to apply. Additionally, this change is acceptable because the removed information will be adequately controlled in the ITS Bases. Changes to the Bases are controlled by the Technical Specification Bases Control Program in Chapter 5. This program provides for the evaluation of changes to ensure the Bases are properly controlled. This change is designated as a less restrictive removal of detail change because information relating to system design is being removed from the Technical Specifications.

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DISCUSSION OF CHANGES
ITS 3.1.7, ROD POSITION INDICATION

LESS RESTRICTIVE CHANGES

L01 *(Category 4 – Relaxation of Required Action)* CTS 3.1.3.2 ACTION a covers the inoperability for a maximum of one rod position indicator per bank. CTS 3.1.3.2 ACTION b covers the inoperability for more than one rod position indicator per bank. CTS 3.1.3.2 ACTION c covers the inoperability for a maximum of one demand position indicator per bank. ITS 3.1.7 ACTIONS are modified by Note 1 that states "Separate Condition entry is allowed for each inoperable rod position indicator and each demand position indicator." ITS 3.1.7 ACTION A covers inoperability for one rod position indicator per bank. ITS 3.1.7 ACTION B covers inoperability for more than one rod position indicator per bank. ITS 3.1.7 ACTION C covers inoperability for one demand position indicator bank for one or more banks. This changes the CTS by allowing separate Condition entry for each inoperable rod position indicator and each demand position indicator.

The purpose of CTS 3.1.3.2 ACTION a is to provide compensatory actions for a maximum of one rod position indicator per bank. The purpose of CTS 3.1.3.2 ACTION b is to provide compensatory actions for more than one rod position indicator per bank. The purpose of CTS 3.1.3.2 ACTION c is to provide compensatory actions for one demand position indicator per bank. This change is acceptable because the Required Actions are used to establish remedial measures that must be taken in response to the degraded conditions in order to minimize risk associated with continued operation while providing time to repair inoperable features. The Required Actions are consistent with safe operation under the specified Condition, considering the OPERABLE status of the redundant systems or features. This includes the capacity and capability of remaining features, a reasonable time for repairs or replacement of required features, and the low probability of a DBA occurring during the repair period. This change will allow separate Condition entry for each inoperable rod position indicator and each inoperable demand position indicator while the CTS does not. The ITS will allow each inoperable rod position indicator or each inoperable demand position indicator to be tracked separately. This change is acceptable because the Required Actions for each Condition provide appropriate compensatory actions for inoperable position indication. This change is designated as less restrictive because less stringent Required Actions are being applied in the ITS than were applied in the CTS.

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CTS

Rod Position Indication
3.1.7

3.1 REACTIVITY CONTROL SYSTEMS

3.1.7 Rod Position Indication

3.1.3.2 LCO 3.1.7 The ~~[Digital]~~ Rod Position Indication ~~([D]RPI)~~ System and the Demand Position Indication System shall be OPERABLE. (1)

Applicability APPLICABILITY: MODES 1 and 2.

ACTIONS

---NOTE [S]--- (5)

[1.] Separate Condition entry is allowed for each inoperable rod position indicator and each demand position indicator. [INSERT 1]

CONDITION	REQUIRED ACTION	COMPLETION TIME
ACTION a A. One ~~[D]RPI~~ [rod position indicator] per ~~group~~ [bank] inoperable ~~for one or more groups~~.	A.1 Verify the position of the rods with inoperable position indicators indirectly by using movable incore detectors. [INSERT 3] OR A.~~2~~ [3] Reduce THERMAL POWER to ~~≤~~ [<] 50% RTP.	Once per ~~8~~ [12] hours (1) (4) [INSERT 2] (2) (3) 8 hours (3) (4)
ACTION b B. More than one ~~[D]RPI~~ [rod position indicator] per ~~group~~ [bank] inoperable.	B.1 Place the control rods under manual control. AND B.2 Monitor and record Reactor Coolant System T_{avg}. AND	Immediately (1) (4) Once per 1 hour

4 **INSERT 1**

3.1.3.2 Note* 2. LCO 3.0.4.a and b are not applicable for Required Actions A.2.1 and A.2.2 following a startup from a refueling outage, or following entry into MODE 5 of sufficient duration to safely repair an inoperable rod position indication.

2 **INSERT 2**

AND

Action a.1 Immediately after a rod with an inoperable position indicator has been moved in excess of 24 steps in one direction since the last determination of the rod's position

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(3) **INSERT 3**

OR	
--------------------NOTE------------------- Required Actions A.2.1 and A.2.2 may only be applied to one inoperable rod position indicator. ---	
A.2.1 Verify position of the rod with inoperable position indicator indirectly by using movable incore detectors.	8 hours AND Once per 31 days thereafter AND 8 hours if Rod Control System parameters indicate unintended movement AND 8 hours if the rod with an inoperable position indicator is moved greater than 12 steps AND Prior to increasing THERMAL POWER above 50% RTP AND 8 hours after reaching 100% RTP
AND	

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3 **INSERT 3 (Continued)**

A.2.2	Review the parameters of the Rod Control System for indications of unintended rod movement for the rod with the inoperable position indicator.	16 hours <u>AND</u> Once per 8 hours thereafter

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ACTIONS (continued)

	CONDITION	REQUIRED ACTION	COMPLETION TIME	
ACTION b		B.3 Verify the position of the rods with inoperable position indicators indirectly by using the movable incore detectors.	Once per ~~8~~ 12 hours INSERT 4	4 2
		AND		
		B.4 Restore inoperable position indicators to OPERABLE status such that a maximum of one ~~[D]RPI~~ rod position indicator per ~~group~~ bank is inoperable.	24 hours	1 4
	~~C. One or more rods with inoperable position indicators have been moved in excess of 24 steps in one direction since the last determination of the rod's position.~~	~~C.1 Verify the position of the rods with inoperable position indicators indirectly by using movable incore detectors.~~	~~[4] hours~~	2
		~~OR~~		
		~~C.2 Reduce THERMAL POWER to ≤ 50% RTP.~~	~~8 hours~~	
DOC L01 ACTION c	~~D~~ C. One demand position indicator per bank inoperable for one or more banks.	~~D~~ C.1.1 Verify by administrative means all ~~[D]RPIs~~ rod position indicators for the affected banks are OPERABLE.	Once per ~~8~~ 12 hours	2 4 1
		AND		
		~~D~~ C.1.2 Verify the most withdrawn rod and the least withdrawn rod of the affected banks are ≤ 12 steps apart.	Once per ~~8~~ 12 hours	2 4
		OR		

(2) **INSERT 4**

AND

Action b.1

Immediately after a rod with an inoperable position indicator has been moved in excess of 24 steps in one direction since the last determination of the rod's position

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CTS

ACTIONS (continued)

	CONDITION	REQUIRED ACTION		COMPLETION TIME	
ACTION c		~~D~~ C.2	Reduce THERMAL POWER to ~~≤~~ < 50% RTP.	8 hours	2 4
ACTION b.4, DOC M02	~~E~~ D. Required Action and associated Completion Time not met.	~~E~~ D.1	Be in MODE 3.	6 hours	2

SURVEILLANCE REQUIREMENTS

	SURVEILLANCE		FREQUENCY	
4.1.3.2	SR 3.1.7.1	Verify each ~~[D]RPI~~ rod position indicator agrees within ~~[~~12~~]~~ steps of the group demand position ~~for the [full indicated range]~~ at 20 and 215 steps of rod travel.	Once prior to criticality after each removal of the reactor head	1

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3.1 REACTIVITY CONTROL SYSTEMS

3.1.7 Rod Position Indication

3.1.3.2 LCO 3.1.7 The [Digital] Rod Position Indication ([D]RPI) System and the Demand Position Indication System shall be OPERABLE. 1

Applicability APPLICABILITY: MODES 1 and 2.

ACTIONS S 5

-----NOTE-----

1. Separate Condition entry is allowed for each inoperable rod position indicator and each demand position indicator. INSERT 1

CONDITION	REQUIRED ACTION	COMPLETION TIME
ACTION a A. One [D]RPI (rod position indicator) per group (bank) inoperable for one or more groups.	A.1 Verify the position of the rods with inoperable position indicators indirectly by using movable incore detectors. INSERT 3	Once per 8 (12) hours INSERT 2 — 1 4 2 3
	OR	
	A.2 (3) Reduce THERMAL POWER to ≤ (<) 50% RTP.	8 hours — 3 4
ACTION b B. More than one [D]RPI (rod position indicator) per group (bank) inoperable.	B.1 Place the control rods under manual control.	Immediately — 1 4
	AND	
	B.2 Monitor and record Reactor Coolant System T_{avg}.	Once per 1 hour
	AND	

4 **INSERT 1**

3.1.3.2 Note* 2. LCO 3.0.4.a and b are not applicable for Required Actions A.2.1 and A.2.2 following a startup from a refueling outage, or following entry into MODE 5 of sufficient duration to safely repair an inoperable rod position indication.

2 **INSERT 2**

AND

Action a.1 Immediately after a rod with an inoperable position indicator has been moved in excess of 24 steps in one direction since the last determination of the rod's position

(3) **INSERT 3**

OR --------------------NOTE------------------- Required Actions A.2.1 and A.2.2 may only be applied to one inoperable rod position indicator. --	
A.2.1 Verify position of the rod with inoperable position indicator indirectly by using movable incore detectors.	8 hours AND Once per 31 days thereafter AND 8 hours if Rod Control System parameters indicate unintended movement AND 8 hours if the rod with an inoperable position indicator is moved greater than 12 steps AND Prior to increasing THERMAL POWER above 50% RTP AND 8 hours after reaching 100% RTP
AND	

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3

INSERT 3 (Continued)

A.2.2	Review the parameters of the Rod Control System for indications of unintended rod movement for the rod with the inoperable position indicator.	16 hours <u>AND</u> Once per 8 hours thereafter

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ACTIONS (continued)

CONDITION	REQUIRED ACTION	COMPLETION TIME
ACTION b	B.3 Verify the position of the rods with inoperable position indicators indirectly by using the movable incore detectors.	Once per ~~8~~ 12 hours (4) INSERT 4 (2)
	AND	
	B.4 Restore inoperable position indicators to OPERABLE status such that a maximum of one ~~[D]RPI~~ rod position indicator per ~~group~~ bank is inoperable. (1) (4)	24 hours
~~C. One or more rods with inoperable position indicators have been moved in excess of 24 steps in one direction since the last determination of the rod's position.~~	~~C.1 Verify the position of the rods with inoperable position indicators indirectly by using movable incore detectors.~~	~~[4] hours~~ (2)
	~~OR~~	
	~~C.2 Reduce THERMAL POWER to ≤ 50% RTP.~~	~~8 hours~~
DOC L01 ACTION c ~~D~~ C. One demand position indicator per bank inoperable for one or more banks.	~~D~~ C.1.1 Verify by administrative means all ~~[D]RPIs~~ rod position indicators for the affected banks are OPERABLE.	Once per ~~8~~ 12 hours (2) (4) (1)
	AND	
	~~D~~ C.1.2 Verify the most withdrawn rod and the least withdrawn rod of the affected banks are ≤ 12 steps apart.	Once per ~~8~~ 12 hours (2) (4)
	OR	

(2) **INSERT 4**

AND

Action b.1 Immediately after a rod with an inoperable position indicator has been moved in excess of 24 steps in one direction since the last determination of the rod's position

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ACTIONS (continued)

	CONDITION	REQUIRED ACTION		COMPLETION TIME	
ACTION c		~~D~~ C.2	Reduce THERMAL POWER to ~~≤~~ < 50% RTP.	8 hours	2 4
ACTION b.4, DOC M02	~~E~~ D. Required Action and associated Completion Time not met.	~~E~~ D.1	Be in MODE 3.	6 hours	2

SURVEILLANCE REQUIREMENTS

	SURVEILLANCE		FREQUENCY	
4.1.3.2	SR 3.1.7.1	Verify each ~~[D]RPI~~ rod position indicator agrees within ~~[~~12~~]~~ steps of the group demand position ~~for the [full indicated range]~~ at 20 and 215 steps of rod travel.	Once prior to criticality after each removal of the reactor head	1

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JUSTIFICATION FOR DEVIATIONS
ITS 3.1.7, ROD POSITION INDICATION

1. The ISTS contains bracketed information and/or values that are generic to Westinghouse vintage plants. The brackets are removed and the proper plant specific information/value is inserted to reflect the current licensing basis.

2. ISTS 3.1.7 ACTION C has been deleted and a new conditional Completion time has been added to Required Action A.1 and B.3. The new completion time ensures that SQN current licensing basis is maintained, in that a verification of the position indicator is still being performed immediately after a rod with an inoperable position indicator has been moved in excess of 24 steps in one direction since the last determination of the rod's position. Additionally, ISTS 3.1.7 ACTIONS D and E has been changed to ITS 3.1.7 ACTIONS C and D, respectively, because of this deletion.

3. ISTS 3.1.7 ACTION A provides compensatory actions for when one rod position indicator is inoperable. ITS 3.1.7 provides an additional Required Action that can be taken when one rod position indicator is inoperable. The new Required Action allows the use of an alternate means other than the movable incore detectors to monitor the position of a control or shutdown rod when the analog rod position indication system is inoperable. This change reflects a current licensing basis that was approved by the NRC in Amendment 315 for Unit 1 and Amendment 304 for Unit 2 (ADAMS Accession No. ML063120575). Additionally ISTS 3.1.7 Required Action A.2 has been renumbered as ITS 3.1.7 Required Action A.3.

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

5. Editorial changes made for enhanced clarity/consistency.

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Improved Standard Technical Specifications (ISTS) Markup and Justification for Deviations (JFDs)

Improved Standard Technical Specifications (ISTS) Bases Markup and Bases Justification for Deviations (JFDs)

B 3.1 REACTIVITY CONTROL SYSTEMS

B 3.1.7 Rod Position Indication

BASES

BACKGROUND

According to GDC 13 (Ref. 1), instrumentation to monitor variables and systems over their operating ranges during normal operation, anticipated operational occurrences, and accident conditions must be OPERABLE. LCO 3.1.7 is required to ensure OPERABILITY of the control [and shutdown] rod position indicators to determine ~~control~~ rod positions and thereby ensure compliance with the control rod alignment and insertion limits. 1

The OPERABILITY, including position indication, of the shutdown and control rods is an initial assumption in all safety analyses that assume rod insertion upon reactor trip. Maximum rod misalignment is an initial assumption in the safety analysis that directly affects core power distributions and assumptions of available SDM. Rod position indication is required to assess OPERABILITY and misalignment.

Mechanical or electrical failures may cause a ~~control~~ rod to become inoperable or to become misaligned from its group. Control rod inoperability or misalignment may cause increased power peaking, [resulting from] ~~due to~~ the asymmetric reactivity distribution and a reduction in the total available rod worth for reactor shutdown. Therefore, control rod alignment and OPERABILITY are related to core operation in design power peaking limits and the core design requirement of a minimum SDM. 5

Limits on control rod alignment and OPERABILITY have been established, and ~~all~~ rod positions are monitored and controlled during power operation to ensure that the power distribution and reactivity limits defined by the design power peaking and SDM limits are preserved. 5

Rod cluster control assemblies (RCCAs), or rods, are moved out of the core (up or withdrawn) or into the core (down or inserted) by their control rod drive mechanisms. The RCCAs are divided among control banks and shutdown banks. Each bank may be further subdivided into two groups to provide for precise reactivity control.

The axial position of shutdown rods and control rods are determined by two separate and independent systems: the ~~Bank~~ Demand Position Indication System (commonly called group step counters) and the ~~[Digital]~~ Rod Position Indication ~~([D]RPI)~~ System. 1 2

BASES

BACKGROUND (continued)

The Bank Demand Position Indication System counts the pulses from the Rod Control System that move the rods. There is one step counter for each group of rods. Individual rods in a group all receive the same signal to move and should, therefore, all be at the same position indicated by the group step counter for that group. The Bank Demand Position Indication System is considered highly precise (± 1 step or ± 5/8 ⅝ inch). If a rod does not move one step for each demand pulse, the step counter will still count the pulse and incorrectly reflect the position of the rod. 1 5 5 1 1

Rod Position Indication an

The [D]RPI System provides a highly accurate indication of actual control rod position, but at a lower precision than the step counters. This system is based on inductive analog signals from a series of coils spaced along a hollow tube with a center to center distance of 3.75 inches, which is 6 steps. To increase the reliability of the system, the inductive coils are connected alternately to data system A or B. Thus, if one system fails, the [D]RPI will go on half accuracy with an effective coil spacing of 7.5 inches, which is 12 steps. Therefore, the normal indication accuracy of the [D]RPI System is ± 6 steps (± 3.75 inches), and the maximum uncertainty is ± 12 steps (± 7.5 inches). INSERT 1 With an indicated deviation of 12 steps between the group step counter and [D]RPI, the maximum deviation between actual rod position and the demand position could be 24 steps, or 15 inches. 2 1 1

APPLICABLE SAFETY ANALYSES

Control and shutdown rod position accuracy is essential during power operation. Power peaking, ejected rod worth, or SDM limits may be violated in the event of a Design Basis Accident (Ref. 2), with control or shutdown rods operating outside their limits undetected. Therefore, the acceptance criteria for rod position indication is are that rod positions must be known with sufficient accuracy in order to verify the core is operating within the group sequence, overlap, design peaking limits, ejected rod worth, and with minimum SDM (LCO 3.1.5, "Shutdown Bank Insertion Limits," and LCO 3.1.6, "Control Bank Insertion Limits"). The rod positions must also be known in order to verify the alignment limits are preserved (LCO 3.1.4, "Rod Group Alignment Limits"). Control rod positions are continuously monitored to provide operators with information that ensures the plant is operating within the bounds of the accident analysis assumptions. 5 5

The control rod position indicator channels satisfy Criterion 2 of 10 CFR 50.36(c)(2)(ii). The control rod position indicators monitor control rod position, which is an initial condition of the accident. 5

1 **INSERT 1**

A deviation of ± 12 steps between the group step counter and a rod position indication is based on normal Rod Position Indication System indication accuracy of ± 5% span with a maximum uncertainty of 10% span between the group step counter and the rod position indication.

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BASES

LCO

LCO 3.1.7 specifies that one ~~[D]RPI~~ Rod Position Indication System ~~and one Bank~~ shall ~~Demand Position Indication System~~ be OPERABLE for each ~~control~~ rod. INSERT 2 For the ~~control~~ rod position indicators to be OPERABLE requires meeting the SR of the LCO and the following: 2 1 5

a. The ~~[D]RPI~~ Rod Position Indication System indicates within 12 steps of the group step counter demand position as required by LCO 3.1.4, "Rod Group Alignment Limits," 2

b. For the ~~[D]RPI~~ Rod Position Indication System there are no failed coils, and 2

c. The ~~Bank~~ Demand Position Indication System has been calibrated either in the fully inserted position or ~~to the [D]RPI System~~ INSERT 3. 1 4 1

The 12 step agreement limit between the ~~Bank~~ Demand Position Indication System and the ~~[D]RPI~~ Rod Position Indication System indicates that the ~~Bank~~ Demand Position Indication System is adequately calibrated, and can be used for indication of the measurement of control rod bank position. 2 1

A deviation of less than the allowable limit, given in LCO 3.1.4, in position indication for a single control rod, ensures high confidence that the position uncertainty of the corresponding control rod group is within the assumed values used in the analysis (that specified control rod group insertion limits).

These requirements ensure that control rod position indication during power operation and PHYSICS TESTS is accurate, and that design assumptions are not challenged.

OPERABILITY of the position indicator channels ensures that inoperable, misaligned, or mispositioned control rods can be detected. Therefore, power peaking, ejected rod worth, and SDM can be controlled within acceptable limits.

APPLICABILITY

The requirements ~~on~~ of the ~~[D]RPI~~ Rod Position Indication and step counters are only applicable in MODES 1 and 2 (consistent with LCO 3.1.4, LCO 3.1.5, and LCO 3.1.6), because these are the only MODES in which power is generated, and the OPERABILITY and alignment of rods have the potential to affect the safety of the plant. In the shutdown MODES, the OPERABILITY of the shutdown and control banks has the potential to affect the required SDM, but this effect can be compensated for by an increase in the boron concentration of the Reactor Coolant System. 5 2

1 **INSERT 2**

Additionally, one Demand Position Indication System shall be OPERABLE for each group within a bank.

1 **INSERT 3**

a check is performed between the two step counters in the same bank. Shutdown Banks C and D each contain a single group. Therefore, validation of movement for Shutdown Banks C and D can only be performed with a comparison of the single group to the corresponding RPI movement.

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BASES

ACTIONS

The ACTIONS Table is modified by a Note indicating that a separate Condition entry is allowed for each inoperable rod position indicator and each demand position indicator. This is acceptable because the Required Actions for each Condition provide appropriate compensatory actions for each inoperable position indicator.

INSERT 4 (4)

A.1

Rod Position Indication bank

When one [D]RPI channel per group fails, the position of the rod may still be determined indirectly by use of the movable incore detectors. The Required Action may also be satisfied by ensuring at least once per 8 hours that F_Q satisfies LCO 3.2.1, $F^N_{\Delta H}$ satisfies LCO 3.2.2, and SHUTDOWN MARGIN is within the limits provided in the COLR, provided the nonindicating rods have not been moved. Based on experience, normal power operation does not require excessive movement of banks. If a bank has been significantly moved, the Required Action of C.1 or C.2 below is required. Therefore, verification of RCCA position within the Completion Time of 8 hours is adequate for allowing continued full power operation, since the probability of simultaneously having a rod significantly out of position and an event sensitive to that rod position is small. (2) (1) (5) (3) (4) 12 (4)

INSERT 5 (4)

3

A.2 (4)

<

Reduction of THERMAL POWER to ≤ 50% RTP puts the core into a condition where rod position is not significantly affecting core peaking factors (Ref. 3). (4)

<

The allowed Completion Time of 8 hours is reasonable, based on operating experience, for reducing power to ≤ 50% RTP from full power conditions without challenging plant systems and allowing for rod position determination by Required Action A.1 above. (4)

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

bank fails
Rod Position Indication

When more than one [D]RPI per group fail, additional actions are necessary to ensure that acceptable power distribution limits are maintained, minimum SDM is maintained, and the potential effects of rod misalignment on associated accident analyses are limited. Placing the Rod Control System in manual assures unplanned rod motion will not occur. Together with the indirect position determination available via (2) (1) (5)

4 **INSERT 4**

A second Note has been added to provide clarification that LCO 3.0.4.a and LCO 3.0.4.c are not applicable for Required Action A.2.1 and A.2.2 following startup from a refueling outage, or following entry into MODE 5 of sufficient duration to safely repair an inoperable rod position indication.

4 **INSERT 5**

If one or more rods have been significantly moved (in excess of 24 steps in one direction, since the position was last determined), Required Action A.1 is still appropriate, but actions must be initiated immediately to begin verifying that the rod is still properly positioned, relative to their group positions. In this Required Action, the Completion Time only begins on discovery that both:

a. One rod position indication per bank is inoperable, and

b. A rod with an inoperable position indicator has been moved in excess of 24 steps in one direction since the last determination of the rod's position.

If at any time during the existence of Condition A (one RPI per bank inoperable), a rod with an inoperable position indicator has been moved in excess of 24 steps in one direction since the last determination of the rod's position, this Completion Time begins to be tracked.

<u>A.2.1, and A.2.2</u>

When one RPI channel per bank fails, the position of the rod may still be determined indirectly by use of the movable incore detectors and reviewing the parameters of the rod control system for indications of unintended rod movement for the rod with the inoperable position indication. Therefore, verification of RCCA position within 8 hours and every 31days thereafter is adequate for allowing continued full power operation as long as a review of the parameters of the rod control system for indications of unintended rod movement for the rod with the inoperable position indication is performed within 16 hours and every 8 hours thereafter. Furthermore, if the rod control system parameters indicate unintended movement or if the rod with an inoperable position indicator is moved greater than 12 steps, then the verification of the RCCA position must be performed within 8 hours. As long as these compensatory actions are met, reactor operation can then continue until the end of the current cycle or until an entry into MODE 5 of sufficient duration that the repair of the inoperable rod position indication can safely be performed.

Required Actions A.2.1,and A.2.2 are modified by a Note directing that these Required Actions may only be applied to one inoperable rod position indicator.

BASES

ACTIONS (continued)

movable incore detectors will minimize the potential for rod misalignment. The immediate Completion Time for placing the Rod Control System in manual reflects the urgency with which unplanned rod motion must be prevented while in this Condition.

helps

Monitoring and recording reactor coolant T_{avg} ~~help~~ assure that significant changes in power distribution and SDM are avoided. The once per hour Completion Time is acceptable because only minor fluctuations in RCS temperature are expected at steady state plant operating conditions. 5

The position of the rods may be determined indirectly by use of the movable incore detectors. ~~The Required Action may also be satisfied by ensuring at least once per 8 hours that F_Q satisfies LCO 3.2.1, $F^N_{\Delta H}$ satisfies LCO 3.2.2, and SHUTDOWN MARGIN is within the limits provided in the COLR, provided the nonindicating rods have not been moved.~~ Verification of control rod position once per ~~8~~ 12 hours is adequate for allowing continued full power operation for a limited, 24 hour period, since the probability of simultaneously having a rod significantly out of position and an event sensitive to that rod position is small. The 24 hour Completion Time provides sufficient time to troubleshoot and restore the ~~[D]RPI~~ Rod Position Indication system to operation while avoiding the plant challenges associated with the shutdown without full rod position indication. 3 4 2 5

Based on operating experience, normal power operation does not require excessive rod movement. If one or more rods has been significantly moved~~, the Required Action of C.1 or C.2 below is required~~. 4

INSERT 6

~~C.1 and C.2~~

~~These Required Actions clarify that when one or more rods with inoperable position indicators have been moved in excess of 24 steps in one direction, since the position was last determined, the Required Actions of A.1 and A.2, [or B.1, as applicable] are still appropriate but must be initiated promptly under Required Action C.1 to begin verifying that these rods are still properly positioned, relative to their group positions.~~

~~If, within [4] hours, the rod positions have not been determined, THERMAL POWER must be reduced to ≤ 50% RTP within 8 hours to avoid undesirable power distributions that could result from continued operation at > 50% RTP, if one or more rods are misaligned by more than 24 steps. The allowed Completion Time of [4] hours provides an acceptable period of time to verify the rod positions.~~ 4

4 **INSERT 6**

(in excess of 24 steps in one direction, since the position was last determined), Required Action B.3 is still appropriate, but action must be initiated immediately to begin verifying that the rod is properly positioned, relative to its bank position. In this Required Action, the Completion Time only begins on discovery that both:

a. More than one RPI per bank is inoperable; and

b. A rod with an inoperable position indicator has been moved in excess of 24 steps in one direction since the last determination of the rod's position.

If at any time during the existence of Condition B (more than one RPI per bank inoperable), a rod with an inoperable position indicator has been moved in excess of 24 steps in one direction since the last determination of the rod's position, this Completion Time begins to be tracked.

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BASES

ACTIONS (continued)

C

D.1.1 and D.1.2 4

With one demand position indicator per bank inoperable, the rod positions can be determined by the [D]RPI Rod Position Indication System. Since normal power operation does not require excessive movement of rods, verification by administrative means that the rod position indicators are OPERABLE and the most withdrawn rod and the least withdrawn rod are ≤ 12 steps apart within the allowed Completion Time of once every 8 12 hours is adequate. 2 4

C

D.2 4

Reduction of THERMAL POWER to ≤ < 50% RTP puts the core into a condition where rod position is not significantly affecting core peaking factor limits (Ref. 3). The allowed Completion Time of 8 hours provides an acceptable period of time to verify the rod positions per Required Actions C.1.1 and C.1.2 or reduce power to ≤ < 50% RTP. 4 4 1

D

E.1 4

If the Required Actions cannot be completed within the associated Completion Time, the plant must be brought to a MODE in which the requirement does not apply. To achieve this status, the plant must be brought to at least MODE 3 within 6 hours. The allowed Completion Time 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

SR 3.1.7.1

Verification that the [D]RPI Rod Position Indication agrees with the demand position within [12] steps ensures that the [D]RPI Rod Position Indication is operating correctly. Since the [D]RPI does not display the actual shutdown rod positions between 18 and 210 steps, only points within the indicated ranges are required in comparison. INSERT 7 2 1

This Surveillance is performed prior to reactor criticality after each removal of the reactor head, as there is the potential for unnecessary plant transients if the SR were performed with the reactor at power.

1 **INSERT 7**

This verification will be performed at 20 steps and 215 steps of rod travel.

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BASES

REFERENCES

1. 10 CFR 50, Appendix A, GDC 13.

2. FSAR, ~~Chapter [15]~~ Section 7.7.1. (1) (2)

U

3. FSAR, Chapter ~~[~~15~~]~~. (1) (2)

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B 3.1 REACTIVITY CONTROL SYSTEMS

B 3.1.7 Rod Position Indication

BASES

BACKGROUND

According to GDC 13 (Ref. 1), instrumentation to monitor variables and systems over their operating ranges during normal operation, anticipated operational occurrences, and accident conditions must be OPERABLE. LCO 3.1.7 is required to ensure OPERABILITY of the control and shutdown rod position indicators to determine ~~control~~ rod positions and thereby ensure compliance with the control rod alignment and insertion limits. 1

The OPERABILITY, including position indication, of the shutdown and control rods is an initial assumption in all safety analyses that assume rod insertion upon reactor trip. Maximum rod misalignment is an initial assumption in the safety analysis that directly affects core power distributions and assumptions of available SDM. Rod position indication is required to assess OPERABILITY and misalignment.

Mechanical or electrical failures may cause a ~~control~~ rod to become inoperable or to become misaligned from its group. Control rod inoperability or misalignment may cause increased power peaking, resulting from ~~due to~~ the asymmetric reactivity distribution and a reduction in the total available rod worth for reactor shutdown. Therefore, control rod alignment and OPERABILITY are related to core operation in design power peaking limits and the core design requirement of a minimum SDM. 5

Limits on control rod alignment and OPERABILITY have been established, and ~~all~~ rod positions are monitored and controlled during power operation to ensure that the power distribution and reactivity limits defined by the design power peaking and SDM limits are preserved. 5

Rod cluster control assemblies (RCCAs), or rods, are moved out of the core (up or withdrawn) or into the core (down or inserted) by their control rod drive mechanisms. The RCCAs are divided among control banks and shutdown banks. Each bank may be further subdivided into two groups to provide for precise reactivity control.

The axial position of shutdown rods and control rods are determined by two separate and independent systems: the ~~Bank~~ Demand Position Indication System (commonly called group step counters) and the ~~[Digital]~~ Rod Position Indication ~~([D]RPI)~~ System. 1 2

BASES

BACKGROUND (continued)

The Bank Demand Position Indication System counts the pulses from the Rod Control System that move the rods. There is one step counter for each group of rods. Individual rods in a group all receive the same signal to move and should, therefore, all be at the same position indicated by the group step counter for that group. The Bank Demand Position Indication System is considered highly precise (± 1 step or ± 5/8 ⅝ inch). If a rod does not move one step for each demand pulse, the step counter will still count the pulse and incorrectly reflect the position of the rod. 1 5 5 1 1

The Rod Position Indication [D]RPI System provides an a highly accurate indication of actual control rod position, but at a lower precision than the step counters. This system is based on inductive analog signals from a series of coils spaced along a hollow tube with a center to center distance of 3.75 inches, which is 6 steps. To increase the reliability of the system, the inductive coils are connected alternately to data system A or B. Thus, if one system fails, the [D]RPI will go on half accuracy with an effective coil spacing of 7.5 inches, which is 12 steps. Therefore, the normal indication accuracy of the [D]RPI System is ± 6 steps (± 3.75 inches), and the maximum uncertainty is ± 12 steps (± 7.5 inches). INSERT 1 With an indicated deviation of 12 steps between the group step counter and [D]RPI, the maximum deviation between actual rod position and the demand position could be 24 steps, or 15 inches. 2 1 1

APPLICABLE SAFETY ANALYSES

Control and shutdown rod position accuracy is essential during power operation. Power peaking, ejected rod worth, or SDM limits may be violated in the event of a Design Basis Accident (Ref. 2), with control or shutdown rods operating outside their limits undetected. Therefore, the acceptance criteria for rod position indication are is that rod positions must be known with sufficient accuracy in order to verify the core is operating within the group sequence, overlap, design peaking limits, ejected rod worth, and with minimum SDM (LCO 3.1.5, "Shutdown Bank Insertion Limits," and LCO 3.1.6, "Control Bank Insertion Limits"). The rod positions must also be known in order to verify the alignment limits are preserved (LCO 3.1.4, "Rod Group Alignment Limits"). Control rod positions are continuously monitored to provide operators with information that ensures the plant is operating within the bounds of the accident analysis assumptions. 5 5

The control rod position indicator channels satisfy Criterion 2 of 10 CFR 50.36(c)(2)(ii). The control rod position indicators monitor control rod position, which is an initial condition of the accident. 5

1 **INSERT 1**

A deviation of ± 12 steps between the group step counter and a rod position indication is based on normal Rod Position Indication System indication accuracy of ± 5% span with a maximum uncertainty of 10% span between the group step counter and the rod position indication.

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BASES

LCO

INSERT 2

LCO 3.1.7 specifies that one ~~[D]RPI~~ Rod Position Indication System ~~and one Bank~~ shall ~~Demand Position Indication System~~ be OPERABLE for each ~~control~~ rod. For the ~~control~~ rod position indicators to be OPERABLE requires meeting the SR of the LCO and the following: 2 1 5

a. The ~~[D]RPI~~ Rod Position Indication System indicates within 12 steps of the group step counter demand position as required by LCO 3.1.4, "Rod Group Alignment Limits," 2

b. For the ~~[D]RPI~~ Rod Position Indication System there are no failed coils, and 2

c. The ~~Bank~~ Demand Position Indication System has been calibrated either in the fully inserted position or ~~to the [D]RPI System~~ INSERT 3. 1 4 1

The 12 step agreement limit between the ~~Bank~~ Demand Position Indication System and the ~~[D]RPI~~ Rod Position Indication System indicates that the ~~Bank~~ Demand Position Indication System is adequately calibrated, and can be used for indication of the measurement of control rod bank position. 2 1

A deviation of less than the allowable limit, given in LCO 3.1.4, in position indication for a single control rod, ensures high confidence that the position uncertainty of the corresponding control rod group is within the assumed values used in the analysis (that specified control rod group insertion limits).

These requirements ensure that control rod position indication during power operation and PHYSICS TESTS is accurate, and that design assumptions are not challenged.

OPERABILITY of the position indicator channels ensures that inoperable, misaligned, or mispositioned control rods can be detected. Therefore, power peaking, ejected rod worth, and SDM can be controlled within acceptable limits.

APPLICABILITY

The requirements ~~on~~ of the ~~[D]RPI~~ Rod Position Indication and step counters are only applicable in MODES 1 and 2 (consistent with LCO 3.1.4, LCO 3.1.5, and LCO 3.1.6), because these are the only MODES in which power is generated, and the OPERABILITY and alignment of rods have the potential to affect the safety of the plant. In the shutdown MODES, the OPERABILITY of the shutdown and control banks has the potential to affect the required SDM, but this effect can be compensated for by an increase in the boron concentration of the Reactor Coolant System. 5 2

(1) **INSERT 2**

Additionally, one Demand Position Indication System shall be OPERABLE for each group within a bank.

(1) **INSERT 3**

a check is performed between the two step counters in the same bank. Shutdown Banks C and D each contain a single group. Therefore, validation of movement for Shutdown Banks C and D can only be performed with a comparison of the single group to the corresponding RPI movement.

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BASES

ACTIONS

The ACTIONS Table is modified by a Note indicating that a separate Condition entry is allowed for each inoperable rod position indicator and each demand position indicator. This is acceptable because the Required Actions for each Condition provide appropriate compensatory actions for each inoperable position indicator.

INSERT 4 (4)

A.1

Rod Position Indication bank

When one [D]RPI channel per group fails, the position of the rod may still be determined indirectly by use of the movable incore detectors. The Required Action may also be satisfied by ensuring at least once per 8 hours that F_Q satisfies LCO 3.2.1, $F^N_{\Delta H}$ satisfies LCO 3.2.2, and SHUTDOWN MARGIN is within the limits provided in the COLR, provided the nonindicating rods have not been moved. Based on experience, normal power operation does not require excessive movement of banks. If a bank has been significantly moved, the Required Action of C.1 or C.2 below is required. Therefore, verification of RCCA position within the Completion Time of 8 12 hours is adequate for allowing continued full power operation, since the probability of simultaneously having a rod significantly out of position and an event sensitive to that rod position is small. (2) (1) (5) (3) (4) (4)

INSERT 5 (4)

A.2 3 (4)

Reduction of THERMAL POWER to ≤ < 50% RTP puts the core into a condition where rod position is not significantly affecting core peaking factors (Ref. 3). (4)

The allowed Completion Time of 8 hours is reasonable, based on operating experience, for reducing power to ≤ < 50% RTP from full power conditions without challenging plant systems and allowing for rod position determination by Required Action A.1 above. (4)

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

Rod Position Indication bank fails

When more than one [D]RPI per group fail, additional actions are necessary to ensure that acceptable power distribution limits are maintained, minimum SDM is maintained, and the potential effects of rod misalignment on associated accident analyses are limited. Placing the Rod Control System in manual assures unplanned rod motion will not occur. Together with the indirect position determination available via (2) (1) (5)

4 **INSERT 4**

A second Note has been added to provide clarification that LCO 3.0.4.a and LCO 3.0.4.c are not applicable for Required Action A.2.1 and A.2.2 following startup from a refueling outage, or following entry into MODE 5 of sufficient duration to safely repair an inoperable rod position indication.

4 **INSERT 5**

If one or more rods have been significantly moved (in excess of 24 steps in one direction, since the position was last determined), Required Action A.1 is still appropriate, but actions must be initiated immediately to begin verifying that the rod is still properly positioned, relative to their group positions. In this Required Action, the Completion Time only begins on discovery that both:

a. One rod position indication per bank is inoperable, and

b. A rod with an inoperable position indicator has been moved in excess of 24 steps in one direction since the last determination of the rod's position.

If at any time during the existence of Condition A (one RPI per bank inoperable), a rod with an inoperable position indicator has been moved in excess of 24 steps in one direction since the last determination of the rod's position, this Completion Time begins to be tracked.

A.2.1, and A.2.2

When one RPI channel per bank fails, the position of the rod may still be determined indirectly by use of the movable incore detectors and reviewing the parameters of the rod control system for indications of unintended rod movement for the rod with the inoperable position indication. Therefore, verification of RCCA position within 8 hours and every 31days thereafter is adequate for allowing continued full power operation as long as a review of the parameters of the rod control system for indications of unintended rod movement for the rod with the inoperable position indication is performed within 16 hours and every 8 hours thereafter. Furthermore, if the rod control system parameters indicate unintended movement or if the rod with an inoperable position indicator is moved greater than 12 steps, then the verification of the RCCA position must be performed within 8 hours. As long as these compensatory actions are met, reactor operation can then continue until the end of the current cycle or until an entry into MODE 5 of sufficient duration that the repair of the inoperable rod position indication can safely be performed.

Required Actions A.2.1,and A.2.2 are modified by a Note directing that these Required Actions may only be applied to one inoperable rod position indicator.

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BASES

ACTIONS (continued)

movable incore detectors will minimize the potential for rod misalignment. The immediate Completion Time for placing the Rod Control System in manual reflects the urgency with which unplanned rod motion must be prevented while in this Condition.

helps

Monitoring and recording reactor coolant T_{avg} ~~help~~ assure that significant changes in power distribution and SDM are avoided. The once per hour Completion Time is acceptable because only minor fluctuations in RCS temperature are expected at steady state plant operating conditions. 5

The position of the rods may be determined indirectly by use of the movable incore detectors. ~~The Required Action may also be satisfied by ensuring at least once per 8 hours that F_Q satisfies LCO 3.2.1, $F^N_{\Delta H}$ satisfies LCO 3.2.2, and SHUTDOWN MARGIN is within the limits provided in the COLR, provided the nonindicating rods have not been moved.~~ Verification of control rod position once per ~~8~~ 12 hours is adequate for allowing continued full power operation for a limited, 24 hour period, since the probability of simultaneously having a rod significantly out of position and an event sensitive to that rod position is small. The 24 hour Completion Time provides sufficient time to troubleshoot and restore the ~~[D]RPI~~ Rod Position Indication system to operation while avoiding the plant challenges associated with the shutdown without full rod position indication. 3 4 2 5

Based on operating experience, normal power operation does not require excessive rod movement. If one or more rods has been significantly moved~~, the Required Action of C.1 or C.2 below is required~~. 4

INSERT 6

~~C.1 and C.2~~

~~These Required Actions clarify that when one or more rods with inoperable position indicators have been moved in excess of 24 steps in one direction, since the position was last determined, the Required Actions of A.1 and A.2, [or B.1, as applicable] are still appropriate but must be initiated promptly under Required Action C.1 to begin verifying that these rods are still properly positioned, relative to their group positions.~~

~~If, within [4] hours, the rod positions have not been determined, THERMAL POWER must be reduced to ≤ 50% RTP within 8 hours to avoid undesirable power distributions that could result from continued operation at > 50% RTP, if one or more rods are misaligned by more than 24 steps. The allowed Completion Time of [4] hours provides an acceptable period of time to verify the rod positions.~~ 4

4 **INSERT 6**

(in excess of 24 steps in one direction, since the position was last determined), Required Action B.3 is still appropriate, but action must be initiated immediately to begin verifying that the rod is properly positioned, relative to its bank position. In this Required Action, the Completion Time only begins on discovery that both:

a. More than one RPI per bank is inoperable; and

b. A rod with an inoperable position indicator has been moved in excess of 24 steps in one direction since the last determination of the rod's position.

If at any time during the existence of Condition B (more than one RPI per bank inoperable), a rod with an inoperable position indicator has been moved in excess of 24 steps in one direction since the last determination of the rod's position, this Completion Time begins to be tracked.

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BASES

ACTIONS (continued)

C

~~D~~.1.1 and ~~D~~.1.2 4

Rod Position Indication

With one demand position indicator per bank inoperable, the rod positions can be determined by the ~~[D]RPI~~ System. Since normal power operation does not require excessive movement of rods, verification by administrative means that the rod position indicators are OPERABLE and the most withdrawn rod and the least withdrawn rod are ≤ 12 steps apart within the allowed Completion Time of once every ~~8~~ hours is adequate. 2 4

12

C

~~D~~.2 4

<

Reduction of THERMAL POWER to ~~≤~~ 50% RTP puts the core into a condition where rod position is not significantly affecting core peaking factor limits (Ref. 3). The allowed Completion Time of 8 hours provides an acceptable period of time to verify the rod positions ~~per Required Actions C.1.1 and C.1.2~~ or reduce power to ~~≤~~ 50% RTP. 4 4 1

<

D

~~E~~.1 4

If the Required Actions cannot be completed within the associated Completion Time, the plant must be brought to a MODE in which the requirement does not apply. To achieve this status, the plant must be brought to at least MODE 3 within 6 hours. The allowed Completion Time 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

SR 3.1.7.1

Rod Position Indication

Rod Position Indication

Verification that the ~~[D]RPI~~ agrees with the demand position within ~~[~~12~~]~~ steps ensures that the ~~[D]RPI~~ is operating correctly. ~~Since the [D]RPI does not display the actual shutdown rod positions between 18 and 210 steps, only points within the indicated ranges are required in comparison.~~ 2 1

INSERT 7

This Surveillance is performed prior to reactor criticality after each removal of the reactor head, as there is the potential for unnecessary plant transients if the SR were performed with the reactor at power.

1 **INSERT 7**

This verification will be performed at 20 steps and 215 steps of rod travel.

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BASES

REFERENCES

1. 10 CFR 50, Appendix A, GDC 13.

2. FSAR, ~~Chapter [15]~~ Section 7.7.1. (1) (2)

3. FSAR, Chapter ~~[~~15~~]~~. (1) (2)

U

JUSTIFICATION FOR DEVIATIONS
ITS 3.1.7 BASES, ROD POSITION INDICATION

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

2. The ISTS contains bracketed information and/or values that are generic to Westinghouse vintage plants. The brackets are removed and the proper plant specific information/value is inserted to reflect the current licensing basis.

3. ISTS 3.1.7 Required Action A.1 Bases contains a statement allowing an alternative method of satisfying Required Action A.1 by verifying that F_Q and $F^N_{\Delta H}$ are within the limits provided in the COLR, provided the nonindicating rods have not been moved. Additionally, ISTS 3.1.7 Required Action B.3 Bases also contains this statement. ITS 3.1.7 Required Action A.1 Bases and Required Action B.3 Bases do not contain this statement. The statement has been deleted because it allows an alternative method for satisfying Required Actions A.1 and B.3 that are not addressed in the Specification. Since the Technical Specification Bases are not allowed to modify the Technical Specifications, this statement has been deleted.

4. Changes are made to be consistent with changes made to the Specification.

5. Editorial changes made for enhanced clarity/consistency.

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Specific No Significant Hazards Considerations (NSHCs)

DETERMINATION OF NO SIGNIFICANT HAZARDS CONSIDERATIONS
ITS 3.1.7, ROD POSITION INDICATION

There are no specific No Significant Hazards Considerations for this Specification.

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ATTACHMENT 8

ITS 3.1.8, PHYSICS TESTS EXCEPTIONS – MODE 2

Current Technical Specification (CTS) Markup and Discussion of Changes (DOCs)

ITS — A01 — ITS 3.1.8

3.1 REACTIVITY CONTROL SYSTEMS

~~SPECIAL TEST EXCEPTIONS~~

3/4.10.3 PHYSICS TESTS — Exceptions – MODE 2 — A02

LIMITING CONDITION FOR OPERATION

INSERT 1 — A03

LCO 3.1.8

3.10.3 The limitations of Specifications 3.1.1.3, 3.1.1.4, 3.1.3.1, 3.1.3.5 and 3.1.3.6 may be suspended during the performance of PHYSICS TESTS provided:

a. The THERMAL POWER does not exceed 5% of RATED THERMAL POWER,

~~b. The reactor trip setpoints on the OPERABLE Intermediate and Power Range Nuclear Channels low trip setpoints are set at less than or equal to 25% of RATED THERMAL POWER, and~~ — A04

c. The Reactor Coolant System lowest operating loop temperature (T_{avg}) is greater than or equal to 531°F.

Add proposed LCO 3.1.8.b — M01

Applicability — APPLICABILITY: MODE 2.

During PHYSICS TESTS initiated in — A05

ACTION:

Add proposed ACTION A — M01

ACTION B — a. With the THERMAL POWER greater than 5% of RATED THERMAL POWER, immediately open the reactor trip breakers.

ACTION C / ACTION D — b. With a Reactor Coolant System operating loop temperature (T_{avg}) less than 531°F, restore T_{avg} to within its limits within 15 minutes or be in at least HOT STANDBY within the next 15 minutes.

SURVEILLANCE REQUIREMENTS

SR 3.1.8.3 — 4.10.3.1 The THERMAL POWER shall be determined to be less than or equal to 5% of RATED THERMAL POWER ~~at least once per hour during PHYSICS TESTS~~.

In accordance with the Surveillance Frequency Control Program — LA01

SR 3.1.8.1 — 4.10.3.2 Each Intermediate and Power Range Channel shall be subjected to a CHANNEL ~~FUNCTIONAL~~ TEST prior to initiating PHYSICS TESTS.

OPERATIONAL — M02

SR 3.1.8.2 — 4.10.3.3 The Reactor Coolant System temperature (T_{avg}) shall be determined to be greater than or equal to 531°F ~~at least once per 30 minutes during PHYSICS TESTS~~.

In accordance with the Surveillance Frequency Control Program — LA01

Add proposed SR 3.1.8.4 ~~with a Frequency of 24 hours~~ — M01

A03 **INSERT 1**

and the number of required channels for LCO 3.3.1, "RTS Instrumentation," Functions 2, 3, 6 and 16.e, may be reduced to 3 required channels,

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ITS — A01 — ITS 3.1.8

3.1 REACTIVITY CONTROL SYSTEMS

~~SPECIAL TEST EXCEPTIONS~~ — A02

3/4.10.3 PHYSICS TESTS — Exceptions – MODE 2

LIMITING CONDITION FOR OPERATION

INSERT 1 — A03

LCO 3.1.8 — 3.10.3 The limitations of Specifications 3.1.1.3, 3.1.1.4, 3.1.3.1, 3.1.3.5, and 3.1.3.6 may be suspended during the performance of PHYSICS TESTS provided:

a. The THERMAL POWER does not exceed 5% of RATED THERMAL POWER,

~~b. The reactor trip setpoints on the OPERABLE Intermediate and Power Range Nuclear Channels are set at less than or equal to 25% of RATED THERMAL POWER, and~~ — A04

c. The Reactor Coolant System lowest operating loop temperature (T_{avg}) is greater than or equal to 531°F.

Add proposed LCO 3.1.8.b — M01

Applicability — APPLICABILITY: During PHYSICS TESTS initiated in MODE 2. — A05

ACTION:

Add proposed ACTION A — M01

ACTION B — a. With the THERMAL POWER greater than 5% of RATED THERMAL POWER, immediately open the reactor trip breakers.

ACTION C / ACTION D — b. With a Reactor Coolant System operating loop temperature (T_{avg}) less than 531°F, restore (T_{avg}) to within its limit within 15 minutes or be in at least HOT STANDBY within the next 15 minutes.

SURVEILLANCE REQUIREMENTS

SR 3.1.8.3 — 4.10.3.1 The THERMAL POWER shall be determined to be less than or equal to 5% of RATED THERMAL POWER ~~at least once per hour during PHYSICS TESTS~~ In accordance with the Surveillance Frequency Control Program. — LA01

SR 3.1.8.1 — 4.10.3.2 Each Intermediate and Power Range Channel shall be subjected to a CHANNEL ~~FUNCTIONAL~~ OPERATIONAL TEST prior to initiating PHYSICS TESTS. — M02

SR 3.1.8.2 — 4.10.3.3 The Reactor Coolant System temperature (T_{avg}) shall be determined to be greater than or equal to 531°F ~~at least once per 30 minutes during PHYSICS TESTS~~ In accordance with the Surveillance Frequency Control Program. — LA01

Add proposed SR 3.1.8.4 ~~with a Frequency of 24 hours~~ In accordance with the Surveillance Frequency Control Program — M01

A03 **INSERT 1**

and the number of required channels for LCO 3.3.1, "RTS Instrumentation," Functions 2, 3, 6 and 16.e, may be reduced to 3 required channels,

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DISCUSSION OF CHANGES
ITS 3.1.8, PHYSICS TESTS EXCEPTIONS – MODE 2

ADMINISTRATIVE CHANGES

A01 In the conversion of the Sequoyah Nuclear Plant (SQN) Current Technical Specifications (CTS) to the plant specific Improved Technical Specifications (ITS), certain changes (wording preferences, editorial changes, reformatting, revised numbering, etc.) are made to obtain consistency with NUREG - 1431, Rev. 4.0, "Standard Technical Specifications - Westinghouse Plants" (ISTS) and additional Technical Specification Task Force (TSTF) travelers included in this submittal.

These changes are designated as administrative changes and are acceptable because they do not result in technical changes to the CTS.

A02 CTS Section 3.10 is titled SPECIAL TEST EXCEPTIONS. CTS Specification 3.10.3 is titled PHYSICS TESTS. ITS Section 3.1 is titled REACTIVITY CONTROL SYSTEMS. ITS Specification 3.1.8 is titled PHYSICS TESTS Exceptions – MODE 2. This changes the CTS by changing the title of the Section and the Specification.

This change is acceptable because the requirements have not changed. This change is to the titles only. This change is designated as administrative because it does not result in a technical change to the CTS.

A03 CTS 3.10.3 states the limitations of certain Specifications may be suspended during the performance of PHYSICS TESTS. ITS LCO 3.1.8 includes an allowance to reduce the required number of channels for ITS LCO 3.3.1, "Reactor Trip System (RTS) Instrumentation," Function 2 (Power Range Neutron Flux), Function 3 (Power Range Neutron Flux Rate), Function 6, (Overtemperature ΔT), and Function 16.e (Power Range Neutron Flux, P-10) from "4" to "3." This changes CTS 3.10.3 by adding an allowance to reduce the number of required RTS channels from "4" to "3" for specified Functions.

The purpose of CTS 3.10.3 is to allow some flexibility during the performance of PHYSICS TESTS while ensuring appropriate limitations are in place to help ensure safe operation. This change is acceptable because the minimum channels required for OPERABILITY for these RTS Functions in CTS Table 3.3-1 is currently "3." This allowance is needed since the "Required Channels" in ITS 3.3.1, Reactor Trip System Instrumentation, is "4." The change from CTS "MINIMUM CHANNELS OPERABLE" to ITS "Required Channels is discussed in Discussion of Changes for ITS 3.3.1. This change is designated as administrative because it does not result in technical changes to the CTS.

A04 CTS 3.10.3.b states that the limitations of certain Specifications may be suspended during the performance of PHYSICS TESTS provided the reactor trip setpoints on the OPERABLE Intermediate and Power Range Nuclear Channels are set at less than or equal to 25% of RATED THERMAL POWER. ITS 3.1.8 states the requirements of certain Specifications may be suspended but contains no requirements on the Intermediate and Power Range Channels. The ITS contains the same requirements on the Intermediate and Power Range Channels in ITS LCO 3.3.1. This changes the CTS by eliminating the requirement that the Reactor Trip Setpoints on the OPERABLE Intermediate and Power Range

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DISCUSSION OF CHANGES
ITS 3.1.8, PHYSICS TESTS EXCEPTIONS – MODE 2

Channels are set at ≤ 25% of RATED THERMAL POWER from the test exception.

This change is acceptable because the Reactor Trip Setpoints on the OPERABLE Intermediate and Power Range Channels are contained in ITS LCO 3.3.1, "Reactor Trip System (RTS) Instrumentation." Repeating that requirement in the test exception LCO is unnecessary. This change is designated as administrative as it eliminates a repeated requirement from the CTS, resulting in no technical change to the CTS.

A05 CTS 3.10.3 is applicable in MODE 2. ITS 3.1.8 is applicable during PHYSICS TESTS initiated in MODE 2. This changes the CTS such that the Specification is applicable in MODE 2 only when a PHYSICS TEST is initiated.

The purpose of ITS 3.1.8 Applicability is to ensure the ACTIONS contained in the Specification are followed. The wording of the CTS appears to be contradictory because, if THERMAL POWER exceeds 5% RTP, then the test exception Specification Applicability is exited and the Actions no longer apply. However, it is clear that the CTS Action should be applied if THERMAL POWER exceeds 5% RTP and PHYSICS TESTS are in progress. The ITS Applicability eliminates this apparent contradiction and allows the test exception Conditions and Required Actions to be applied when the LCO is not met. This is consistent with the wording of the CTS ACTION. This change is designated as administrative because it clarifies the current wording of the Specification with no change in intent.

MORE RESTRICTIVE CHANGES

M01 CTS 3.10.3 states that limitations of certain Specifications may be suspended during the performance of PHYSICS TESTS and provides restrictions that must be followed when utilizing the CTS exception. ITS 3.1.8 adds a requirement that SHUTDOWN MARGIN must be within the limits provided in the COLR. A Surveillance (ITS SR 3.1.8.4), to verify the SHUTDOWN MARGIN every 24 hours, and an ACTION (ITS 3.1.8 ACTION A), to follow if the SHUTDOWN MARGIN is not met, are also added. See DOC LA01 for the discussion on moving the 24 hours Frequency to the Surveillance Frequency Control Program. This changes the CTS by imposing an additional requirement on the application of the test exception LCO.

This change is acceptable because it imposes reasonable restrictions on the performance of PHYSICS TESTS when the control rod and RCS minimum temperature Specifications are allowed to be violated. The Bases for ITS 3.1.1, "SHUTDOWN MARGIN," states that during MODE 2, the SHUTDOWN MARGIN is ensured by compliance with the rod insertion limit Specifications. Under this test exception, those limits are allowed to be violated. This change is designated as more restrictive because it imposes additional restrictions not found in the CTS.

M02 CTS 4.10.3.2 requires performance of a CHANNEL FUNCTIONAL TEST on each Intermediate and Power Range Channel. ITS SR 3.1.8.1 requires

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performance of a CHANNEL OPERATIONAL TEST (COT) on each intermediate and power range channel. This changes the CTS by requiring a COT instead of a CHANNEL FUNCTIONAL TEST.

CTS defines a CHANNEL FUNCTIONAL TEST as the injection of a simulated signal into the sensor as close to the sensor as practicable to verify OPERABILITY. ITS defines a COT as the injection of an actual or simulated signal into the channel as close to the sensor as practicable to verify OPERABILITY of all devices in the channel required for channel OPERABILITY. The COT shall include adjustments, as necessary, of the required alarm, interlock, and trip setpoints required for channel OPERABILITY such that the setpoints are within the necessary range and accuracy. This changes the CTS by requiring adjustments of the setpoints so that the Intermediate and Power Range Channel are within the necessary range and accuracy. This change is designated as more restrictive because it imposes additional requirements on testing.

RELOCATED SPECIFICATIONS

None

REMOVED DETAIL CHANGES

LA01 *(Type 5 – Removal of SR Frequency to the Surveillance Frequency Control Program)* CTS 4.10.3.1 requires determining that the THERMAL POWER is less than or equal to 5% of RATED THERMAL POWER at least once per hour during PHYSICS TESTS. CTS 4.10.3.3 requires determining that the Reactor Coolant System temperature (T_{avg}) is greater than or equal to 531°F at least once per 30 minutes during PHYSICS TESTS. ITS SR 3.1.8.2 and ITS SR 3.1.8.3 requires similar Surveillances and specifies the periodic Frequencies as, "In accordance with the Surveillance Frequency Control Program." This changes the CTS by moving the specified Frequencies for these SR and associated Bases to the Surveillance Frequency Control Program.

The removal of these details related to Surveillance Requirement Frequencies from the Technical Specifications is acceptable, because this type of information is not necessary to be included in the Technical Specifications to provide adequate protection of public health and safety. The existing Surveillance Frequencies are removed from Technical Specifications and placed under licensee control pursuant to the methodology described in NEI 04-10. A new program (Surveillance Frequency Control Program) is being added to the Administrative Controls section of the Technical Specifications describing the control of Surveillance Frequencies. The surveillance test requirements remain in the Technical Specifications. The control of changes to the Surveillance Frequencies will be in accordance with the Surveillance Frequency Control Program. The Program shall ensure that Surveillance Requirements specified in the Technical Specifications are performed at intervals sufficient to assure the associated Limiting Conditions for Operation are met. This change is designated

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DISCUSSION OF CHANGES
ITS 3.1.8, PHYSICS TESTS EXCEPTIONS – MODE 2

as a less restrictive removal of detail change, because the Surveillance Frequencies are being removed from the Technical Specifications.

LESS RESTRICTIVE CHANGES

None

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Improved Standard Technical Specifications (ISTS) Markup and Justification for Deviations (JFDs)

3.1 REACTIVITY CONTROL SYSTEMS

3.1.8 PHYSICS TESTS Exceptions – MODE 2

3.10.3

LCO 3.1.8 During the performance of PHYSICS TESTS, the requirements of:

LCO 3.1.3, "Moderator Temperature Coefficient,";
LCO 3.1.4, "Rod Group Alignment Limits,";
LCO 3.1.5, "Shutdown Bank Insertion Limits,";
LCO 3.1.6, "Control Bank Insertion Limits," and
LCO 3.4.2, "RCS Minimum Temperature for Criticality" 4

may be suspended and the number of required channels for LCO 3.3.1, "RTS Instrumentation," Functions 2, 3, 6 and 18.e, 6 may be reduced to 3 required channels, provided: 2

a. RCS lowest loop average temperature is ≥ [531]°F, 1

b. SDM is within the limits specified in the COLR, and

c. THERMAL POWER is ≤ 5% RTP.

Applicability

APPLICABILITY: During PHYSICS TESTS initiated in MODE 2.

ACTIONS

	CONDITION	REQUIRED ACTION	COMPLETION TIME
DOC M01	A. SDM not within limit.	A.1 Initiate boration to restore SDM to within limit. AND A.2 Suspend PHYSICS TESTS exceptions.	15 minutes 1 hour
ACTION a	B. THERMAL POWER not within limit.	B.1 Open reactor trip breakers.	Immediately
ACTION b	C. RCS lowest loop average temperature not within limit.	C.1 Restore RCS lowest loop average temperature to within limit.	15 minutes

ACTIONS (continued)

	CONDITION	REQUIRED ACTION	COMPLETION TIME
ACTION b	D. Required Action and associated Completion Time of Condition C not met.	D.1 Be in MODE 3.	15 minutes

SURVEILLANCE REQUIREMENTS

	SURVEILLANCE		FREQUENCY	
4.10.3.2	SR 3.1.8.1	Perform a CHANNEL OPERATIONAL TEST on power range and intermediate range channels per [SR 3.3.1.7, SR 3.3.1.8, and Table 3.3.1-1].	Prior to initiation of PHYSICS TESTS	1
4.10.3.3	SR 3.1.8.2	Verify the RCS lowest loop average temperature is ≥ [531]°F.	[30 minutes OR In accordance with the Surveillance Frequency Control Program]	1 3 3
4.10.3.1	SR 3.1.8.3	Verify THERMAL POWER is $\leq$ 5% RTP.	[30 minutes OR In accordance with the Surveillance Frequency Control Program]	3 3

SURVEILLANCE REQUIREMENTS (continued)

	SURVEILLANCE	FREQUENCY	
DOC M01	SR 3.1.8.4 Verify SDM is within the limits specified in the COLR.	~~[24 hours~~ ~~OR~~ In accordance with the Surveillance Frequency Control Program ~~]~~	3

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3.1 REACTIVITY CONTROL SYSTEMS

3.1.8 PHYSICS TESTS Exceptions – MODE 2

3.10.3

LCO 3.1.8 During the performance of PHYSICS TESTS, the requirements of:

LCO 3.1.3, "Moderator Temperature Coefficient,";
LCO 3.1.4, "Rod Group Alignment Limits,";
LCO 3.1.5, "Shutdown Bank Insertion Limits,";
LCO 3.1.6, "Control Bank Insertion Limits,"; and
LCO 3.4.2, "RCS Minimum Temperature for Criticality" (4)

may be suspended and the number of required channels for LCO 3.3.1, "RTS Instrumentation," Functions 2, 3, 6 and 186.e, may be reduced to 3 required channels, provided: (2)

a. RCS lowest loop average temperature is ≥ [531]°F, (1)

b. SDM is within the limits specified in the COLR, and

c. THERMAL POWER is ≤ 5% RTP.

Applicability

APPLICABILITY: During PHYSICS TESTS initiated in MODE 2.

ACTIONS

	CONDITION	REQUIRED ACTION	COMPLETION TIME
DOC M01	A. SDM not within limit.	A.1 Initiate boration to restore SDM to within limit. AND A.2 Suspend PHYSICS TESTS exceptions.	15 minutes 1 hour
ACTION a	B. THERMAL POWER not within limit.	B.1 Open reactor trip breakers.	Immediately
ACTION b	C. RCS lowest loop average temperature not within limit.	C.1 Restore RCS lowest loop average temperature to within limit.	15 minutes

ACTIONS (continued)

	CONDITION	REQUIRED ACTION	COMPLETION TIME
ACTION b	D. Required Action and associated Completion Time of Condition C not met.	D.1 Be in MODE 3.	15 minutes

SURVEILLANCE REQUIREMENTS

	SURVEILLANCE		FREQUENCY	
4.10.3.2	SR 3.1.8.1	Perform a CHANNEL OPERATIONAL TEST on power range and intermediate range channels per [SR 3.3.1.7, SR 3.3.1.8, and Table 3.3.1-1].	Prior to initiation of PHYSICS TESTS	1
4.10.3.3	SR 3.1.8.2	Verify the RCS lowest loop average temperature is ≥ [531]°F.	~~[30 minutes~~ ~~OR~~ In accordance with the Surveillance Frequency Control Program]	1 3 3
4.10.3.1	SR 3.1.8.3	Verify THERMAL POWER is ≤ 5% RTP.	~~[30 minutes~~ ~~OR~~ In accordance with the Surveillance Frequency Control Program]	3 3

SURVEILLANCE REQUIREMENTS (continued)

	SURVEILLANCE	FREQUENCY
DOC M01 SR 3.1.8.4	Verify SDM is within the limits specified in the COLR.	~~[24 hours~~ ③ ~~OR~~ In accordance with the Surveillance Frequency Control Program ~~]~~ ③

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JUSTIFICATION FOR DEVIATIONS
ITS 3.1.8, PHYSICS TEST EXCEPTIONS – MODE 2

1. The ISTS contains bracketed information and/or values that are generic to Westinghouse vintage plants. The brackets are removed and the proper plant specific information/value is inserted to reflect the current licensing basis.

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

3. ISTS SR 3.1.8.2, SR 3.1.8.3, and SR 3.1.8.4 provide two options for controlling the Frequencies of Surveillance Requirements. SQN is proposing to control the Surveillance Frequencies under the Surveillance Frequency Control Program.

4. The punctuation corrections have been made consistent with the Writers Guide for the Improved Standard Technical Specifications, NEI 01-03, Section 5.1.3.

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Improved Standard Technical Specifications (ISTS) Bases Markup and Bases Justification for Deviations (JFDs)

B 3.1 REACTIVITY CONTROL SYSTEMS

B 3.1.8 PHYSICS TESTS Exceptions - MODE 2

BASES

BACKGROUND

The primary purpose of the MODE 2 PHYSICS TESTS exceptions is to permit relaxations of existing LCOs to allow certain PHYSICS TESTS to be performed.

Section XI of 10 CFR 50, Appendix B (Ref. 1), requires that a test program be established to ensure that structures, systems, and components will perform satisfactorily in service. ~~All~~ The functions necessary to ensure that the specified design conditions are not exceeded during normal operation and anticipated operational occurrences must be tested. This testing is an integral part of the design, construction, and operation of the plant. Requirements for notification of the NRC, for the purpose of conducting tests and experiments, are specified in 10 CFR 50.59 (Ref. 2). 5

The key objectives of a test program are to (Ref. 3):

a. Ensure that the facility has been adequately designed,

b. Validate the analytical models used in the design and analysis,

c. Verify the assumptions used to predict unit response,

d. Ensure that installation of equipment in the facility has been accomplished in accordance with the design, and

e. Verify that the operating and emergency procedures are adequate.

To accomplish these objectives, testing is performed prior to initial criticality, during startup, during low power operations, during power ascension, at high power, and after each refueling. The PHYSICS TESTS requirements for reload fuel cycles ensure that the operating characteristics of the core are consistent with the design predictions and that the core can be operated as designed (Ref. 4).

PHYSICS TESTS procedures are written and approved in accordance with established formats. The procedures include ~~all~~ the information necessary to permit a detailed execution of the testing required to ensure that the design intent is met. PHYSICS TESTS are performed in accordance with these procedures and test results are approved prior to continued power escalation and long term power operation. 5

BASES

BACKGROUND (continued)

The PHYSICS TESTS required for reload fuel cycles (Ref. 4) in MODE 2 are listed below:

a. Critical Boron Concentration - Control Rods Withdrawn, ; 6

b. Critical Boron Concentration - Control Rods Inserted; ;

c. Control Rod Worth; ; and 1

d. Isothermal Temperature Coefficient (ITC), and . 1

e. Neutron Flux Symmetry. 1

The first four tests are performed in MODE 2, and the last test can be performed in either MODE 1 or 2. These and other supplementary tests may be required to calibrate the nuclear instrumentation or to diagnose operational problems. These tests may cause the operating controls and process variables to deviate from their LCO requirements during their performance. 1

[a. The Critical Boron Concentration - Control Rods Withdrawn Test measures the critical boron concentration at hot zero power (HZP). With all rods out, the lead control bank is at or near its fully withdrawn position. HZP is where the core is critical (k_{eff} = 1.0), and the Reactor Coolant System (RCS) is at design temperature and pressure for zero power. Performance of this test should not violate any of the referenced LCOs. 2

b. The Critical Boron Concentration - Control Rods Inserted Test measures the critical boron concentration at HZP, with a bank having a worth of at least 1% Δk/k when fully inserted into the core. This test is used to measure the boron reactivity coefficient. With the core at HZP and all banks fully withdrawn, the boron concentration of the reactor coolant is gradually lowered in a continuous manner. The selected bank is then inserted to make up for the decreasing boron concentration until the selected bank has been moved over its entire range of travel. The reactivity resulting from each incremental bank movement is measured with a reactivity computer. The difference between the measured critical boron concentration with all rods fully withdrawn and with the bank inserted is determined. The boron reactivity coefficient is determined by dividing the measured bank worth by the measured boron concentration difference. Performance of this test could violate LCO 3.1.4, "Rod Group Alignment Limits," LCO 3.1.5, "Shutdown Bank Insertion Limit," or LCO 3.1.6, "Control Bank Insertion Limits."

BASES

BACKGROUND (continued)

c. The Control Rod Worth Test is used to measure the reactivity worth of selected control banks. This test is performed at HZP and has three alternative methods of performance. The first method, the Boron Exchange Method, varies the reactor coolant boron concentration and moves the selected control bank in response to the changing boron concentration. The reactivity changes are measured with a reactivity computer. This sequence is repeated for the remaining control banks. The second method, the Rod Swap Method, measures the worth of a predetermined reference bank using the Boron Exchange Method above. The reference bank is then nearly fully inserted into the core. The selected bank is then inserted into the core as the reference bank is withdrawn. The HZP critical conditions are then determined with the selected bank fully inserted into the core. The worth of the selected bank is inferred, based on the position of the reference bank with respect to the selected bank. This sequence is repeated as necessary for the remaining control banks. The third method, the Boron Endpoint Method, moves the selected control bank over its entire length of travel and then varies the reactor coolant boron concentration to achieve HZP criticality again. The difference in boron concentration is the worth of the selected control bank. This sequence is repeated for the remaining control banks. Performance of this test could violate LCO 3.1.4, LCO 3.1.5, or LCO 3.1.6.

d. The ITC Test measures the ITC of the reactor. This test is performed at HZP and has two methods of performance. The first method, the Slope Method, varies RCS temperature in a slow and continuous manner. The reactivity change is measured with a reactivity computer as a function of the temperature change. The ITC is the slope of the reactivity versus the temperature plot. The test is repeated by reversing the direction of the temperature change, and the final ITC is the average of the two calculated ITCs. The second method, the Endpoint Method, changes the RCS temperature and measures the reactivity at the beginning and end of the temperature change. The ITC is the total reactivity change divided by the total temperature change. The test is repeated by reversing the direction of the temperature change, and the final ITC is the average of the two calculated ITCs. Performance of this test could violate LCO 3.4.2, "RCS Minimum Temperature for Criticality."

~~e. The Flux Symmetry Test measures the degree of azimuthal symmetry of the neutron flux at as low a power level as practical, depending on the test method employed. This test can be performed at HZP (Control Rod Worth Symmetry Method) or at ≤ 30% RTP (Flux Distribution Method). The Control Rod Worth Symmetry~~ 1

BASES

BACKGROUND (continued)

Method inserts a control bank, which can then be withdrawn to compensate for the insertion of a single control rod from a symmetric set. The symmetric rods of each set are then tested to evaluate the symmetry of the control rod worth and neutron flux (power distribution). A reactivity computer is used to measure the control rod worths. Performance of this test could violate LCO 3.1.4, LCO 3.1.5, or LCO 3.1.6. The Flux Distribution Method uses the incore flux detectors to measure the azimuthal flux distribution at selected locations with the core at ≤ 30% RTP.] 1 2

APPLICABLE SAFETY ANALYSES

Core Operating Limit Methodology for Westinghouse Designed PWRs

The fuel is protected by LCOs that preserve the initial conditions of the core assumed during the safety analyses. The methods for development of the LCOs that are excepted by this LCO are described in the Westinghouse Reload Safety Evaluation Methodology Report (Ref. 5). 1 The above mentioned PHYSICS TESTS, and other tests that may be required to calibrate nuclear instrumentation or to diagnose operational problems, may require the operating control or process variables to deviate from their LCO limitations.

U

The FSAR defines requirements for initial testing of the facility, including PHYSICS TESTS. Tables [14.1-1 and 14.1-2] summarize the zero, low power, and power tests. Requirements for reload fuel cycle PHYSICS TESTS are defined in ANSI/ANS-19.6.1-1985 (Ref. 4). Although these PHYSICS TESTS are generally accomplished within the limits for all LCOs, conditions may occur when one or more LCOs must be suspended to make completion of PHYSICS TESTS possible or practical. This is acceptable as long as the fuel design criteria are not violated. When one or more of the requirements specified in LCO 3.1.3, "Moderator Temperature Coefficient (MTC)," LCO 3.1.4, LCO 3.1.5, LCO 3.1.6, and LCO 3.4.2 are suspended for PHYSICS TESTS, the fuel design criteria are preserved as long as the power level is limited to ≤ 5% RTP, the reactor coolant temperature is kept ≥ 531°F, and SDM is within the limits provided in the COLR.

s 1997 the 1 2 5 1 5

The PHYSICS TESTS include measurement of core nuclear parameters or the exercise of control components that affect process variables. Among the process variables involved are AFD and QPTR, which represent initial conditions of the unit safety analyses. Also involved are the movable control components (control and shutdown rods), which are required to shut down the reactor. The limits for these variables are specified for each fuel cycle in the COLR.

representing that 5

BASES

APPLICABLE SAFETY ANALYSES (continued)

As described in LCO 3.0.7, compliance with Test Exception LCOs is optional, and therefore no criteria of 10 CFR 50.36(c)(2)(ii) apply. Test Exception LCOs provide flexibility to perform certain operations by appropriately modifying requirements of other LCOs. A discussion of the criteria satisfied for the other LCOs is provided in their respective Bases.

~~Reference 6 allows special test exceptions (STEs) to be included as part of the LCO that they affect. It was decided, however, to retain this STE as a separate LCO because it was less cumbersome and provided additional clarity.~~ (1)

LCO

This LCO allows the reactor parameters of MTC and minimum temperature for criticality to be outside their specified limits. In addition, it allows selected control and shutdown rods to be positioned outside of their specified alignment and insertion limits. One power range neutron flux channel may be bypassed, reducing the number of required channels from 4 to 3. Operation beyond specified limits is permitted for the purpose of performing PHYSICS TESTS and poses no threat to fuel integrity, provided the SRs are met.

The requirements of LCO 3.1.3, LCO 3.1.4, LCO 3.1.5, LCO 3.1.6, and LCO 3.4.2 may be suspended and the number of required channels for LCO 3.3.1, "RTS Instrumentation," Functions 2, 3, 6 and 1~~8~~6 may be reduced to 3 required channels during the performance of PHYSICS TESTS provided: (1)

a. RCS lowest loop average temperature is ≥ ~~[~~531~~]~~°F, (2)

b. SDM is within the limits provided in the COLR, and

c. THERMAL POWER is ≤ 5% RTP.

APPLICABILITY

This LCO is applicable when performing low power PHYSICS TESTS. The Applicability is stated as "during PHYSICS TESTS initiated in MODE 2" to ensure that the 5% RTP maximum power level is not exceeded. Should the THERMAL POWER exceed 5% RTP, and consequently the unit enter MODE 1, this Applicability statement prevents exiting this Specification and its Required Actions.

BASES

ACTIONS

A.1 and A.2

If the SDM requirement is not met, boration must be initiated promptly. A Completion Time of 15 minutes is adequate for an operator to correctly align and start the required systems and components. The operator should begin boration with the best source available for the plant conditions. Boration will be continued until SDM is within limit.

Suspension of PHYSICS TESTS exceptions requires restoration of each of the applicable LCOs to within specification.

B.1

When THERMAL POWER is > 5% RTP, the only acceptable action is to open the reactor trip breakers (RTBs) to prevent operation of the reactor beyond its design limits. Immediately opening the RTBs will shut down the reactor and prevent operation of the reactor outside of its design limits.

C.1

When the RCS lowest T_{avg} is < 531°F, the appropriate action is to restore T_{avg} to within its specified limit. The allowed Completion Time of 15 minutes provides time for restoring T_{avg} to within limits without allowing the plant to remain in an unacceptable condition for an extended period of time. Operation with the reactor critical and with temperature below 531°F could violate the assumptions for accidents analyzed in the safety analyses.

D.1

If the Required Actions cannot be completed within the associated Completion Time, the plant must be brought to a MODE in which the requirement does not apply. To achieve this status, the plant must be brought to at least MODE 3 within an additional 15 minutes. The Completion Time of 15 additional minutes is reasonable, based on operating experience, for reaching MODE 3 in an orderly manner and without challenging plant systems.

BASES

SURVEILLANCE REQUIREMENTS

SR 3.1.8.1

The power range and intermediate range neutron detectors must be verified to be OPERABLE in MODE 2 by LCO 3.3.1, "Reactor Trip System (RTS) Instrumentation." A CHANNEL OPERATIONAL TEST is performed on each power range and intermediate range channel prior to initiation of the PHYSICS TESTS. This will ensure that the RTS is properly aligned to provide the required degree of core protection during the performance of the PHYSICS TESTS.

SR 3.1.8.2

Verification that the RCS lowest loop T_{avg} is ≥ 531°F will ensure that the unit is not operating in a condition that could invalidate the safety analyses. [Verification of the RCS temperature at a Frequency of 30 minutes during the performance of the PHYSICS TESTS will ensure that the initial conditions of the safety analyses are not violated. 3

OR

The Surveillance Frequency is controlled under the Surveillance Frequency Control Program.

-----REVIEWER'S NOTE-----
Plants controlling Surveillance Frequencies under a Surveillance Frequency Control Program should utilize the appropriate Frequency description, given above, and the appropriate choice of Frequency in the Surveillance Requirement. 4
-----] 3

SR 3.1.8.3

Verification that the THERMAL POWER is ≤ 5% RTP will ensure that the plant is not operating in a condition that could invalidate the safety analyses. [Verification of the THERMAL POWER at a Frequency of 30 minutes during the performance of the PHYSICS TESTS will ensure that the initial conditions of the safety analyses are not violated. 3

OR

The Surveillance Frequency is controlled under the Surveillance Frequency Control Program.

BASES

SURVEILLANCE REQUIREMENTS (continued)

----------------------------------REVIEWER'S NOTE----------------------------------
Plants controlling Surveillance Frequencies under a Surveillance Frequency Control Program should utilize the appropriate Frequency description, given above, and the appropriate choice of Frequency in the Surveillance Requirement.
---] 4 3

SR 3.1.8.4

The SDM is verified by performing a reactivity balance calculation, considering the following reactivity effects:

a. RCS boron concentration,

b. Control bank position,

c. RCS average temperature,

d. Fuel burnup based on gross thermal energy generation,

e. Xenon concentration,

f. Samarium concentration,

g. Isothermal temperature coefficient (ITC), when below the point of adding heat (POAH),

h. Moderate Moderator temperature defect, when above the POAH, and 1

i. Doppler defect, when above the POAH.

Using the ITC accounts for Doppler reactivity in this calculation when the reactor is subcritical or critical but below the POAH, and the fuel temperature will be changing at the same rate as the RCS.

[The Frequency of 24 hours is based on the generally slow change in required boron concentration and on the low probability of an accident occurring without the required SDM. 3

OR

The Surveillance Frequency is controlled under the Surveillance Frequency Control Program.

BASES

SURVEILLANCE REQUIREMENTS (continued)

-----------------------------------REVIEWER'S NOTE-----------------------------------
Plants controlling Surveillance Frequencies under a Surveillance Frequency Control Program should utilize the appropriate Frequency description, given above, and the appropriate choice of Frequency in the Surveillance Requirement.
--]

4

3

REFERENCES

1. 10 CFR 50, Appendix B, Section XI.
2. 10 CFR 50.59.
3. Regulatory Guide 1.68, Revision 2, August, 1978.
4. ANSI/ANS-19.6.1-1985, December 13, 1985. 1997 1
5. WCAP-9273-NP-A, "Westinghouse Reload Safety Evaluation Methodology Report," July 1985. BAW-10163P-A, "Core Operating Limit Methodology for Westinghouse Designed PWRs," June 1989 1
6. WCAP-11618, including Addendum 1, April 1989. 1

B 3.1 REACTIVITY CONTROL SYSTEMS

B 3.1.8 PHYSICS TESTS Exceptions - MODE 2

BASES

BACKGROUND

The primary purpose of the MODE 2 PHYSICS TESTS exceptions is to permit relaxations of existing LCOs to allow certain PHYSICS TESTS to be performed.

Section XI of 10 CFR 50, Appendix B (Ref. 1), requires that a test program be established to ensure that structures, systems, and components will perform satisfactorily in service. ~~All~~ The functions necessary to ensure that the specified design conditions are not exceeded during normal operation and anticipated operational occurrences must be tested. This testing is an integral part of the design, construction, and operation of the plant. Requirements for notification of the NRC, for the purpose of conducting tests and experiments, are specified in 10 CFR 50.59 (Ref. 2). 5

The key objectives of a test program are to (Ref. 3):

a. Ensure that the facility has been adequately designed,

b. Validate the analytical models used in the design and analysis,

c. Verify the assumptions used to predict unit response,

d. Ensure that installation of equipment in the facility has been accomplished in accordance with the design, and

e. Verify that the operating and emergency procedures are adequate.

To accomplish these objectives, testing is performed prior to initial criticality, during startup, during low power operations, during power ascension, at high power, and after each refueling. The PHYSICS TESTS requirements for reload fuel cycles ensure that the operating characteristics of the core are consistent with the design predictions and that the core can be operated as designed (Ref. 4).

PHYSICS TESTS procedures are written and approved in accordance with established formats. The procedures include ~~all~~ the information necessary to permit a detailed execution of the testing required to ensure that the design intent is met. PHYSICS TESTS are performed in accordance with these procedures and test results are approved prior to continued power escalation and long term power operation. 5

BASES

BACKGROUND (continued)

The PHYSICS TESTS required for reload fuel cycles (Ref. 4) in MODE 2 are listed below:

a. Critical Boron Concentration - Control Rods Withdrawn, ; 6

b. Critical Boron Concentration - Control Rods Inserted;

c. Control Rod Worth; ; and 1

d. Isothermal Temperature Coefficient (ITC), and . 1

e. Neutron Flux Symmetry. 1

The first four tests are performed in MODE 2, and the last test can be performed in either MODE 1 or 2. These and other supplementary tests may be required to calibrate the nuclear instrumentation or to diagnose operational problems. These tests may cause the operating controls and process variables to deviate from their LCO requirements during their performance. 1

[a. The Critical Boron Concentration - Control Rods Withdrawn Test measures the critical boron concentration at hot zero power (HZP). With all rods out, the lead control bank is at or near its fully withdrawn position. HZP is where the core is critical (k_{eff} = 1.0), and the Reactor Coolant System (RCS) is at design temperature and pressure for zero power. Performance of this test should not violate any of the referenced LCOs. 2

b. The Critical Boron Concentration - Control Rods Inserted Test measures the critical boron concentration at HZP, with a bank having a worth of at least 1% Δk/k when fully inserted into the core. This test is used to measure the boron reactivity coefficient. With the core at HZP and all banks fully withdrawn, the boron concentration of the reactor coolant is gradually lowered in a continuous manner. The selected bank is then inserted to make up for the decreasing boron concentration until the selected bank has been moved over its entire range of travel. The reactivity resulting from each incremental bank movement is measured with a reactivity computer. The difference between the measured critical boron concentration with all rods fully withdrawn and with the bank inserted is determined. The boron reactivity coefficient is determined by dividing the measured bank worth by the measured boron concentration difference. Performance of this test could violate LCO 3.1.4, "Rod Group Alignment Limits," LCO 3.1.5, "Shutdown Bank Insertion Limit," or LCO 3.1.6, "Control Bank Insertion Limits."

BASES

BACKGROUND (continued)

c. The Control Rod Worth Test is used to measure the reactivity worth of selected control banks. This test is performed at HZP and has three alternative methods of performance. The first method, the Boron Exchange Method, varies the reactor coolant boron concentration and moves the selected control bank in response to the changing boron concentration. The reactivity changes are measured with a reactivity computer. This sequence is repeated for the remaining control banks. The second method, the Rod Swap Method, measures the worth of a predetermined reference bank using the Boron Exchange Method above. The reference bank is then nearly fully inserted into the core. The selected bank is then inserted into the core as the reference bank is withdrawn. The HZP critical conditions are then determined with the selected bank fully inserted into the core. The worth of the selected bank is inferred, based on the position of the reference bank with respect to the selected bank. This sequence is repeated as necessary for the remaining control banks. The third method, the Boron Endpoint Method, moves the selected control bank over its entire length of travel and then varies the reactor coolant boron concentration to achieve HZP criticality again. The difference in boron concentration is the worth of the selected control bank. This sequence is repeated for the remaining control banks. Performance of this test could violate LCO 3.1.4, LCO 3.1.5, or LCO 3.1.6.

d. The ITC Test measures the ITC of the reactor. This test is performed at HZP and has two methods of performance. The first method, the Slope Method, varies RCS temperature in a slow and continuous manner. The reactivity change is measured with a reactivity computer as a function of the temperature change. The ITC is the slope of the reactivity versus the temperature plot. The test is repeated by reversing the direction of the temperature change, and the final ITC is the average of the two calculated ITCs. The second method, the Endpoint Method, changes the RCS temperature and measures the reactivity at the beginning and end of the temperature change. The ITC is the total reactivity change divided by the total temperature change. The test is repeated by reversing the direction of the temperature change, and the final ITC is the average of the two calculated ITCs. Performance of this test could violate LCO 3.4.2, "RCS Minimum Temperature for Criticality."

~~e. The Flux Symmetry Test measures the degree of azimuthal symmetry of the neutron flux at as low a power level as practical, depending on the test method employed. This test can be performed at HZP (Control Rod Worth Symmetry Method) or at ≤ 30% RTP (Flux Distribution Method). The Control Rod Worth Symmetry~~ 1

BASES

BACKGROUND (continued)

~~Method inserts a control bank, which can then be withdrawn to compensate for the insertion of a single control rod from a symmetric set. The symmetric rods of each set are then tested to evaluate the symmetry of the control rod worth and neutron flux (power distribution). A reactivity computer is used to measure the control rod worths. Performance of this test could violate LCO 3.1.4, LCO 3.1.5, or LCO 3.1.6. The Flux Distribution Method uses the incore flux detectors to measure the azimuthal flux distribution at selected locations with the core at ≤ 30% RTP.]~~ 1 2

APPLICABLE SAFETY ANALYSES

Core Operating Limit Methodology for Westinghouse Designed PWRs

The fuel is protected by LCOs that preserve the initial conditions of the core assumed during the safety analyses. The methods for development of the LCOs that are excepted by this LCO are described in the ~~Westinghouse Reload Safety Evaluation Methodology Report~~ (Ref. 5). 1 The above mentioned PHYSICS TESTS, and other tests that may be required to calibrate nuclear instrumentation or to diagnose operational problems, may require the operating control or process variables to deviate from their LCO limitations.

U 3

The FSAR defines requirements for initial testing of the facility, including PHYSICS TESTS. Table~~s~~ ~~[~~14.1-~~1 and 14.1-2]~~ summarize the zero, low power, and power tests. Requirements for reload fuel cycle PHYSICS TESTS are defined in ANSI/ANS-19.6.1-~~1985~~ (Ref. 4). Although these PHYSICS TESTS are generally accomplished within the limits for ~~all~~ LCOs, conditions may occur when one or more LCOs must be suspended to make completion of PHYSICS TESTS possible or practical. This is acceptable as long as the fuel design criteria are not violated. When one or more of the requirements specified in LCO 3.1.3, "Moderator Temperature Coefficient (MTC)," LCO 3.1.4, LCO 3.1.5, LCO 3.1.6, and LCO 3.4.2 are suspended for PHYSICS TESTS, the fuel design criteria are preserved as long as the power level is limited to ≤ 5% RTP, the reactor coolant temperature is kept ≥ 531°F, and SDM is within the limits provided in the COLR.

1997 s the 1 2 5 1 5

The PHYSICS TESTS include measurement of core nuclear parameters or the exercise of control components that affect process variables. Among the process variables involved are AFD and QPTR, ~~which represent~~ initial conditions of the unit safety analyses. Also involved are the movable control components (control and shutdown rods), ~~which~~ are required to shut down the reactor. The limits for these variables are specified for each fuel cycle in the COLR.

representing that 5

BASES

APPLICABLE SAFETY ANALYSES (continued)

As described in LCO 3.0.7, compliance with Test Exception LCOs is optional, and therefore no criteria of 10 CFR 50.36(c)(2)(ii) apply. Test Exception LCOs provide flexibility to perform certain operations by appropriately modifying requirements of other LCOs. A discussion of the criteria satisfied for the other LCOs is provided in their respective Bases.

~~Reference 6 allows special test exceptions (STEs) to be included as part of the LCO that they affect. It was decided, however, to retain this STE as a separate LCO because it was less cumbersome and provided additional clarity.~~ 1

LCO

This LCO allows the reactor parameters of MTC and minimum temperature for criticality to be outside their specified limits. In addition, it allows selected control and shutdown rods to be positioned outside of their specified alignment and insertion limits. One power range neutron flux channel may be bypassed, reducing the number of required channels from 4 to 3. Operation beyond specified limits is permitted for the purpose of performing PHYSICS TESTS and poses no threat to fuel integrity, provided the SRs are met.

The requirements of LCO 3.1.3, LCO 3.1.4, LCO 3.1.5, LCO 3.1.6, and LCO 3.4.2 may be suspended and the number of required channels for LCO 3.3.1, "RTS Instrumentation," Functions 2, 3, 6 and 1~~8~~6.e may be reduced to 3 required channels during the performance of PHYSICS TESTS provided: 1

a. RCS lowest loop average temperature is ≥ ~~[~~531~~]~~°F, 2

b. SDM is within the limits provided in the COLR, and

c. THERMAL POWER is ≤ 5% RTP.

APPLICABILITY

This LCO is applicable when performing low power PHYSICS TESTS. The Applicability is stated as "during PHYSICS TESTS initiated in MODE 2" to ensure that the 5% RTP maximum power level is not exceeded. Should the THERMAL POWER exceed 5% RTP, and consequently the unit enter MODE 1, this Applicability statement prevents exiting this Specification and its Required Actions.

BASES

ACTIONS

A.1 and A.2

If the SDM requirement is not met, boration must be initiated promptly. A Completion Time of 15 minutes is adequate for an operator to correctly align and start the required systems and components. The operator should begin boration with the best source available for the plant conditions. Boration will be continued until SDM is within limit.

Suspension of PHYSICS TESTS exceptions requires restoration of each of the applicable LCOs to within specification.

B.1

When THERMAL POWER is > 5% RTP, the only acceptable action is to open the reactor trip breakers (RTBs) to prevent operation of the reactor beyond its design limits. Immediately opening the RTBs will shut down the reactor and prevent operation of the reactor outside of its design limits.

C.1

When the RCS lowest T_{avg} is < 531°F, the appropriate action is to restore T_{avg} to within its specified limit. The allowed Completion Time of 15 minutes provides time for restoring T_{avg} to within limits without allowing the plant to remain in an unacceptable condition for an extended period of time. Operation with the reactor critical and with temperature below 531°F could violate the assumptions for accidents analyzed in the safety analyses.

D.1

If the Required Actions cannot be completed within the associated Completion Time, the plant must be brought to a MODE in which the requirement does not apply. To achieve this status, the plant must be brought to at least MODE 3 within an additional 15 minutes. The Completion Time of 15 additional minutes is reasonable, based on operating experience, for reaching MODE 3 in an orderly manner and without challenging plant systems.

BASES

SURVEILLANCE REQUIREMENTS

SR 3.1.8.1

The power range and intermediate range neutron detectors must be verified to be OPERABLE in MODE 2 by LCO 3.3.1, "Reactor Trip System (RTS) Instrumentation." A CHANNEL OPERATIONAL TEST is performed on each power range and intermediate range channel prior to initiation of the PHYSICS TESTS. This will ensure that the RTS is properly aligned to provide the required degree of core protection during the performance of the PHYSICS TESTS.

SR 3.1.8.2

Verification that the RCS lowest loop T_{avg} is ≥ 531°F will ensure that the unit is not operating in a condition that could invalidate the safety analyses. [Verification of the RCS temperature at a Frequency of 30 minutes during the performance of the PHYSICS TESTS will ensure that the initial conditions of the safety analyses are not violated. 3

OR

The Surveillance Frequency is controlled under the Surveillance Frequency Control Program.

-----REVIEWER'S NOTE-----
Plants controlling Surveillance Frequencies under a Surveillance Frequency Control Program should utilize the appropriate Frequency description, given above, and the appropriate choice of Frequency in the Surveillance Requirement. 4
-----] 3

SR 3.1.8.3

Verification that the THERMAL POWER is ≤ 5% RTP will ensure that the plant is not operating in a condition that could invalidate the safety analyses. [Verification of the THERMAL POWER at a Frequency of 30 minutes during the performance of the PHYSICS TESTS will ensure that the initial conditions of the safety analyses are not violated. 3

OR

The Surveillance Frequency is controlled under the Surveillance Frequency Control Program.

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BASES

SURVEILLANCE REQUIREMENTS (continued)

--------------------------------REVIEWER'S NOTE-----------------------------------
Plants controlling Surveillance Frequencies under a Surveillance Frequency Control Program should utilize the appropriate Frequency description, given above, and the appropriate choice of Frequency in the Surveillance Requirement.
---]

4

3

SR 3.1.8.4

The SDM is verified by performing a reactivity balance calculation, considering the following reactivity effects:

a. RCS boron concentration,

b. Control bank position,

c. RCS average temperature,

d. Fuel burnup based on gross thermal energy generation,

e. Xenon concentration,

f. Samarium concentration,

g. Isothermal temperature coefficient (ITC), when below the point of adding heat (POAH),

h. Moderate Moderator temperature defect, when above the POAH, and 1

i. Doppler defect, when above the POAH.

Using the ITC accounts for Doppler reactivity in this calculation when the reactor is subcritical or critical but below the POAH, and the fuel temperature will be changing at the same rate as the RCS.

[The Frequency of 24 hours is based on the generally slow change in required boron concentration and on the low probability of an accident occurring without the required SDM.

OR

3

The Surveillance Frequency is controlled under the Surveillance Frequency Control Program.

BASES

SURVEILLANCE REQUIREMENTS (continued)

~~-----------------------------------REVIEWER'S NOTE-----------------------------------~~
~~Plants controlling Surveillance Frequencies under a Surveillance Frequency Control Program should utilize the appropriate Frequency description, given above, and the appropriate choice of Frequency in the Surveillance Requirement.~~
~~---]~~ 4 3

REFERENCES

1. 10 CFR 50, Appendix B, Section XI.

2. 10 CFR 50.59.

3. Regulatory Guide 1.68, Revision 2, August, 1978.

4. ANSI/ANS-19.6.1-~~1985, December 13, 1985~~ 1997. 1

5. ~~WCAP-9273-NP-A, "Westinghouse Reload Safety Evaluation Methodology Report," July 1985~~ BAW-10163P-A, "Core Operating Limit Methodology for Westinghouse Designed PWRs," June 1989. 1

~~6. WCAP-11618, including Addendum 1, April 1989.~~ 1

JUSTIFICATION FOR DEVIATIONS
ITS 3.1.8 BASES, PHYSICS TESTS EXCEPTIONS – MODE 2

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

2. The ISTS contains bracketed information and/or values that are generic to Westinghouse vintage plants. The brackets are removed and the proper plant specific information/value is inserted to reflect the current licensing basis.

3. ISTS SR 3.1.8.2, SR 3.1.8.3, and SR 3.1.8.4 Bases provides two options for controlling the Frequencies of Surveillance Requirements. SQN is proposing to control the Surveillance Frequencies under the Surveillance Frequency Control Program. Additionally, the Frequency description which is being removed will be included in the Surveillance Frequency Control Program.

4. The Reviewer's Note has been deleted. This information is for the NRC reviewer to be keyed into what is needed to meet this requirement. This Note is not meant to be retained in the final version of the plant specific submittal.

5. Editorial changes made for enhanced clarity/consistency.

6. These punctuation corrections have been made consistent with the Writer's Guide for the Improved Technical Specifications, TSTF-GG-05-01, Section 5.1.3.

Specific No Significant Hazards Considerations (NSHCs)

DETERMINATION OF NO SIGNIFICANT HAZARDS CONSIDERATIONS
ITS 3.1.8, PHYSICS TESTS EXCEPTIONS – MODE 2

There are no specific No Significant Hazards Considerations for this Specification.

ATTACHMENT 9

Relocated/Deleted Current Technical Specifications (CTS)

CTS 3/4.10.1, SHUTDOWN MARGIN

Current Technical Specification (CTS) Markup
and Discussion of Changes (DOCs)

CTS 3/4.10.1

3/4.10 SPECIAL TEST EXCEPTIONS

3/4.10.1 SHUTDOWN MARGIN

LIMITING CONDITION FOR OPERATION

3.10.1 The SHUTDOWN MARGIN requirement of Specification 3.1.1.1 may be suspended for measurement of control rod worth and shutdown margin provided reactivity equivalent to at least the highest estimated control rod worth is available for trip insertion from OPERABLE control rod(s).

APPLICABILITY: MODE 2.

ACTION:

a. With any full length control rod not fully inserted and with less than the above reactivity equivalent available for trip insertion, immediately initiate and continue boration at greater than or equal to 35 gpm of a solution containing greater than or equal to 6120 ppm boron or its equivalent until the SHUTDOWN MARGIN required by Specification 3.1.1.1 is restored.

b. With all full length control rods inserted and the reactor subcritical by less than the above reactivity equivalent, immediately initiate and continue boration at greater than or equal to 35 gpm of a solution containing greater than or equal to 6120 ppm boron or its equivalent until the SHUTDOWN MARGIN required by Specification 3.1.1.1 is restored.

M01

SURVEILLANCE REQUIREMENTS

4.10.1.1 The position of each full length rod either partially or fully withdrawn shall be determined at least once per 2 hours.

4.10.1.2 Each full length rod not fully inserted shall be demonstrated capable of full insertion when tripped from at least 50% withdrawn position within 24 hours prior to reducing the SHUTDOWN MARGIN to less than the limits of Specification 3.1.1.1.

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CTS 3/4.10.1

3/4.10 SPECIAL TEST EXCEPTIONS

3/4.10.1 SHUTDOWN MARGIN

LIMITING CONDITION FOR OPERATION

3.10.1 The SHUTDOWN MARGIN requirement of Specification 3.1.1.1 may be suspended for measurement of control rod worth and shutdown margin provided reactivity equivalent to at least the highest estimated control rod worth is available for trip insertion from OPERABLE control rod(s).

APPLICABILITY: MODE 2.

ACTION:

a. With any full length control rod not fully inserted and with less than the above reactivity equivalent available for trip insertion, immediately initiate and continue boration at greater than or equal to 35 gpm of a solution containing greater than or equal to 6120 ppm boron or its equivalent until the SHUTDOWN MARGIN required by Specification 3.1.1.1 is restored. M01

b. With all full length control rods fully inserted and the reactor subcritical by less than the above reactivity equivalent, immediately initiate and continue boration at greater than or equal to 35 gpm of a solution containing greater than or equal to 6120 ppm boron or its equivalent until the SHUTDOWN MARGIN required by Specification 3.1.1.1 is restored.

SURVEILLANCE REQUIREMENTS

4.10.1.1 The position of each full length rod either partially or fully withdrawn shall be determined at least once per 2 hours.

4.10.1.2 Each full length rod not fully inserted shall be demonstrated capable of full insertion when tripped from at least the 50% withdrawn position within 24 hours prior to reducing the SHUTDOWN MARGIN to less than the limits of Specification 3.1.1.1.

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DISCUSSION OF CHANGES
CTS 3/4.10.1, SHUTDOWN MARGIN

ADMINISTRATIVE CHANGES

None

MORE RESTRICTIVE CHANGES

M01 CTS 3.10.1 provides an exception to the SHUTDOWN MARGIN requirements in CTS 3.1.1.1 in MODE 2 due to the purpose of the measurement of rod worth and shutdown margin provided the reactivity equivalent to at least the highest estimated control rod worth is available for trip insertion from OPERABLE control rod(s). According to the Bases, this special test exception provides that a minimum amount of control rod worth is immediately available for reactivity control when tests are performed for control rod worth measurement. This special test exception is required to permit the periodic verification of the actual versus predicted core reactivity condition occurring as a result of fuel burnup or fuel cycling operations. This changes the CTS by eliminating a special test exception.

This change is acceptable because this method of testing is no longer used. As a result, the CTS special test exception is not needed. Other rod worth measurement techniques that do not violate the SHUTDOWN MARGIN requirements are used. This change is designated as more restrictive because an exception to the CTS is being deleted.

RELOCATED SPECIFICATIONS

None

REMOVED DETAIL CHANGES

None

LESS RESTRICTIVE CHANGES

None

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Specific No Significant Hazards Considerations (NSHCs)

DETERMINATION OF NO SIGNIFICANT HAZARDS CONSIDERATIONS
CTS 3/4.10.1, SHUTDOWN MARGIN

There are no specific No Significant Hazards Considerations for this Specification.

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CTS 3/4.10.2, GROUP HEIGHT, INSERTION AND POWER DISTRIBUTION LIMITS

Current Technical Specification (CTS) Markup and Discussion of Changes (DOCs)

CTS 3/4.10.2

SPECIAL TEST EXCEPTIONS

3/4.10.2 GROUP HEIGHT, INSERTION AND POWER DISTRIBUTION LIMITS

LIMITING CONDITION FOR OPERATION

3.10.2 The group height, insertion and power distribution limits of Specifications 3.1.3.1, 3.1.3.5, 3.1.3.6, 3.2.1 and 3.2.4 may be suspended during the performance of PHYSICS TESTS provided:

a. The THERMAL POWER is maintained less than or equal to 85% of RATED THERMAL POWER, and

b. The limits of Specifications 3.2.2 and 3.2.3 are maintained and determined at the frequencies specified in Specification 4.10.2.2 below.

APPLICABILITY: MODE 1

ACTION:

With any of the limits of Specifications 3.2.2 or 3.2.3 being exceeded while the requirements of Specification 3.13.1., 3.1.3.5, 3.1.3.6, 3.2.1 and 3.2.4 are suspended, either:

a. Reduce THERMAL POWER sufficient to satisfy the ACTION requirements of Specifications 3.2.2 and 3.2.3, or

b. Be in HOT STANDBY within 6 hours.

M01

SURVEILLANCE REQUIREMENTS

4.10.2.1 The THERMAL POWER shall be determined to be less than or equal to 85% of RATED THERMAL POWER at least once per hour during PHYSICS TESTS.

4.10.2.2 Perform the surveillance required by the below listed Specifications at least once per 12 hours during PHYSICS TESTS:

a. Specification 4.2.2.2 and 4.2.2.3

b. Specification 4.2.3.2.

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CTS 3/4.10.2

SPECIAL TEST EXCEPTIONS

3/4.10.2 GROUP HEIGHT, INSERTION AND POWER DISTRIBUTION LIMITS

LIMITING CONDITION FOR OPERATION

3.10.2 The group height, insertion and power distribution limits of Specifications 3.1.3.1, 3.1.3.5, 3.1.3.6, 3.2.1 and 3.2.4 may be suspended during the performance of PHYSICS TESTS provided:

a. The THERMAL POWER is maintained less than or equal to 85% of RATED THERMAL POWER, and

b. The limits of Specifications 3.2.2 and 3.2.3 are maintained and determined at the frequencies specified in Specification 4.10.2.2 below.

APPLICABILITY: MODE 1.

ACTION:

With any of the limits of Specifications 3.2.2 or 3.2.3 being exceeded while the requirements of Specifications 3.1.3.1, 3.1.3.5, 3.1.3.6, 3.2.1 and 3.2.4 are suspended, either: M01

a. Reduce THERMAL POWER sufficient to satisfy the ACTION requirements of Specifications 3.2.2 and 3.2.3, or

b. Be in HOT STANDBY within 6 hours.

SURVEILLANCE REQUIREMENTS

4.10.2.1 The THERMAL POWER shall be determined to be less than or equal to 85% of RATED THERMAL POWER at least once per hour during PHYSICS TESTS.

4.10.2.2 Perform the surveillance required by the below listed Specifications at least once per 12 hours during PHYSICS TESTS:

a. Specification 4.2.2 2 and 4.2.2.3

b. Specification 4.2.3.2

DISCUSSION OF CHANGES
CTS 3/4.10.2, GROUP HEIGHT, INSERTION AND POWER DISTRIBUTION LIMITS

ADMINISTRATIVE CHANGES

None

MORE RESTRICTIVE CHANGES

M01 CTS 3/4.10.2 provides an exception to the rod group height, rod insertion, and power distribution limits specifications. This special test exception permits individual control rods to be positioned outside of their normal group heights and insertion limits during the performance of such PHYSICS TESTS as those required to 1) measure control rod worth and 2) determine the reactor stability index and damping factor under xenon oscillation conditions. The ITS does not contain this special test exception. This changes the CTS by eliminating a special test exception.

This change is acceptable because these types of PHYSICS TESTS (measurement of control rod worth and determination of the reactor stability index as well as the damping factor under xenon oscillation conditions) are only performed during initial plant startup test programs. These tests are not performed during post-refueling PHYSICS TESTS. As a result, the CTS special test exception is not needed. This change is designated as more restrictive because an exception to the CTS is being deleted.

RELOCATED SPECIFICATIONS

None

REMOVED DETAIL CHANGES

None

LESS RESTRICTIVE CHANGES

None

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Specific No Significant Hazards Considerations (NSHCs)

DETERMINATION OF NO SIGNIFICANT HAZARDS CONSIDERATIONS
CTS 3/4.10.2, GROUP HEIGHT, INSERTION AND POWER DISTRIBUTION LIMITS

There are no specific No Significant Hazards Considerations for this Specification.

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CTS 3/4.10.4, REACTOR COOLANT LOOPS

Current Technical Specification (CTS) Markup and Discussion of Changes (DOCs)

CTS 3/4.10.1

SPECIAL TEST EXCEPTIONS

3/4.10.4 REACTOR COOLANT LOOPS

LIMITING CONDITION FOR OPERATION

3.10.4 The limitations of Specification 3.4.1.1 may be suspended during the performance of startup and PHYSICS TESTS provided:

a. The THERMAL POWER does not exceed the P-7 Interlock Setpoint, and

b. The Reactor Trip Setpoints on the OPERABLE Intermediate and Power Range Channels are set less than or equal to 25% of RATED THERMAL POWER

APPLICABILITY: During operation below the P-7 Interlock Setpoint.

M01

ACTION:

With the THERMAL POWER greater than the P-7 Interlock Setpoint, immediately open the reactor trip breakers.

SURVEILLANCE REQUIREMENTS

4.10.4.1 The THERMAL POWER shall be determined to be less than P-7 Interlock Setpoint at least once per hour during startup and PHYSICS TESTS.

4.10.4.2 Each Intermediate, Power Range Channel and P-7 Interlock shall be subjected to a CHANNEL FUNCTIONAL TEST prior to initiating startup or PHYSICS TESTS.

CTS 3/4.10.1

~~SPECIAL TEST EXCEPTIONS~~

~~3/4.10.5 POSITION INDICATION SYSTEM - SHUTDOWN~~

A01

~~3.10.5 This specification is deleted.~~

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CTS 3/4.10.4

SPECIAL TEST EXCEPTIONS

3/4.10.4 REACTOR COOLANT LOOPS

LIMITING CONDITION FOR OPERATION

3.10.4 The limitations of Specification 3.4.1.1 may be suspended during the performance of start up and PHYSICS TESTS provided:

a. The THERMAL POWER does not exceed the P-7 Interlock Setpoint, and

b. The Reactor Trip Setpoints on the OPERABLE Intermediate and Power Range Channels are set less than or equal to 25% of RATED THERMAL POWER.

APPLICABILITY: During operation below the P-7 Interlock Setpoint.

M01

ACTION:

With the THERMAL POWER greater than the P-7 Interlock Setpoint, immediately open the reactor trip breakers.

SURVEILLANCE REQUIREMENTS

4.10.4.1 The THERMAL POWER shall be determined to be less than P-7 Interlock Setpoint at least once per hour during start up and PHYSICS TESTS.

4.10.4.2 Each Intermediate, Power Range Channel and P-7 Interlock shall be subjected to a CHANNEL FUNCTIONAL TEST prior to initiating start up and PHYSICS TESTS.

CTS 3/4.10.4

SPECIAL TEST EXCEPTIONS

3/4.10.5 POSITION INDICATION SYSTEM - SHUTDOWN

A01

LIMITING CONDITION FOR OPERATION

3.10.5 This specification is deleted.

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DISCUSSION OF CHANGES
CTS 3/4.10.4, REACTOR COOLANT LOOPS

ADMINISTRATIVE CHANGES

A01 In the conversion of the Sequoyah Nuclear Plant (SQN) Current Technical Specifications (CTS) to the plant specific Improved Technical Specifications (ITS), certain changes (wording preferences, editorial changes, reformatting, revised numbering, etc.) are made to obtain consistency with NUREG - 1431, Rev. 4.0, "Standard Technical Specifications - Westinghouse Plants" (ISTS) and additional Technical Specification Task Force (TSTF) travelers included in this submittal.

These changes are designated as administrative changes and are acceptable because they do not result in technical changes to the CTS.

MORE RESTRICTIVE CHANGES

M01 CTS 3/4.10.4 provides an exception to the reactor coolant loops Specification. This special test exception permits reactor criticality under no flow conditions and is required to perform certain startup and PHYSICS TESTS while at low THERMAL POWER levels. Testing within the required frequency is sufficient for verification that the power range and intermediate range monitors are properly functioning. The ITS does not contain this special test exception. This changes the CTS by eliminating a special test exception.

This change is acceptable because these types of PHYSICS TESTS are no longer performed. Future PHYSICS TESTS will be performed under 3.1.8, "PHYSICS TESTS Exceptions – MODE 2." As a result this CTS Special test exception is not needed. This change is designated as more restrictive because an exception to the CTS is being deleted.

RELOCATED SPECIFICATIONS

None

REMOVED DETAIL CHANGES

None

LESS RESTRICTIVE CHANGES

None

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Specific No Significant Hazards Considerations (NSHCs)

DETERMINATION OF NO SIGNIFICANT HAZARDS CONSIDERATIONS
CTS 3/4.10.4, REACTOR COOLANT LOOPS

There are no specific No Significant Hazards Considerations for this Specification.

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