

# **ENCLOSURE 2**

## **VOLUME 6**

### **TURKEY POINT NUCLEAR GENERATING STATION UNIT 3 AND UNIT 4**

#### **IMPROVED TECHNICAL SPECIFICATIONS CONVERSION**

##### **ITS SECTION 3.1 REACTIVITY CONTROL SYSTEMS**

**Revision 1**

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## **ATTACHMENT 1**

### **ITS 3.1.1, SHUTDOWN MARGIN (SDM)**

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

### 3/4.1 REACTIVITY CONTROL SYSTEMS

#### 3/4.1.1 BORATION CONTROL

SHUTDOWN MARGIN  ~~$T_{avg}$  GREATER THAN 200°F~~

#### LIMITING CONDITION FOR OPERATION

LCO 3.1.1 3.1.1.1 The ~~SHUTDOWN MARGIN~~ shall be within the limits specified in the COLR.

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

#### ACTION:

ACTION A With the ~~SHUTDOWN MARGIN~~ not within limits, ~~immediately initiate and continue~~ boration ~~at greater than or equal to 16 gpm of a solution containing greater than or equal to 3.0 wt% (5245 ppm) boron or equivalent~~ 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 within the limits specified in the COLR:

- a. Within 1 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or untrippable, the above required SHUTDOWN MARGIN shall be verified acceptable with an increased allowance for the withdrawn worth of the immovable or untrippable control rod(s);
- b. When in MODE 1 or MODE 2 with  $K_{eff}$  greater than or equal to 1 by verifying that control bank withdrawal is within the limits of Specification 3.1.3.6 in accordance with the Surveillance Frequency Control Program;
- c. When in MODE 2 with  $K_{eff}$  less than 1, 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 Specification 4.1.1.1.1e. below, with the control banks at the maximum insertion limit of Specification 3.1.3.6; and~~

~~\*See Special Test Exceptions Specification 3.10.1.~~

## REACTIVITY CONTROL SYSTEMS

### SURVEILLANCE REQUIREMENTS (Continued)

SR 3.1.1.1

- e. In accordance with the Surveillance Frequency Control Program, when in MODE 3 or 4 ~~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.~~

MODE 2 with  $k_{eff} < 1.0$ 

A01

M01

LA01

4.1.1.1.2 When in Mode 1 or 2, the overall core reactivity balance shall be compared to predicted values to demonstrate agreement within  $\pm 1\% \Delta k/k$  in accordance with the Surveillance Frequency Control Program. This comparison shall consider at least those factors stated in Specification 4.1.1.1.1e, above. The predicted reactivity values shall be adjusted (normalized) to correspond to the actual core conditions prior to exceeding a fuel burnup of 60 EFPD after each fuel loading.

See ITS  
3.1.2

## REACTIVITY CONTROL SYSTEMS

SHUTDOWN MARGIN ~~-T<sub>avg</sub>~~ **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 within the limit specified in the COLR.

Applicability APPLICABILITY: MODE 5.

ACTION A ACTION:

within 15 minutes

L01

With the SHUTDOWN MARGIN not within limits, ~~immediately~~ initiate ~~and continue~~ boration ~~at greater than or equal to 16 gpm of a solution containing greater than or equal to 3.0 wt% (5245 ppm) boron or equivalent~~ until the required SHUTDOWN MARGIN is restored.

L02

### SURVEILLANCE REQUIREMENTS

SR 3.1.1.1 4.1.1.2 The SHUTDOWN MARGIN shall be determined to be within the limit specified in the COLR:

- a. 

Within 1 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); and
- b. In accordance with the Surveillance Frequency Control Program ~~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  
3.1.4

See ITS  
Chapter 1.0

LA01

## **DISCUSSION OF CHANGES**

### **ITS 3.1.1, SHUTDOWN MARGIN (SDM)**

#### ADMINISTRATIVE CHANGES

- A01 In the conversion of the Turkey Point Nuclear Generating Station (PTN) 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. 5.0, "Standard Technical Specifications - Westinghouse Plants" (ISTS).

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 that in MODES 1 and 2, SDM is ensured by complying with Limiting Condition for Operation (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



## **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 Surveillance Requirement (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  $k_{eff} \geq 1.0$ , 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 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.

The removal of these details for performing Surveillance Requirements from the Technical Specifications is acceptable because this type of information is not

## **DISCUSSION OF CHANGES**

### **ITS 3.1.1, SHUTDOWN MARGIN (SDM)**

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 Design Basis Accident (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 "not within limits, immediately initiate and continue boration at greater than or equal to 16 gpm of a solution containing greater than or equal to 3.0 wt% (5245 ppm) boron or equivalent until the required SHUTDOWN MARGIN 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 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

## **DISCUSSION OF CHANGES**

### **ITS 3.1.1, SHUTDOWN MARGIN (SDM)**

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 4.1.1.1.1.d requiring performance once prior to entering MODE 1 (> 5% RATED THERMAL POWER) 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.

# **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

3.1.1.1  
ACTION  
3.1.1.2  
ACTION

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

SURVEILLANCE REQUIREMENTS

4.1.1.1.1.e  
4.1.1.2.b

SURVEILLANCE		FREQUENCY
SR 3.1.1.1	Verify SDM to be within the limits specified in the COLR.	<div><div>1</div><div><del>24 hours</del></div><div>OR</div><div><div>1</div><div>In accordance with the Surveillance Frequency Control Program }</div></div></div>

**JUSTIFICATION FOR DEVIATIONS**  
**ITS 3.1.1, SHUTDOWN MARGIN**

1. The Improved Standard Technical Specifications (ISTS) contains bracketed information and/or values that are generic to all Westinghouse vintage plants. The brackets are removed and the proper plant specific information/value is provided. This is acceptable since the information/value is changed 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.

**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

1967 Proposed GDC 27

References 1 and 5

## 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.

1

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 ~~an~~ 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

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## 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  $\leq 280$  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.

&lt; 200

2

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~~ 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.

double ended

1

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

s

2

- a. Inadvertent boron dilution,
- b. An uncontrolled rod withdrawal from subcritical or low power condition,

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## BASES

## APPLICABLE SAFETY ANALYSES (continued)

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

1

~~d.~~ Rod ejection.

c

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** trip. In all cases, power level, RCS pressure, linear heat rate, and the DNBR do not exceed allowable limits.

high neutron flux trip

an overtemperature  $\Delta T$ 

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.~~

1

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.

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## 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  $k_{\text{eff}} < 1.0$  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 water storage tank~~. The operator should borate with the best source available for the plant conditions.

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%  $\Delta k/k$  must be recovered and a boration flow rate of ~~1~~ 40 gpm, it is possible to increase the boron concentration of the RCS by 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%  $\Delta k/k$ . These boration parameters of ~~1~~ 40 gpm and ~~1~~ 2000 ppm represent typical values and are provided for the purpose of offering a specific example.

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## BASES

SURVEILLANCE  
REQUIREMENTSSR 3.1.1.1

In MODES 1 and 2 with  $k_{\text{eff}} \geq 1.0$ , 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  $k_{\text{eff}} < 1.0$  and in

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

5

- 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.~~

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.~~

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3

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BASES

1967 Atomic Energy Commission  
Proposed General Design Criteria 27

REFERENCES

1. ~~10 CFR 50, Appendix A, GDC 26.~~
- U 2. FSAR, ~~Chapter [15].~~ Section 14.2.5
- U 3. FSAR, Chapter ~~[15].~~ Section 14.1.5
4. 10 CFR 100.
5. UFSAR, Section 3.1.2
- 1
- 1 3
- 1 3
- 1

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

1. Changes are made (additions, deletions, and/or changes) to the Improved Standard Technical Specifications (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. 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. 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.



## **ATTACHMENT 2**

### **ITS 3.1.2, CORE REACTIVITY**

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

### 3/4.1 REACTIVITY CONTROL SYSTEMS

#### ~~3/4.1.1 BORATION CONTROL~~

~~SHUTDOWN MARGIN -  $T_{avg}$  GREATER THAN 200°F~~

Core Reactivity

#### LIMITING CONDITION FOR OPERATION

LCO 3.1.2

3.1.1.1 The SHUTDOWN MARGIN shall be within the limits specified in the COLR.

Add proposed LCO 3.1.2

Applicability

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

#### ACTION:

Add proposed ACTIONS A and B

With the SHUTDOWN MARGIN not within limits, immediately initiate and continue boration at greater than or equal to 16 gpm of a solution containing greater than or equal to 3.0 wt% (5245 ppm) boron or equivalent until the required SHUTDOWN MARGIN is restored.

#### SURVEILLANCE REQUIREMENTS

SR 3.1.2.1

4.1.1.1.1 The SHUTDOWN MARGIN shall be determined to be within the limits specified in the COLR:

- a. Within 1 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).
- b. When in MODE 1 or MODE 2 with  $K_{eff}$  greater than or equal to 1 by verifying that control bank withdrawal is within the limits of Specification 3.1.3.6 in accordance with the Surveillance Frequency Control Program;
- c. When in MODE 2 with  $K_{eff}$  less than 1, 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 Specification 4.1.1.1.1e. below, with the control banks at the maximum insertion limit of Specification 3.1.3.6; and

\*See Special Test Exceptions Specification 3.10.1.

## REACTIVITY CONTROL SYSTEMS

### SURVEILLANCE REQUIREMENTS (Continued)

e. In accordance with the Surveillance Frequency Control Program, when in MODE 3 or 4 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)

A01

L03

LA01

SR 3.1.2.1

4.1.1.1.2 ~~When in Mode 1 or 2, the overall core reactivity balance shall be compared to predicted values to demonstrate agreement within  $\pm 1\%$   $\Delta k/k$  in accordance with the Surveillance Frequency Control Program. This comparison shall consider at least those factors stated in Specification 4.1.1.1.1e, above.~~ The predicted reactivity values ~~shall~~ be adjusted (normalized) to correspond to the actual core conditions prior to exceeding a fuel burnup of 60 EFPD after each fuel loading.

SR 3.1.2.1  
Note

Verify measured core reactivity is

Once prior to entering MODE 1 after refueling AND

A03

Add proposed Frequency Note

of predicted values

may

A01

L04

## **DISCUSSION OF CHANGES ITS 3.1.2, CORE REACTIVITY**

### **ADMINISTRATIVE CHANGES**

- A01 In the conversion of the Turkey Point Nuclear Generating Station (PTN) 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. 5.0, "Standard Technical Specifications - Westinghouse Plants" (ISTS).

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  $\pm 1\% \Delta k/k$ . However, this Surveillance is currently part of the SHUTDOWN MARGIN (SDM) Specification. Additionally, CTS 3.1.1.1 is titled SHUTDOWN MARGIN –  $T_{avg}$  Greater Than 200°F. A new Limiting Condition for Operation (LCO), ITS LCO 3.1.2, requires the measured core reactivity to be within  $\pm 1\% \Delta k/k$  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 SDM 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.

- A03 CTS 4.1.1.1.2 requires the overall core reactivity balance to be compared to predicted values to demonstrate agreement within  $\pm 1\% \Delta k/k$  in accordance with the Surveillance Frequency Control Program (SFCP). ITS Surveillance Requirement (SR) 3.1.2.1 Completion Time includes a Note stating that this SR is "Only required after 60 EFPD." This changes the CTS by stating within the Specification the time in core life in which the SR must be performed.

This change is acceptable because performing the SR after 60 EFPD (effective full power days) is consistent with the Frequency contained within the SFCP; therefore, requirements have not changed. Subsequently, 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

## DISCUSSION OF CHANGES

### ITS 3.1.2, CORE REACTIVITY

#### REMOVED DETAIL CHANGES

- LA01 The removal of these details for performing SR 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  $\pm 1\% \Delta k/k$ . 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.

#### LESS RESTRICTIVE CHANGES

- 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 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). 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 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 6 hours, MODE 4 within 12 hours, and MODE 5 within 24 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.

## DISCUSSION OF CHANGES ITS 3.1.2, CORE REACTIVITY

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 restore 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, restore, or replacement of required features, and the low probability of a Design Basis Accident (DBA) occurring during the repair/restoration 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 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 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. ITS SR 3.1.2.1 requires verifying the measured core reactivity is within  $\pm 1\% \Delta k/k$  of the predicted core reactivity values once prior to entering MODE 1 after each refueling and in accordance with the Surveillance Frequency Control Program after 60 EFPD. This changes the CTS by allowing 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. 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. 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 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

## **DISCUSSION OF CHANGES ITS 3.1.2, CORE REACTIVITY**

exceeding a fuel burnup of 60 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 prior to 60 EFPD of operation allows sufficient time for the core conditions to reach steady state. This change is acceptable because the expectation is to perform the adjustment of the predicted reactivity values to the core conditions only if needed. This change is designated as less restrictive because less stringent SRs are being applied in the ITS than were applied in the CTS.



# **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  $\pm 1\% \Delta k/k$  of predicted values.

Applicability APPLICABILITY: MODES 1 and 2.

#### ACTIONS

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

SURVEILLANCE REQUIREMENTS

SURVEILLANCE	FREQUENCY
<div> <div>4.1.1.1.1.e, 4.1.1.1.2</div> <div> <div>SR 3.1.2.1</div> <div> <div>-----NOTE-----</div> <div>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.</div> <div>-----</div> <div>Verify measured core reactivity is within <math>\pm 1\% \Delta k/k</math> of predicted values.</div> </div> </div> </div>	<div> <div>Once prior to entering MODE 1 after each refueling</div> <div>AND</div> <div>-----NOTE-----</div> <div>Only required after 60 EFPD</div> <div>-----</div> <div><del>{ 31 EFPD thereafter</del></div> <div>OR</div> <div>In accordance with the Surveillance Frequency Control Program }</div> </div>

2

2

**JUSTIFICATION FOR DEVIATIONS**  
**ITS 3.1.2, CORE REACTIVITY**

1. Changes are made (additions, deletions, and/or changes) to the Improved Standard Technical Specifications (ISTS) 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.

**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

1967 Proposed GDC 27, 28, 29, 32, and 33

References 1 and 3

#### 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.

specific Periodic measurement of the RCS boron concentration for comparison with the predicted value with ~~other~~ 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.

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) 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, 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, or that an unexpected change in core conditions has occurred.

life (BOL)

BOL

BOL

1

1

1

## BASES

### APPLICABLE SAFETY ANALYSES (continued)

BOL

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 ~~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  $\pm 1\% \Delta k/k$  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 ~~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).

4

~~WOG~~

Turkey Point Unit 3 and Unit 4

B 3.1.2-3

Revision XXX

~~Rev. 5-0~~

1



## 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**. The SR is modified by a Note. The Note indicates that the normalization of predicted core reactivity to the measured value **must** take place 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.]~~

**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.~~

### REFERENCES

1. ~~10 CFR 50, Appendix A, GDC 26, GDC 28, and GDC 29.~~ 1967 Atomic energy Commission Proposed General Design Criteria 27, 28, 29, 32, and 33
2. FSAR, Chapter ~~[15]~~. 14
3. UFSAR, Chapter 3.1.2

**JUSTIFICATION FOR DEVIATIONS**  
**ITS 3.1.2 BASES, CORE REACTIVITY**

1. Changes are made (additions, deletions, and/or changes) to the Improved Standard Technical Specifications (ISTS) Bases that reflect the plant specific nomenclature, number, reference, system description, analysis, or licensing basis description.
2. 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.
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. Editorial changes made for enhanced clarity/consistency.
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 3.1.2, CORE REACTIVITY**

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

## **ATTACHMENT 3**

### **ITS 3.1.3, MODERATOR TEMPERATURE COEFFICIENT (MTC)**

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

REACTIVITY CONTROL SYSTEMSMODERATOR TEMPERATURE COEFFICIENTLIMITING 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 positive than or equal to  $+5.0 \times 10^{-5} \Delta k/k/^{\circ}F$  for all the rods withdrawn, beginning of cycle life (BOL), for power levels up to 70% RATED THERMAL POWER with a linear ramp to 0  $\Delta k/k/^{\circ}F$  at 100 % RATED THERMAL POWER.~~

Applicability

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

MTC limit

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 or equal to the BOL limit specified in the COLR within 24 hours or be in ~~HOT STANDBY~~ within the next 6 hours. ~~These withdrawal limits shall be in addition to the insertion limits of Specification 3.1.3.6;~~
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.~~

MODE 2 with  $k_{eff} < 1.0$ 

Applicability

\* With  $K_{eff}$  greater than or equal to 1.~~\*\* See Special Test Exceptions Specification 3.10.3.~~



ITS |

REACTIVITY CONTROL SYSTEMSLIMITING CONDITION FOR OPERATIONACTION: (Continued)

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

SURVEILLANCE REQUIREMENTS

SR 3.1.3.1, 4.1.1.3 The MTC shall be determined to be within its limits during each fuel cycle as follows:  
SR 3.1.3.2

- 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; and

- SR 3.1.3.2, 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 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.

Notes 1 and 2

Add proposed SR 3.1.3.2 Note 3

L02

SR 3.1.3.2 Note 4 \* Measurement of the MTC in accordance with Surveillance Requirement 4.1.1.3.b may be suspended provided that the benchmark criteria in ~~WCAP-13749-P-A~~ and the Revised Prediction specified in the COLR are satisfied.

LA01

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

ADMINISTRATIVE CHANGES

- A01 In the conversion of the Turkey Point Nuclear Generating Station (PTN) 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. 5.0, "Standard Technical Specifications - Westinghouse Plants" (ISTS).

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 Moderator Temperature Coefficient (MTC) is more positive than the beginning of life (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 Limiting Condition for Operation (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.

## **DISCUSSION OF CHANGES**

### **ITS 3.1.3, MODERATOR TEMPERATURE COEFFICIENT (MTC)**

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

- A05 CTS 3.1.1.3 states, in part, that "The maximum upper limit shall be less positive than or equal to  $+5.0 \times 10^{-5} \Delta k/k/^\circ F$ ." ITS 3.1.3 brackets the MTC limit. Because the value is stated as the "maximum upper limit," it is not necessary to add further qualification to the limiting value. This changes the CTS by not including the phrase "less positive than or equal to" preceding the limiting value.

This change is acceptable because the requirements have not changed. The omitted phrase is not necessary to establish the limiting value because the value is already specified as the "maximum upper limit." 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 Cycle-Specific Parameter Limits from the Technical Specifications to the Core Operating Limits Report*) CTS SR 4.1.1.3b states in the NOTE \* the use of benchmark criteria in WCAP-13749-P-A. Technical Specification 3.1.3 (SR 3.1.3.2) does not include reference to WCAP-13749-P-A. This changes the CTS by relocating the use of benchmark criteria in WCAP-13749-P-A to the Core Operating Limits Report (COLR).

The removal of these cycle-specific parameter limits from the Technical Specifications and their relocation into the COLR is acceptable because these limits are developed or utilized under NRC-approved methodologies. The NRC documented in Generic Letter 88-16, "Removal of Cycle-Specific Parameter Limits from the Technical Specifications," that 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 requirements and Surveillances that verify that the cycle-specific parameter limits are being met. Surveillance Requirement (SR) 3.1.3.2 states to "Verify MTC is within EOL limit." Also, 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 that the applicable limits (e.g., fuel thermal mechanical limits, core thermal hydraulic limits, Emergency Core Cooling Systems limits, and nuclear limits such as SHUTDOWN MARGIN

## DISCUSSION OF CHANGES

### ITS 3.1.3, MODERATOR TEMPERATURE COEFFICIENT (MTC)

(SDM), transient analysis limits, and accident analysis limits) of the safety analysis 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 Cycle-Specific Parameter Limits from the Technical Specifications to the Core Operating Limits Report)* CTS 3.1.1.3 states "...for all the rods withdrawn, beginning of cycle life (BOL), for power levels up to 70% RATED THERMAL POWER with a linear ramp to 0  $\Delta k/k/^\circ F$  at 100 % RATED THERMAL POWER." This information is contained in the COLR. This changes the CTS by relocating the use of this CTS statement to the COLR.

The removal of these cycle-specific parameter limits from the Technical Specifications and their relocation into the COLR is acceptable because these limits are developed or utilized under NRC-approved methodologies. The NRC documented in Generic Letter 88-16, "Removal of Cycle-Specific Parameter Limits from the Technical Specifications," that 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 requirements and Surveillances that verify that the cycle-specific parameter limits are being met. SR 3.1.3.1 states "Verify MTC is within BOL limit." SR 3.1.3.2 states "Verify MTC is within EOL is within EOL limit." Also, 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 that the applicable limits (e.g., fuel thermal mechanical limits, core thermal hydraulic limits, Emergency Core Cooling Systems limits, and nuclear limits such as SDM, transient analysis limits, and accident analysis limits) of the safety analysis 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.

### 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

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

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.

- L02 *(Category 7 – Relaxation of Surveillance Frequency)* CTS 4.1.1.3.b requires MTC to be determined within limits. "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 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." ITS SR 3.1.3.2 requires verifying MTC is within the end of life (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 effective full power days (EFPD) after reaching the equivalent of an equilibrium RATED THERMAL POWER (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  $\leq 60$  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  $\leq 60$  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.

# **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  $\leq [-]$   $\Delta k/k^\circ F$  ~~at hot zero power~~ ~~[that specified in Figure 3.1.3-1]~~. +5.0 x 10<sup>-5</sup>

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

#### ACTIONS

	CONDITION	REQUIRED ACTION	COMPLETION TIME	
ACTION a.1	A. MTC not within <del>upper</del> limit. <span style="border: 1px solid black; padding: 2px;">BOL</span>	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 <del>lower</del> limit. <span style="border: 1px solid black; padding: 2px;">EOL</span>	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 <del>upper</del> limit. <span style="border: 1px solid black; padding: 2px;">BOL</span>	Prior to entering MODE 1 after each refueling	2

SURVEILLANCE REQUIREMENTS (continued)

SURVEILLANCE		FREQUENCY
SR 3.1.3.2	<p>-----NOTES-----</p> <p>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.</p> <p>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.</p> <p>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.</p>	
	<p>Verify MTC is within <del>lower</del> limit.</p>	Once each cycle

SR 4.1.1.3.b, SR 4.1.1.3.b Note \*

← INSERT 1

EOL

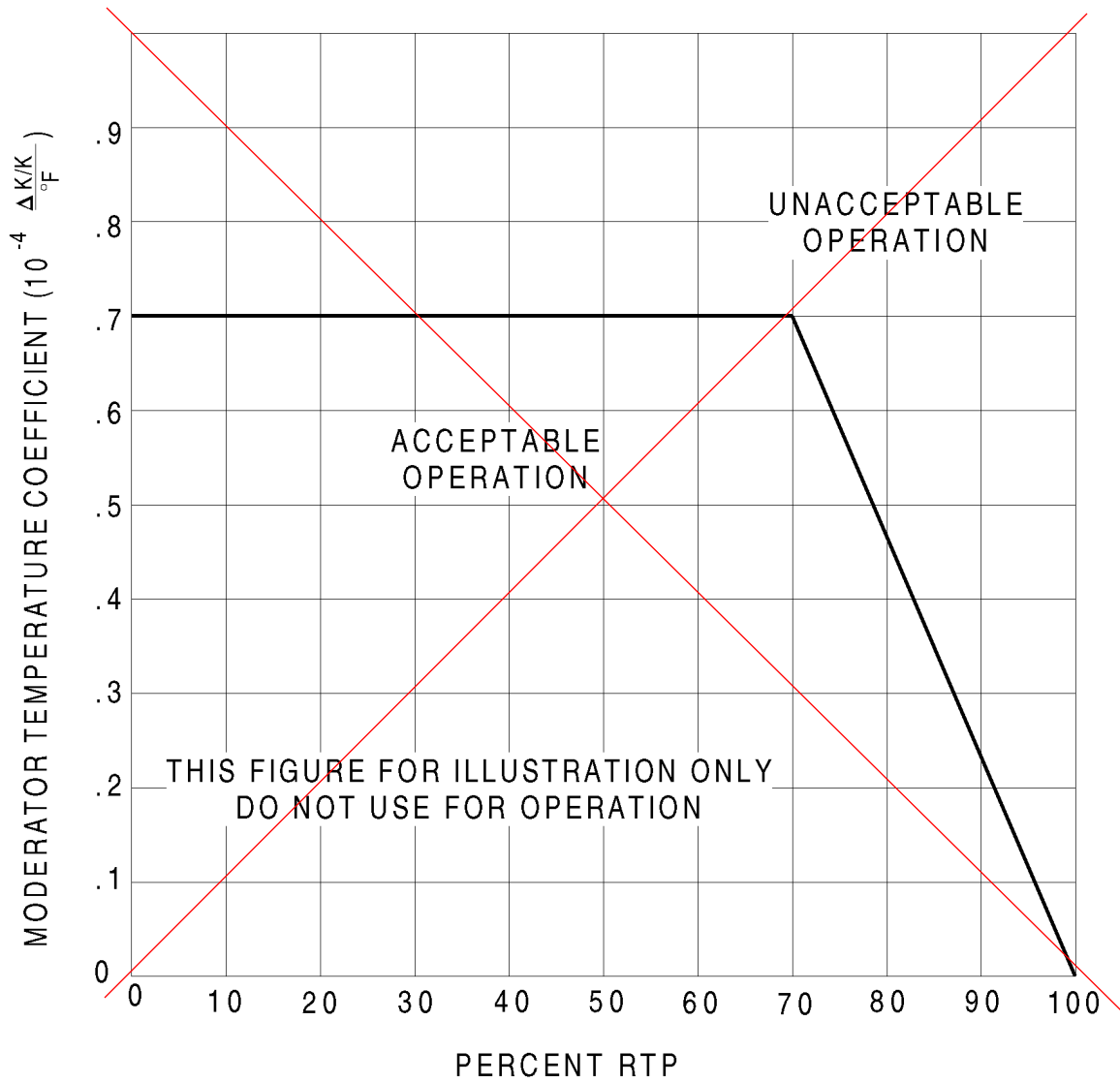
4  
2



4

INSERT 1

4. Measurement of MTC may be suspended provided the benchmark criteria and the revised prediction specified in the COLR are satisfied.



3

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

3

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

1. The Improved Standard Technical Specifications (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.
4. Changes are made to be consistent with Specification.

**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.

(Ref. 1)

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 (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 ~~BOC~~ within the range analyzed in the plant accident analysis. The end of ~~cycle (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 ~~EOC~~ limit.

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

U

## 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

4

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).

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.

1

1

## BASES

## APPLICABLE SAFETY ANALYSES (continued)

	<p>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 rodged and unrodged conditions, whether the reactor is at full or zero power, and whether it is the <del>BOC or EOC life</del>. The most conservative combination appropriate to the accident is then used for the analysis (Ref. 2).</p>	1
	<p>MTC values are bounded in reload safety evaluations assuming steady state conditions at <del>BOC and EOC</del>. An <del>EOC</del> measurement is conducted at conditions when the RCS boron concentration reaches approximately 300 ppm. The measured value may be extrapolated to project the <del>EOC</del> value, in order to confirm reload design predictions.</p>	1 1
	<p>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.</p>	
LCO	<p>LCO 3.1.3 requires the MTC to be 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.</p> <p>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 <del>BOC</del>; this upper bound must not be exceeded. This maximum upper limit occurs at <del>BOC</del>, all rods out (ARO), hot zero power conditions. At <del>EOC</del> 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.</p> <p>During operation, therefore, the conditions of the LCO can only be ensured through measurement. The Surveillance checks at <del>BOC</del> and <del>EOC</del> on MTC provide confirmation that the MTC is behaving as anticipated so that the acceptance criteria are met.</p>	4 1 1

## BASES

## LCO (continued)

**BOL** The LCO establishes a maximum positive value that cannot be exceeded.  
**EOL** The ~~BOC~~ positive limit and the ~~EOC~~ 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.

**BOL** 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~~ 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. 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.  
**EOL** The ~~lower~~ 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

**BOL** If the ~~BOC~~ 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.

1



## BASES

## ACTIONS (continued)

B.1

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

**at least**

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

**EOL** Exceeding the **EOG** MTC limit means that the safety analysis assumptions for the **EOG** accidents that use a bounding negative MTC value may be invalid. If the **EOG** 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.

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  
REQUIREMENTSSR 3.1.3.1

**BOL** This SR requires measurement of the MTC at **BOG** 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.

**BOL** The **BOG** 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 **BOG** MTC limit of the LCO. If required, measurement results and predicted design values can be used to establish administrative withdrawal limits for control banks.

## 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 EOG 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
- EOL necessarily be less negative than the EOG LCO limit. The 300 ppm SR
- EOL value is sufficiently less negative than the EOG LCO limit value to ensure that the LCO limit will be met when the 300 ppm Surveillance criterion is met.

SR 3.1.3.2 is modified by ~~three~~ <sup>four</sup> Notes that include the following requirements:

- a. The SR is not required to be performed until 7 effective full power <sup>2</sup> days (EFPDs), plus the extension allowed by SR 3.0.3, <sup>4</sup> after reaching the equivalent of an equilibrium RTP all rods out (ARO) boron concentration of 300 ppm.
- EOL b. If the 300 ppm Surveillance limit is exceeded, it is possible that the EOG limit on MTC could be reached before the planned EOG.
- EOL Because the MTC changes slowly with core depletion, the Frequency
- EOL of 14 effective full power days, plus the extension allowed by
- <sup>2</sup> SR 3.0.3, is sufficient to avoid exceeding the EOG limit.
- 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 EOG limit will not be exceeded because of the gradual manner in which MTC changes with core burnup.

INSERT 1

## REFERENCES

1. ~~10 CFR 50, Appendix A, GDC 11.~~ UFSAR, Section 3.2.1
- U 2. FSAR, Chapter [15]. <sup>14</sup> WCAP-9272-P-A, "Westinghouse Reload Safety Evaluation Methodology," July 1985.
3. ~~WCAP 9273-NP-A, "Westinghouse Reload Safety Evaluation Methodology," July 1985.~~
- U 4. FSAR, Chapter [15]. Section 14.1.2

- d. Measurement of the MTC may be suspended provided the benchmark criteria and the revised prediction specified in the COLR are satisfied.

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

1. Changes are made (additions, deletions, and/or changes) to the Improved Standard Technical Specifications (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.

## **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

A01

A01

GROUP HEIGHT

Alignment Limits

Rod

#### LIMITING CONDITION FOR OPERATION

LCO 3.1.4

SR 3.1.4.1  
Note 2

3.1.3.1 All ~~full length~~ (shutdown and control) rods shall be OPERABLE and ~~positioned within the~~ Allowed Rod Misalignment between the Analog Rod Position Indication and the group step counter demand position ~~within one hour after rod motion. The Allowed Rod Misalignment~~ shall be defined as:

A01

L08

- a. for THERMAL POWER less than or equal to 90% of RATED THERMAL POWER, the Allowed Rod Misalignment is  $\pm 18$  steps, and
- b. for THERMAL POWER greater than 90% of RATED THERMAL POWER, the Allowed Rod Misalignment is  $\pm 12$  steps.

Applicability APPLICABILITY: MODES 1\* and 2\*

A02

#### ACTION:

- ACTION A** — a. With one or more full length rods inoperable due to being immovable as a result of excessive friction or mechanical interference or known to be untrippable, determine that the SHUTDOWN MARGIN requirement of Specification 3.1.1.1 is satisfied within 1 hour and be in HOT STANDBY within 6 hours.
- ACTION D** — b. With more than one full length rod ~~inoperable or~~ misaligned from the group step counter demand position by more than  $\pm 12$  steps ~~and THERMAL POWER greater than 90% of RATED THERMAL POWER~~, within 1 hour either:
1. ~~Restore all indicated rod positions to within the Allowed Rod Misalignment, or~~
  2. ~~Reduce THERMAL POWER to less than 90% of RATED THERMAL POWER and confirm that all indicated rod positions are within the Allowed Rod Misalignment, or~~
  3. Be in HOT STANDBY within the following 6 hours.
- ACTION D** — c. With more than one full length rod ~~inoperable~~ or misaligned from the group step counter demand position by more than  $\pm 18$  steps ~~and THERMAL POWER less than or equal to 90% of RATED THERMAL POWER~~, within 1 hour either:
1. Restore all indicated rod positions to within the Allowed Rod Misalignment, or
  2. Be in HOT STANDBY within the following 6 hours.

L01

A05

M01

A05

M01

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

A02

# REACTIVITY CONTROL SYSTEMS LIMITING CONDITION FOR OPERATION (Continued)

ACTION B

d. With one full length rod ~~inoperable due to causes other than addressed by ACTION a, above,~~ ~~or~~ misaligned from its group step counter demand position by more than the Allowed Rod Misalignment of Specification 3.1.3.1, POWER OPERATION may continue provided that within one hour either:

1. ~~The rod is restored to OPERABLE status within the Allowed Rod Misalignment of Specification 3.1.3.1, or~~
2. ~~The remainder of the rods in the bank with the inoperable rod are aligned to within the Allowed Rod Misalignment of Specification 3.1.3.1 of the inoperable rod while maintaining the rod sequence and insertion limits of Specification 3.1.3.6; the THERMAL POWER level shall be restricted pursuant to Specification 3.1.3.6 during subsequent operation, or~~
3. ~~The rod is declared inoperable and~~ the SHUTDOWN MARGIN requirement of Specification 3.1.1.1 is satisfied, POWER OPERATION may then continue provided that:

a) The THERMAL POWER level is reduced to less than or equal to 75% of RATED THERMAL POWER within ~~one~~ hour and ~~within the next 4 hours the power range neutron flux high trip setpoint is reduced to less than or equal to 85% of RATED THERMAL POWER. THERMAL POWER shall be maintained less than or equal to 75% of RATED THERMAL POWER until compliance with ACTIONS 3.1.3.1.d.3.c and 3.1.3.1.d.3.d below are demonstrated,~~ and

- b) The SHUTDOWN MARGIN requirement of Specification 3.1.1.1 is determined at least once per 12 hours, and
- c) A power distribution map is obtained from the movable incore detectors and  $F_Q(Z)$  and  $F_{\Delta H}^N$  are verified to be within their limits within 72 hours, and
- d) A reevaluation of ~~each~~ accident analysis ~~of Table 3.1.4~~ 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.

ACTION B

## 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 Allowed Rod Misalignment of the group step counter demand position in accordance with the Surveillance Frequency Control Program (allowing for one hour thermal soak after rod motion) [except during time intervals when the Rod Position Deviation Monitor is inoperable, then verify the group positions] ~~at least once per 4 hours.~~
- SR 3.1.4.1 Note 2
- SR 3.1.4.1 Note 1
- 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 OPERABLE by movement of ~~at least~~ 10 steps in any one direction in accordance with the Surveillance Frequency Control Program.

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 Coolant System Pipe Rupture~~

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

LA01

REACTIVITY CONTROL SYSTEMSROD DROP TIMELIMITING 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 shall be less than or equal to 2.4 seconds from beginning of decay of stationary gripper coil voltage to dashpot entry with:

- a.  $T_{avg}$  greater than or equal to 500°F, and
- b. All reactor coolant pumps operating.

Applicability APPLICABILITY: MODES 1 and 2.

ACTION:

~~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

← Add proposed Required ACTION A

M03

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~~
- ~~c. In accordance with the Surveillance Frequency Control Program.~~

L06

A01

### 3/4.1 REACTIVITY CONTROL SYSTEMS

#### 3/4.1.1 BORATION CONTROL

SHUTDOWN MARGIN -  $T_{avg}$  GREATER THAN 200°F

#### LIMITING CONDITION FOR OPERATION

See ITS  
3.1.1

3.1.1.1 The SHUTDOWN MARGIN shall be within the limits specified in the COLR.

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

#### ACTION:

With the SHUTDOWN MARGIN not within limits, immediately initiate and continue boration at greater than or equal to 16 gpm of a solution containing greater than or equal to 3.0 wt% (5245 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 within the limits specified in the COLR:~~

L07

- ~~a. Within 1 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 by verifying that control bank withdrawal is within the limits of Specification 3.1.3.6 in accordance with the Surveillance Frequency Control Program; See ITS  
3.1.1
- c. When in MODE 2 with  $K_{eff}$  less than 1, 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 Specification 4.1.1.1e. below, with the control banks at the maximum insertion limit of Specification 3.1.3.6; and See ITS  
3.1.1

\*See Special Test Exceptions Specification 3.10.1. See ITS  
3.1.1

REACTIVITY CONTROL SYSTEMSSHUTDOWN MARGIN -  $T_{avg}$  LESS THAN OR EQUAL TO 200°FLIMITING CONDITION FOR OPERATION

3.1.1.2 The SHUTDOWN MARGIN shall be within the limit specified in the COLR.

(See ITS  
3.1.1)

APPLICABILITY: MODE 5.

ACTION:

With the SHUTDOWN MARGIN not within limits, immediately initiate and continue boration at greater than or equal to 16 gpm of a solution containing greater than or equal to 3.0 wt% (5245 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 within the limit specified in the COLR:~~

(L07)

- a. ~~Within 1 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); and

(See ITS  
Chapter 1.0)

- b. In accordance with the Surveillance Frequency Control Program 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)

## REACTIVITY CONTROL SYSTEMS

### 3/4.1.3 MOVABLE CONTROL ASSEMBLIES

A01

A01

GROUP HEIGHT

Alignment Limits

Rod

### LIMITING CONDITION FOR OPERATION

LCO 3.1.4

SR 3.1.4.1  
Note 2

3.1.3.1 All ~~full length~~ (shutdown and control) rods shall be OPERABLE and ~~positioned within the~~ Allowed Rod Misalignment between the Analog Rod Position Indication and the group step counter demand position ~~within one hour after rod motion. The Allowed Rod Misalignment~~ shall be defined as:

A01

L08

- for THERMAL POWER less than or equal to 90% of RATED THERMAL POWER, the Allowed Rod Misalignment is  $\pm 18$  steps, and
- for THERMAL POWER greater than 90% of RATED THERMAL POWER, the Allowed Rod Misalignment is  $\pm 12$  steps.

Applicability APPLICABILITY: MODES 1\* and 2\*

A02

### ACTION:

- With one or more full length rods inoperable due to being immovable as a result of excessive friction or mechanical interference or known to be untrippable, determine that the SHUTDOWN MARGIN requirement of Specification 3.1.1.1 is satisfied within 1 hour and be in HOT STANDBY within 6 hours.   
Add proposed Required Action A.1.2
- With more than one full length rod ~~inoperable or~~ misaligned from the group step counter demand position by more than  $\pm 12$  steps ~~and THERMAL POWER greater than 90% of RATED THERMAL POWER~~, within 1 hour either:
  - ~~Restore all indicated rod positions to within the Allowed Rod Misalignment, or~~
  - ~~Reduce THERMAL POWER to less than 90% of RATED THERMAL POWER and confirm that all indicated rod positions are within the Allowed Rod Misalignment, or~~   
Add proposed Required Action D1.1.1 and D1.1.2
  - Be in HOT STANDBY within the following 6 hours.
- With more than one full length rod ~~inoperable~~ or misaligned from the group step counter demand position by more than  $\pm 18$  steps ~~and THERMAL POWER less than or equal to 90% of RATED THERMAL POWER~~, within 1 hour either:
  - Restore all indicated rod positions to within the Allowed Rod Misalignment, or   
Add proposed Required Action D1.1.1 and D1.1.2
  - Be in HOT STANDBY within the following 6 hours.

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

A02

# REACTIVITY CONTROL SYSTEMS LIMITING CONDITION FOR OPERATION (Continued)

ACTION B

- d. With one full length rod ~~inoperable due to causes other than addressed by ACTION a, above, or~~ misaligned from its group step counter demand position by more than the Allowed Rod Misalignment of Specification 3.1.3.1, POWER OPERATION may continue provided that within one hour either:
1. ~~The rod is restored to OPERABLE status within the Allowed Rod Misalignment of Specification 3.1.3.1, or~~
  2. ~~The remainder of the rods in the bank with the inoperable rod are aligned to within the Allowed Rod Misalignment of Specification 3.1.3.1 of the inoperable rod while maintaining the rod sequence and insertion limits of Specification 3.1.3.6; the THERMAL POWER level shall be restricted pursuant to Specification 3.1.3.6 during subsequent operation, or~~
  3. ~~The rod is declared inoperable and~~ the SHUTDOWN MARGIN requirement of Specification 3.1.1.1 is satisfied. POWER OPERATION may then continue provided that:
    - a) The THERMAL POWER level is reduced to less than or equal to 75% of RATED THERMAL POWER within ~~one~~ hour and ~~within the next 4 hours the power range neutron flux high trip setpoint is reduced to less than or equal to 85% of RATED THERMAL POWER. THERMAL POWER shall be maintained less than or equal to 75% of RATED THERMAL POWER until compliance with ACTIONS 3.1.3.1.d.3.c and 3.1.3.1.d.3.d below are demonstrated, and~~
    - b) The SHUTDOWN MARGIN requirement of Specification 3.1.1.1 is determined at least once per 12 hours, and
    - c) A power distribution map is obtained from the movable incore detectors and  $F_Q(Z)$  and  $F_{\Delta H}^N$  are verified to be within their limits within 72 hours, and
    - d) A reevaluation of ~~each~~ accident analysis ~~of Table 3.1.4~~ 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.

ACTION B

## 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 Allowed Rod Misalignment of the group step counter demand position in accordance with the Surveillance Frequency Control Program (allowing for one hour thermal soak after rod motion) [except during time intervals when the Rod Position Deviation Monitor is inoperable, then verify the group positions] ~~at least once per 4 hours.~~
- SR 3.1.4.1 Note 2
- SR 3.1.4.1 Note 1
- 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 OPERABLE by movement of ~~at least~~ 10 steps in any one direction in accordance with the Surveillance Frequency Control Program.



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 Coolant System Pipe Rupture~~

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

LA01

REACTIVITY CONTROL SYSTEMSROD DROP TIMELIMITING 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 shall be less than or equal to 2.4 seconds from beginning of decay of stationary gripper coil voltage to dashpot entry with:

- a.  $T_{avg}$  greater than or equal to 500°F, and
- b. All reactor coolant pumps operating.

Applicability APPLICABILITY: MODES 1 and 2.

ACTION:

~~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

← Add proposed Required ACTION A

M03

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~~
- ~~c. In accordance with the Surveillance Frequency Control Program.~~

L06

A01

### 3/4.1 REACTIVITY CONTROL SYSTEMS

#### 3/4.1.1 BORATION CONTROL

SHUTDOWN MARGIN -  $T_{avg}$  GREATER THAN 200°F

#### LIMITING CONDITION FOR OPERATION

See ITS  
3.1.1

3.1.1.1 The SHUTDOWN MARGIN shall be within the limits specified in the COLR.

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

#### ACTION:

With the SHUTDOWN MARGIN not within limits, immediately initiate and continue boration at greater than or equal to 16 gpm of a solution containing greater than or equal to 3.0 wt% (5245 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 within the limits specified in the COLR:~~

L07

- ~~a. Within 1 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 by verifying that control bank withdrawal is within the limits of Specification 3.1.3.6 in accordance with the Surveillance Frequency Control Program; See ITS  
3.1.1
- c. When in MODE 2 with  $K_{eff}$  less than 1, 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 Specification 4.1.1.1e. below, with the control banks at the maximum insertion limit of Specification 3.1.3.6; and See ITS  
3.1.1

\*See Special Test Exceptions Specification 3.10.1. See ITS  
3.1.1

REACTIVITY CONTROL SYSTEMSSHUTDOWN MARGIN -  $T_{avg}$  LESS THAN OR EQUAL TO 200°FLIMITING CONDITION FOR OPERATION

3.1.1.2 The SHUTDOWN MARGIN shall be within the limit specified in the COLR.

(See ITS  
3.1.1)

APPLICABILITY: MODE 5.

ACTION:

With the SHUTDOWN MARGIN not within limits, immediately initiate and continue boration at greater than or equal to 16 gpm of a solution containing greater than or equal to 3.0 wt% (5245 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 within the limit specified in the COLR:~~

(L07)

- a. ~~Within 1 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); and

(See ITS  
Chapter 1.0)

- b. In accordance with the Surveillance Frequency Control Program 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)

## **DISCUSSION OF CHANGES**

### **ITS 3.1.4, ROD GROUP ALIGNMENT LIMITS**

#### ADMINISTRATIVE CHANGES

- A01 In the conversion of the Turkey Point Nuclear Generating Station (PTN) 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. 5.0, "Standard Technical Specifications - Westinghouse Plants" (ISTS).

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 d.2 states "The remainder of the rods in the bank with the inoperable rod are aligned to within the Allowed Rod Misalignment of Specification 3.1.3.1 of the inoperable rod while maintaining the rod sequence and insertion limits 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 Limiting Condition for Operation (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 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.

CTS 4.0.4 and ITS Surveillance Requirement (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 permit entry into an applicable mode when an LCO is not met due to an SR not being met, in accordance with ITS LCO 3.0.4. Application of

## **DISCUSSION OF CHANGES**

### **ITS 3.1.4, ROD GROUP ALIGNMENT LIMITS**

ITS LCO 3.0.4 in this case would be acceptable only if plant risk is assessed and deemed to be acceptable. With rod drop times not verified, the reactivity risk to the plant would never be deemed acceptable for entry into MODES 1 or 2. Therefore, 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 since LCO 3.0.4 could not be applied for this configuration. 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.

- A05 CTS 3.1.3.1 ACTION S b.1, c.1, and d.1 require a misaligned rod to be restored to OPERABLE status within one hour. ITS 3.1.4 does not contain a Required Action stating this. This changes the CTS by not specifically stating that the restoration of Allowed Rod Misalignment is required.

This change is acceptable because the technical requirements have not changed. Restoration of compliance with the LCO is always an available Required Action. The convention in the ITS is to not state such "restore" options explicitly unless it is the only action or is required for clarity. This change is designated as an administrative change since it does not result in technical changes to the CTS.

### **MORE RESTRICTIVE CHANGES**

- M01 CTS 3.1.3.1 ACTION b states "With more than one full length rod inoperable or misaligned from the group step counter demand position by more than  $\pm 12$  steps and THERMAL POWER greater than 90% of RATED THERMAL POWER, within 1 hour either: 1. Restore all indicated rod positions to within the Allowed Rod Misalignment, or 2. Reduce THERMAL POWER to less than 90% of RATED THERMAL POWER and confirm that all indicated rod positions are within the Allowed Rod Misalignment, or 3. Be in HOT STANDBY within the following 6 hours." CTS 3.1.3.1 ACTION c states "With more than one full length rod inoperable or misaligned from the group step counter demand position by more than  $\pm 18$  steps and THERMAL POWER less than or equal to 90% of RATED THERMAL POWER, within 1 hour either: 1. Restore all indicated rod positions to within the Allowed Rod Misalignment, or 2. Be in HOT STANDBY within the following 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 (SDM) 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 b and ACTION c 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 SDM must be evaluated. ITS 3.1.4 adds Required Actions to allow verification that the SDM is within the limit or to borate to restore the SDM to within limits. These new Required Actions must be accomplished within 1 hour. The one hour allows the operator adequate time to determine the SDM. Restoration of the required SDM, if necessary, requires increasing the Reactor Coolant System (RCS) boron concentration to provide negative reactivity. The required Completion Time of 1 hour for initiating boration is

## **DISCUSSION OF CHANGES**

### **ITS 3.1.4, ROD GROUP ALIGNMENT LIMITS**

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. Boration will continue until the required SDM is restored. This change is acceptable because it is consistent with the assumptions of the safety analyses to be within the SDM limit. This change has been designated as more restrictive because it adds explicit actions to verify SDM or to restore SDM within limits.

- M02 CTS 3.1.3.1 ACTION d 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.

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 requires that with the drop time of any full length rod determined to exceed the above limit, restore the rod drop time must be restored to within the above limit prior to proceeding to MODE 1 or 2. 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 Core Operating Limits Report (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 inoperable 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 accident occurring, and the steps required to complete the action. 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

## **DISCUSSION OF CHANGES**

### **ITS 3.1.4, ROD GROUP ALIGNMENT LIMITS**

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 3 – Removing Procedural Details for Meeting TS Requirements or Reporting Requirements*) CTS 3.1.3.1 ACTION d.3.d) 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.5 requires that when one rod is misaligned, re-evaluation of the safety analyses is performed along with confirmation that the 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 Updated Final Safety Analysis Report (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 that the 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.

#### LESS RESTRICTIVE CHANGES

- L01 (*Category 4 – Relaxation of Required Action*) CTS 3.1.3.1 ACTION a states, in part, with one or more full length rods inoperable due to being immovable as a result of excessive friction, determine that the SHUTDOWN MARGIN requirement of Specification 3.1.1.1 is satisfied within 1 hour. CTS 3.1.3.1 ACTION d.3 states, in part, with one full length rod misaligned from its group step counter demand height, the rod is declared inoperable and the SDM 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 SDM 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 SDM.

The purpose of CTS 3.1.3.1 ACTION a and d.3 is to verify adequate SDM 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



## **DISCUSSION OF CHANGES**

### **ITS 3.1.4, ROD GROUP ALIGNMENT LIMITS**

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 SDM requirements. Providing a short period of time to reestablish the SDM GIN requirement instead of entering ITS LCO 3.0.3 is justified because of the existing conservatism in the SDM 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 d specifies the requirements for one full length rod misaligned from its group step counter demand height by more than the allowed rod misalignment. CTS 3.1.3.1 ACTION d.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 the specified 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 d.3.a 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 d.3.a 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 Completion Time is consistent with safe operation under the specified Condition, the capacity and capability of remaining features, and the low probability of a Design Basis Accident (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.

**DISCUSSION OF CHANGES**  
**ITS 3.1.4, ROD GROUP ALIGNMENT LIMITS**

- L04 (*Category 4 – Relaxation of Required Action*) CTS 3.1.3.1 ACTION d.3.a 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  $\leq 75\%$  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 d.3.a 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 a 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 "...verify 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.

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 that the rods are misaligned. This change is designated as less restrictive because Surveillances will be performed less frequently under the ITS than under the CTS.

- L06 (*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.

## **DISCUSSION OF CHANGES**

### **ITS 3.1.4, ROD GROUP ALIGNMENT LIMITS**

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 specified 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 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.

- L07 *(Category 5 – Deletion of Surveillance Requirement)* CTS 4.1.1.1.a requires the SDM to be within the limits specified in the COLR 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 SDM to be determined within the limits specified in the COLR 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.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 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

## **DISCUSSION OF CHANGES**

### **ITS 3.1.4, ROD GROUP ALIGNMENT LIMITS**

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.

- L08    *(Category 7 – Relaxation Of Surveillance Frequency Change - NON-24 MONTH TYPE CHANGE)* CTS 3.1.3.1 states "...within one hour after rod motion." ITS SR 3.1.4.1 Note states "Not required to be performed until 1 hour after associated rod motion." This changes the CTS by allowing verification after 1 hour.

The purpose of CTS 3.1.3.1 and ITS SR 3.1.4.1 is verification of position of individual rods within alignment limit. This change is acceptable because the new Surveillance Frequency has been evaluated to ensure that it provides an acceptable level of equipment reliability. Allowing verification after 1 hour may result in additional time to complete the Surveillance. This change is designated as less restrictive because Surveillances will be performed less frequently under the ITS than under the CTS.

# **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 M03 A. One or more rod(s) inoperable.	A.1.1 Verify SDM to be within the limits specified in the COLR.	1 hour
	<u>OR</u>	
	A.1.2 Initiate boration to restore SDM to within limit.	1 hour
	<u>AND</u>	
	A.2 Be in MODE 3.	6 hours
3.1.3.1 ACTION d B. One rod not within alignment limits.	B.1.1 Verify SDM to be within the limits specified in the COLR.	1 hour
	<u>OR</u>	

**INSERT 1**

Rod misalignment between analog rod position indication and group step counter demand position shall be:

- a.  $\pm 18$  steps with THERMAL POWER  $\leq 90\%$  RTP, and
- b.  $\pm 12$  steps with THERMAL POWER  $> 90\%$  RTP.

ACTIONS (continued)

CONDITION	REQUIRED ACTION	COMPLETION TIME
3.1.3.1 ACTION d	B.1.2 Initiate boration to restore SDM to within limit.  <u>AND</u>	1 hour
	B.2 Reduce THERMAL POWER to ≤ 75% RTP.  <u>AND</u>	2 hours
	B.3 Verify SDM is within the limits specified in the COLR.  <u>AND</u>	Once per 12 hours
	B.4 Perform SR 3.2.1.1, <del>SR 3.2.1.2</del> , and SR 3.2.2.1.  <u>AND</u>	72 hours
	B.5 Re-evaluate safety analyses and confirm results remain valid for duration of operation under these conditions.	5 days
DOC M02	C. Required Action and associated Completion Time of Condition B not met.	C.1 Be in MODE 3.
3.1.3.1 ACTION b, 3.1.3.1 ACTION c	D. More than one rod not within alignment limit.  <u>OR</u>	D.1.1 Verify SDM is within the limits specified in the COLR.



ACTIONS (continued)

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

SURVEILLANCE REQUIREMENTS

SURVEILLANCE		FREQUENCY
4.1.3.1.1    SR 3.1.4.1	<div>----- NOTES -----</div> <div>1. Not required to be performed for rods associated with inoperable rod position indicator or demand position indicator.</div> <div>3.1.3.1 LCO</div> <div><div>[2. Not required to be performed until 1 hour after associated rod motion.]</div></div> <div>-----</div> <div>Verify position of individual rods within alignment limit.</div>	<div></div> <div><del>[12 hours]</del></div> <div><u>OR</u></div> <div>In accordance with the Surveillance Frequency Control Program }</div>
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.	<div><del>[92 days]</del></div> <div><u>OR</u></div> <div>In accordance with the Surveillance Frequency Control Program }</div>

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SURVEILLANCE REQUIREMENTS (continued)

SURVEILLANCE		FREQUENCY
SR 3.1.4.3	Verify rod drop time of each rod, from the fully withdrawn position, is $\leq$ <del>2.2</del> seconds from the beginning of decay of stationary gripper coil voltage to dashpot entry, with:  a. $T_{avg} \geq 500^{\circ}\text{F}$ and  b. All reactor coolant pumps operating.	Prior to criticality after each removal of the reactor head

3.1.3.4,  
4.1.3.4

2.4

2

**JUSTIFICATION FOR DEVIATIONS**  
**ITS 3.1.4, ROD GROUP ALIGNMENT LIMITS**

1. Changes are made (additions, deletions, and/or changes) to the Improved Standard Technical Specifications (ISTS) 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. Changes were made to reflect inclusion of specific CTS not included in ISTS.
4. Changes have been made to reflect changes made to the Specification.
5. CTS 3.1.3.1 Action d.3.c) requires that a power distribution map is obtained from the movable incore detectors and  $F_Q^0(Z)$  and  $F_{\Delta H}^N$  are verified to be within their limits within 72 hours. ITS 3.1.4 Required Action B.4 provides similar requirements allowing  $F_Q^0(Z)$  to be obtained by either SR 3.2.1.1 or SR 3.2.1.2 and  $F_{\Delta H}^N$  to be obtained by SR 3.2.2.1.

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

B 3.1 REACTIVITY CONTROL SYSTEMS

~~B 3.3 INSTRUMENTATION~~

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.

1967 AEC Proposed General Design Criteria, GDC 27, "Redundancy of Reactivity Control," GDC 6, "Reactor Core Design"

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).

References 1 and 6

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~~ inch) at a time, but at varying rates (steps per minute) depending on the signal output from the Rod Control System.

5/8

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~~ four control banks and ~~at least~~ two shutdown banks.

Each unit has

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

## 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.

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

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 ( $\pm 1$  step or  $\pm \frac{5}{8}$  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.

The <sup>Rod Position Indication</sup> ~~DRPI~~ System provides <sup>an</sup> a highly accurate 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 <sup>Rod Position Indication</sup> ~~DRPI~~ System is capable of monitoring rod position within at least  $\pm 12$  steps ~~with either full accuracy or half accuracy.~~

### 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
- b. The core remains subcritical after accident transients.

## BASES

### APPLICABLE SAFETY ANALYSES (continued)

~~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.~~

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Two types of analysis are performed in regard to static rod misalignment (Ref. 4). 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 bank 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.

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).

~~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.~~

~~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 ( $F_{\Delta H}^N$ ) 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  $F_{\Delta H}^N$  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  $F_{\Delta H}^N$  to the operating limits.~~

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. 5)



## 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.

INSERT 2

~~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 (15 inches), and in some cases a total misalignment from fully withdrawn to fully inserted is assumed.~~

linear heat rate (

Failure to meet the requirements of this LCO may produce unacceptable power peaking factors and LHRs, or unacceptable SDMs, ~~all of which~~ may constitute initial conditions inconsistent with the safety analysis.

)  
that

### 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 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.

### 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.

**INSERT 2**

The allowed rod misalignment when THERMAL POWER is less than or equal to 90% of RATED THERMAL POWER, is  $\pm 18$  steps. When THERMAL POWER is greater than 90% of RATED THERMAL POWER, the allowed rod misalignment is  $\pm 12$  steps.

## 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.1.1 and B.1.2

When a rod becomes misaligned, it can usually be moved and is ~~still~~ trippable. 7

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."

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 trippable ~~but misaligned,~~ misaligned but (OPERABLE) 7 4  
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.

#### B.2, B.3, B.4, and B.5

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

## BASES

### ACTIONS (continued)

4 Reduction of power to 75% RTP ensures that local LHR increases ~~due to~~ a misaligned RCCA will not cause the core design criteria to be exceeded (Ref. ~~7~~). The Completion Time of 2 hours gives the operator sufficient time to accomplish an orderly power reduction without challenging the Reactor Protection System. resulting from 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  $F_Q(Z)$ , ~~as approximated by  $F_Q^C(Z)$  and  $F_Q^W(Z)$~~ , and  $F_{\Delta H}^N$  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  $F_Q(Z)$  and  $F_{\Delta H}^N$ . 1

4 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 FSAR Chapter ~~15~~ (Ref. ~~5~~) that may be adversely affected will be 4 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  $K_{eff} < 1.0$~~  within 6 hours, which 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. 4 4 3

## BASES

### ACTIONS (continued)

#### 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 of increasing the RCS boron concentration to provide negative reactivity, as described in the Bases ~~or~~ 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.

8

#### 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 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  $K_{eff} < 1.0$~~  within 6 hours.

of the control banks

1

4

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

3

4

### SURVEILLANCE REQUIREMENTS

#### SR 3.1.4.1

~~[Verification that the position of individual rods is 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.]~~

6

~~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.~~

5

6

The SR is modified by a Note that permits it to not be performed for rods associated with an inoperable demand position indicator or an inoperable rod position indicator. The alignment limit is based on the demand position indicator which is not available if the indicator is inoperable. LCO 3.1.7, "Rod Position Indication," provides Actions to verify the rods are in alignment when one or more rod position indicators are inoperable.

#### Reviewer's Note

~~The bracketed SR Note is only applicable to plants with an analog rod position indication system.~~

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~~[The Surveillance is modified by a Note which states that the SR is not required to be performed until 1 hour after associated rod motion. Control rod temperature affects the accuracy of the rod position indication system. Due to changes in the magnetic permeability of the drive shaft as a function of temperature, the indicated position is expected to change with time as the drive shaft temperature changes. The one hour period allows control rod temperature to stabilize following rod movement in order to ensure the indicated rod position is accurate.]~~

6

#### 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 10 steps 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.~~

greater than or equal to

in either direction

4

1

6

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.~~

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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.

#### 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~~, 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  $\geq 500^{\circ}\text{F}$  to simulate a reactor trip under actual conditions.

installation

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.

1967 AEC Proposed General Design Criteria, GDC 6 and GDC 27

### REFERENCES

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

Section 14.1.4

14

WCAP-17152-P, Rev. 1, "Turkey Point Unit 3 and 4 Extended Power Uprate (EPU) Engineering Report," November 2014.

Section 3.1.2

1

1

6

1

6

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1

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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 Improved Standard Technical Specifications (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 Limiting Condition for Operation (LCO) is not met. The ITS Bases 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. 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.
7. Editorial changes made for enhanced clarity/consistency.
8. Typographical/grammatical error corrected.



## **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.

## **ATTACHMENT 5**

### **ITS 3.1.5, SHUTDOWN BANK INSERTION LIMITS**

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

## REACTIVITY CONTROL SYSTEMS

### SHUTDOWN ~~ROD~~ INSERTION LIMIT

BANK

A02

## LIMITING CONDITION FOR OPERATION

LCO 3.1.5

3.1.3.5 ~~All~~ shutdown ~~rods~~ shall be ~~fully withdrawn~~.  
 Each bank within insertion limits specified in the COLR

A02

Applicability

APPLICABILITY: MODES 1\* and 2\*\*\*

A03

M01

### ACTION:

Add proposed Required ACTION A

LCO NOTE

L03

~~With a maximum of one shutdown rod not fully withdrawn, except for surveillance testing pursuant to Specification 4.1.3.1.2, within 4 hour either:~~  
 two One or more shutdown banks not within limits for reasons other than Condition A.

ACTION B

a. ~~Fully withdraw the rod, or~~

Add proposed Required ACTIONS B.1.1, B.1.2, and B.2

L01

b. ~~Declare the rod to be inoperable and apply Specification 3.1.3.1.~~

Add proposed Required ACTION C

## SURVEILLANCE REQUIREMENTS

Add proposed SR 3.1.5.1 Note

L04

SR 3.1.5.1

4.1.3.5 Each shutdown ~~rod~~ shall be determined to be ~~fully withdrawn~~:  
 bank

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. In accordance with the Surveillance Frequency Control Program ~~thereafter~~.

A01

\*~~See Special Test Exceptions Specifications 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 Turkey Point Nuclear Generating Station (PTN) 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 NUREG1431, Rev. 5.0, "Standard Technical Specifications - Westinghouse Plants" (ISTS).

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 fully withdrawn." Additionally, the title of CTS 3.1.3.5 is "SHUTDOWN ROD INSERTION LIMIT." ITS Limiting Condition for Operation (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 shut down the reactor and to maintain the shutdown margin (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 shut down the reactor and to maintain the SDM. This change is a change in presentation to match the ITS 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 states "...except for surveillance testing pursuant to Specification 4.1.3.1.2...". ITS LCO 3.1.5 Applicability Note states "Not applicable to shutdown banks inserted while performing SR 3.1.4.2." The CTS statement has been moved to LCO 3.1.5. This changes the CTS by not including the statement for surveillance testing in the ACTION.

The purpose of CTS 4.1.3.1.2 is to determine each full length rod not fully inserted in the core to be OPERABLE by movement of  $\geq 10$  steps in any one direction in accordance with the Surveillance Frequency Control Program (SFCP). The Test Exception residing in the ITS LCO does not modify the Applicability of this Specification. This change is designated as administrative because it does not result in a technical change to the CTS.

## DISCUSSION OF CHANGES ITS 3.1.5, SHUTDOWN BANK INSERTION LIMITS

### MORE RESTRICTIVE CHANGES

- M01 CTS 3.1.3.5 is applicable in MODES 1 and 2 with  $k_{\text{eff}} \geq 1.0$ . 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 SDM 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 SDM is available and is consistent with plant operation, in that the shutdown banks are completely withdrawn before beginning to withdraw the control banks and approaching criticality. This change is designated as more restrictive because it increases the conditions under which Technical Specification controls will be applied.

### RELOCATED SPECIFICATIONS

None

### REMOVED DETAIL CHANGES

None

### LESS RESTRICTIVE CHANGES

- L01 (*Category 4 – Relaxation of Required Action*) CTS 3.1.3.5 ACTION provides compensatory actions for a maximum of one shutdown rod not fully withdrawn. The actions require within one hour to either fully withdraw the rod or declare the rod to be inoperable and apply ACTION 3.1.3.1. For more than one shutdown rod not fully withdrawn, 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 that the SDM is within the limits specified in the Core Operating Limits Report (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 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 not fully withdrawn, provides an additional hour to restore the shutdown bank or shutdown rod to within limits, eliminates the requirement 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.

## **DISCUSSION OF CHANGES**

### **ITS 3.1.5, SHUTDOWN BANK INSERTION LIMITS**

The purpose of CTS 3.1.3.5 ACTION is to ensure the shutdown banks are fully withdrawn in order to ensure that there is sufficient SDM 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 Design Basis Accident (DBA) occurring during the repair period. Allowing an additional hour (two hours total) to restore one or more shutdown banks (or more than one shutdown rod) to within insertion limits 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 SDM requirement is met or actions to restore the SDM 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 specified 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 designated as less restrictive because a Surveillance which was required in CTS will not be required in the ITS.

- L03 (*Category 4 – Relaxation of Required Action*) CTS 3.1.3.5 ACTION provides compensatory actions for a maximum of one shutdown rod not fully withdrawn. The Actions require within one hour either fully withdraw the rod or declare the rod to be inoperable and apply ACTION 3.1.3.1. For more than one shutdown bank not fully withdrawn, 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 A provides Required Actions for one shutdown bank inserted  $\leq 20$  steps beyond the



## **DISCUSSION OF CHANGES**

### **ITS 3.1.5, SHUTDOWN BANK INSERTION LIMITS**

insertion limits specified in the COLR. ITS 3.1.5 Required Action A.1 requires verification of all control banks are within the insertion limits specified in the COLR and either verification that the SDM is within the limits specified in the COLR (Required Action A.1.1) or the initiation of boration to restore SDM to within limits (Required Action A.1.2), all three within 1 hour. ITS 3.1.5 Required Action A.3 requires restoration of the shutdown banks to within limits within 24 hours. Additionally, ITS 3.1.5 ACTION C requires that 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 one shutdown bank to be not fully withdrawn, provides an additional 24 hours 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 not fully withdrawn.

The purpose of CTS 3.1.3.5 ACTION is to ensure the shutdown banks are fully withdrawn in order to ensure that there is sufficient SDM 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 24 hours to restore one shutdown bank to within insertion limits 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 SDM 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.

- L04 *(Category 7 – Relaxation Of Surveillance Frequency Change - NON-24 MONTH TYPE CHANGE)* CTS Surveillance Requirement (SR) 4.1.3.5 requires the shutdown rod bank to be determined fully withdrawn. The ITS requires the shutdown bank to be within the insertion limits specified in the COLR. The ITS is modified by a Note which states "Not required to be performed until 1 hour after the associated rod motion." This changes the CTS by adding the ITS Note; which, allows the SR to be delayed 1 hour after rod motion.

The purpose of the SR is to ensure the shutdown banks are within the required insertion limit prior to the approach to criticality. This ensures that when the reactor is critical or being taken critical the shutdown banks are available to shut down the reactor and the required SDM will be maintained following a reactor trip. The purpose of the allowed one-hour delay in verification of the insertion limits ensures the accuracy of the rod position indication system is not affected by rod temperature. Due to changes in the magnetic permeability of the drive shaft as a function of temperature, the indicated position is expected to change with time as the drive shaft temperature changes. This change is acceptable because it delays the SR performance for a sufficient time to ensure the

**DISCUSSION OF CHANGES**  
**ITS 3.1.5, SHUTDOWN BANK INSERTION LIMITS**

accuracy of the position indication system. This change is designated as less restrictive because a delay of one hour is allowed to perform the SR that is not currently allowed.

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

### 3.1 REACTIVITY CONTROL SYSTEMS

#### 3.1.3.5 3.1.5 Shutdown Bank Insertion Limits

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

ACTION

-----NOTE-----  
Not applicable to shutdown banks inserted while performing SR 3.1.4.2.  
-----

Applicability APPLICABILITY: MODES 1 and 2.

#### ACTIONS

CONDITION	REQUIRED ACTION	COMPLETION TIME
<p>DOC L03</p> <p>A. One shutdown bank inserted <math>\leq</math> [16] steps beyond the insertion limits specified in the COLR.</p> <p>20</p>	A.1 Verify all control banks are within the insertion limits specified in the COLR.	1 hour
	<u>AND</u>	
	A.2.1 Verify SDM is within the limits specified in the COLR.	1 hour
	<u>OR</u>	
	A.2.2 Initiate boration to restore SDM to within limit.	1 hour
	<u>AND</u>	
	A.3 Restore the shutdown bank to within the insertion limits specified in the COLR.	24 hours
<p>ACTION DOC L01</p> <p>B. One or more shutdown banks not within limits for reasons other than Condition A.</p>	<p>B.1.1 Verify SDM is within the limits specified in the COLR.</p> <p><u>OR</u></p>	1 hour

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ACTIONS (continued)

CONDITION	REQUIRED ACTION	COMPLETION TIME
	B.1.2 Initiate boration to restore SDM to within limit.  <u>AND</u> B.2 Restore shutdown banks to within limits.	1 hour  2 hours
C. Required Action and associated Completion Time not met.	C.1 Be in MODE 3.	6 hours

SURVEILLANCE REQUIREMENTS

SURVEILLANCE	FREQUENCY
<div>4.1.3.5</div> <div>3.1.3.1 LCO</div> <div>SR 3.1.5.1</div> <div> <div>[</div> <div>----- NOTE -----</div> <div>Not required to be performed until 1 hour after associated rod motion.</div> <div>-----]</div> </div> <div>Verify each shutdown bank is within the insertion limits specified in the COLR.</div>	<div> <div>[12 hours</div> <div>OR</div> <div>In accordance with the Surveillance Frequency Control Program ]</div> </div>

3

3

**JUSTIFICATION FOR DEVIATIONS  
ITS 3.1.5, SHUTDOWN BANK INSERTION LIMITS**

1. The Improved Standard Technical Specifications (ISTS) contains bracketed information and/or values that are generic to all Westinghouse vintage plants. The brackets are removed and the proper plant specific information/value is provided. Under Nuclear Energy Institute (NEI) Technical Specification Task Force (TSTF) traveler TSTF-547 the NRC approved, in part, the addition of LCO 3.1.5 Condition A (ADAMS Accession No. ML15328A3500). In TSTF-547 it states that the specific number of steps is bracketed and will be replaced with the plant-specific minimum number of steps that the rods must be moved to perform SR 3.1.4.2. Turkey Point's procedure for performing SR 3.1.4.2 states to insert the shutdown bank a minimum of 10 steps to a maximum of 20 steps until all rod off top indicating lights are off. Therefore, the bracketed value is changed to 20 steps.
2. Changes are made (additions, deletions, and/or changes) to the Improved Standard Technical Specifications (ISTS) that reflect the plant specific nomenclature, number, reference, system description, analysis, or licensing basis description.
3. The ISTS contains bracketed information and/or values that are generic to all Westinghouse vintage plants. The brackets are removed and the proper plant specific information/value is provided. This is acceptable since the information/value is changed to reflect the current licensing basis.

**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

1967 AEC Proposed General Design Criteria, GDC 27, "Redundancy of Reactivity Control," GDC 28, "Reactivity Hot Shutdown Capability," GDC 29, "Reactivity Shutdown Capability," GDC 6, "Reactor Core Design," GDC 32, "Maximum Reactivity Worth of Control Rods," GDC 33, "Reactor Coolant Pressure Boundary Capability"

#### 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.

References 1 and 4

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~~ four control banks and ~~at least~~ two 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.

Each unit has

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 boration). 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. 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.

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### 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 analysis involving core reactivity and SDM (Ref. 3).

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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).

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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.

The LCO is modified by a Note indicating the LCO requirement is not applicable to shutdown banks being inserted while performing SR 3.1.4.2. This SR verifies the freedom of the rods to move, and may require the shutdown bank to move below the LCO limits, which would normally violate the LCO. This Note applies to each shutdown bank as it is moved below the insertion limit to perform the SR. This Note is not applicable should a malfunction stop performance of the SR.

### 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 are fully inserted in the core and contribute to the SDM. Refer to LCO 3.1.1 for SDM requirements in MODES 3, 4, and 5. LCO 3.9.1, "Boron Concentration," ensures adequate SDM in MODE 6.

MODE 2  $K_{\text{eff}} < 1.0$ ,

, except for control rod OPERABILITY testing.

### ACTIONS

A.1, A.2.1, A.2.2, and A.3

#### ~~Reviewer's Note~~

~~The bracketed number [16] in Condition A should be replaced with the plant-specific minimum number of steps that the rods must be moved to ensure correct performance of SR 3.1.4.2.~~

If one shutdown bank is inserted less than or equal to [16] steps below the insertion limit, 24 hours is allowed to restore the shutdown bank to within the limit. This is necessary because the available SDM may be reduced with a shutdown bank not within its insertion limit. 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 a shutdown bank is not within its insertion limit, SDM will be verified by performing a reactivity balance calculation, considering the effects listed in the BASES for SR 3.1.1.1.

While the shutdown bank is outside the insertion limit, all control banks must be within their insertion limits to ensure sufficient shutdown margin is available. The 24 hour Completion Time is sufficient to repair most rod control failures that would prevent movement of a shutdown bank.

## BASES

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### ACTIONS (continued)

#### B.1.1, B.1.2, and B.2

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.

#### C.1

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

---

### 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.

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#### Reviewer's Note

~~The bracketed SR Note is only applicable to plants with an analog rod position indication system.~~

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## BASES

### SURVEILLANCE REQUIREMENTS (continued)

[The Surveillance is modified by a Note which states that the SR is not required to be performed for shutdown banks until 1 hour after motion of rods in those banks. Rod temperature affects the accuracy of the rod position indication system. Due to changes in the magnetic permeability of the drive shaft as a function of temperature, the indicated position is expected to change with time as the drive shaft temperature changes. The one hour period allows rod temperature to stabilize following rod movement in order to ensure the indicated position is accurate.]

~~[ 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.~~

### REFERENCES

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

2. 10 CFR 50.46.

3. FSAR, Chapter [15].

4. UFSAR, Chapter 3.1.2.

1967 AEC Proposed General Design Criteria, GDC 6, GDC 27, GDC 28, GDC 29, GDC 32, and GDC 33

**JUSTIFICATION FOR DEVIATIONS**  
**ITS 3.1.5 BASES, SHUTDOWN BANK INSERTION LIMITS**

1. Changes are made (additions, deletions, and/or changes) to the Improved Standard Technical Specifications (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.
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. 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.

## **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.

## **ATTACHMENT 6**

### **ITS 3.1.6, CONTROL BANK INSERTION LIMITS**



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

REACTIVITY CONTROL SYSTEMS  
 CONTROL ~~ROD~~ <sup>BANK</sup> INSERTION LIMITS

LIMITING CONDITION FOR OPERATION

LCO 3.1.6

3.1.3.6 ~~The~~ control banks shall be ~~limited in physical insertion specified in the Rod Bank Insertion Limits curve, defined in the CORE OPERATING LIMITS REPORT.~~ <sup>within the insertion, sequence, and overlap limits specified</sup> <sup>COLR</sup>

Applicability

APPLICABILITY: MODES 1\* and 2\* \*\*

ACTION:

ACTION B

With the control banks inserted beyond the above insertion limits, <sup>LOC Note</sup> ~~except for surveillance testing pursuant to~~ Specification 4.1.3.1.2 either:

a. Restore the control banks to within the limits within 2 hours, or

~~b. Reduce THERMAL POWER within two hours to less than or equal to that fraction of RATED THERMAL POWER which is allowed by the bank position specified in the Rod Bank Insertion Limits curve, defined in the CORE OPERATING LIMITS REPORT, or~~

ACTION D

c. Be in at least ~~HOT STANDBY~~ within 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 in accordance with the Surveillance Frequency Control Program, ~~except during time intervals when the Rod Insertion Limit Monitor is inoperable, then verify the individual rod positions at least once per 4 hours.~~

~~\* See Special Test Exceptions Specifications 3.10.2 and 3.10.3.~~

Applicability

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

3/4.1 REACTIVITY CONTROL SYSTEMS3/4.1.1 BORATION CONTROLSHUTDOWN MARGIN -  $T_{avg}$  GREATER THAN 200°FLIMITING CONDITION FOR OPERATION

3.1.1.1 The SHUTDOWN MARGIN shall be within the limits specified in the COLR.

(See ITS  
3.1.1)

Applicability

APPLICABILITY: MODES 1, 2\*, 3, and 4.(See ITS  
3.1.1)ACTION:

With the SHUTDOWN MARGIN not within limits, immediately initiate and continue boration at greater than or equal to 16 gpm of a solution containing greater than or equal to 3.0 wt% (5245 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 within the limits specified in the COLR:

- a. Within 1 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);
- b. When in MODE 1 or MODE 2 with  $K_{eff}$  greater than or equal to 1 by verifying that control bank withdrawal is within the limits of Specification 3.1.3.6 in accordance with the Surveillance Frequency Control Program;
- c. When in MODE 2 with  $K_{eff}$  less than 1, 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 Specification 4.1.1.1.e. below, with the control banks at the maximum insertion limit of Specification 3.1.3.6; and

(See ITS  
3.1.4)(See ITS  
Chapter 1.0)

Add proposed SR 3.1.6.2 Note

L03

\*See Special Test Exceptions Specification 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 Turkey Point Nuclear Generating Station (PTN) 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. 5.0, "Standard Technical Specifications - Westinghouse Plants" (ISTS).

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 b states "Reduce THERMAL POWER within two hours to less than or equal to that fraction of RATED THERMAL POWER which is allowed by the bank position specified in the Rod Bank Insertion Limits curve, defined in the CORE OPERATING LIMITS REPORT." 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 change is considered administrative because the technical requirements have not changed.

- A04 CTS 3.1.3.6 ACTION c requires 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 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

## **DISCUSSION OF CHANGES**

### **ITS 3.1.6, CONTROL BANK INSERTION LIMITS**

requirements. This change is designated as administrative because it does not result in a technical change to the CTS.

- A05 CTS 3.1.3.5 states "...except for surveillance testing pursuant to Specification 4.1.3.1.2...". ITS LCO 3.1.5 Applicability Note states "Not applicable to shutdown banks inserted while performing SR 3.1.4.2." The CTS statement has been moved to LCO 3.1.5. This changes the CTS by not including the statement for surveillance testing in the ACTION. The ITS LCO 3.1.5 now has the requirement.

The purpose of CTS 4.1.3.1.2 is to determine each full length rod not fully inserted in the core to be OPERABLE by movement of  $\geq 10$  steps in any one direction in accordance with the Surveillance Frequency Control Program (SFCP). The Test Exception residing in the ITS Limiting Condition for Operation (LCO) does not modify the Applicability of this Specification. This change is designated as administrative because it does not result in a technical change to the CTS.

#### **MORE RESTRICTIVE CHANGES**

- M01 CTS 3.1.3.6 requires the control banks to be limited in physical insertion as specified in the Core Operating Limits Report (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 in accordance with the SFCP. This changes the CTS by adding the requirements on the sequence and overlap limits 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 (SRs) 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 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 shutdown margin (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

**DISCUSSION OF CHANGES**  
**ITS 3.1.6, CONTROL BANK INSERTION LIMITS**

change is designated as more restrictive because requirements are added to the CTS.

RELOCATED SPECIFICATIONS

None

REMOVED DETAIL CHANGES

None

LESS RESTRICTIVE CHANGES

- L01 *(Category 5 – Deletion of Surveillance Requirement)* CTS 4.1.3.6 requires that during time intervals when the Rod Insertion Limit Monitor is inoperable, the individual rod positions be verified 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 SFCP. 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.

- L02 *(Category 3 – Relaxation of Completion Time)* CTS 3.1.3.6 does not have an ACTION associated with control bank A, B, or C inserted  $\leq 12$  steps beyond the insertion, sequence, or overlap limits specified in the COLR. ITS 3.1.5 ACTION A provides Required Actions for one shutdown bank inserted  $\leq 20$  steps beyond the insertion limits specified in the COLR. ITS 3.1.6 Required Action A.1 requires verification of all control banks are within the insertion limits specified in the COLR and either verification that the SDM is within the limits specified in the COLR (Required Action A.1.1) or the initiation of boration to restore SDM to within limits (Required Action A.1.2), all three within 1 hour. ITS 3.1.6 Required Action A.3 requires restoration of the shutdown banks to within limits within 24 hours. Additionally, ITS 3.1.6 ACTION C requires that 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 one control bank to be beyond the insertion, sequence, or overlap limits specified in the COLR for 24 hours to restore the control rod bank to within limits, eliminates the allowance to declare the rod inoperable and to take the ACTIONS of Specification 3.1.3.1, and adds

**DISCUSSION OF CHANGES**  
**ITS 3.1.6, CONTROL BANK INSERTION LIMITS**

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 not fully withdrawn.

The purpose of CTS 3.1.3.6 ACTION is to ensure the control rod banks are fully withdrawn in order to ensure that there is sufficient SDM 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 24 hours to restore one control rod bank to within insertion limits 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 SDM 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.

- L03 *(Category 7 – Relaxation of Surveillance Frequency Change - NON-24 MONTH TYPE CHANGE)* CTS Surveillance Requirement (SR) 4.1.1.1.b requires control bank withdrawal to be verified within the limits specified in CTS 3.1.3.6 in accordance with the SFCP. ITS SR 3.1.6.2 requires the control bank to be within the insertion limits specified in the COLR. The ITS is modified by a Note which states "Not required to be performed until 1 hour after the associated rod motion." This changes the CTS by adding the ITS Note; which, allows the SR to be delayed 1 hour after rod motion.

The purpose of ITS SR 3.1.6.2 is to keep control banks within the insertion limits specified in the COLR. This ensures that when the reactor is critical the required SDM will be maintained following a reactor trip. The purpose of the allowed one-hour delay in verification of the insertion limits ensures the accuracy of the rod position indication system is not affected by rod temperature. Due to changes in the magnetic permeability of the drive shaft as a function of temperature, the indicated position is expected to change with time as the drive shaft temperature changes. This change is acceptable because it delays the SR performance for a sufficient time to ensure the accuracy of the position indication system. This change is designated as less restrictive because a delay of one hour is allowed to perform the SR that is not currently allowed.

# **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.

ACTION -----NOTE-----  
Not applicable to control banks inserted while performing SR 3.1.4.2.  
-----

Applicability Footnote \*\* APPLICABILITY: MODE 1,  
MODE 2 with  $k_{eff} \geq 1.0$ .

#### ACTIONS

CONDITION	REQUIRED ACTION	COMPLETION TIME
DOC L02 A. Control bank A, B, or C inserted $\leq$ <del>16</del> steps beyond the insertion, sequence, or overlap limits specified in the COLR.	A.1 Verify all shutdown banks are within the insertion limits specified in the COLR.	1 hour
	<u>AND</u>	
	A.2.1 Verify SDM is within the limits specified in the COLR.	1 hour
	<u>OR</u>	
	A.2.2 Initiate boration to restore SDM to within limit.	1 hour
	<u>AND</u>	
	A.3 Restore the control bank to within the insertion, sequence, and overlap limits specified in the COLR.	24 hours

ACTIONS (continued)

	CONDITION	REQUIRED ACTION	COMPLETION TIME
ACTION	B. Control bank insertion limits not met for reasons other than Condition A.	B.1.1 Verify SDM is within the limits specified in the COLR.	1 hour
		<u>OR</u>	
		B.1.2 Initiate boration to restore SDM to within limit.	1 hour
		<u>AND</u>	
		B.2 Restore control bank(s) to within limits.	2 hours
DOC M01	C. Control bank sequence or overlap limits not met for reasons other than Condition A.	C.1.1 Verify SDM is within the limits specified in the COLR.	1 hour
		<u>OR</u>	
		C.1.2 Initiate boration to restore SDM to within limit.	1 hour
		<u>AND</u>	
		C.2 Restore control bank sequence and overlap to within limits.	2 hours
ACTION c	D. Required Action and associated Completion Time not met.	D.1 Be in MODE 2 with $k_{eff} < 1.0$ .	6 hours

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	<div> <div> <div>----- NOTE -----</div> <div>Not required to be performed until 1 hour after associated rod motion.</div> <div>-----</div> </div> <div>Verify each control bank insertion is within the insertion limits specified in the COLR.</div> </div>	<div> <div>3</div> <div>3</div> <div> <div><del>12 hours</del></div> <div>OR</div> <div>In accordance with the Surveillance Frequency Control Program</div> </div> </div>
DOC M01	SR 3.1.6.3	<div> <div> <div>----- NOTE -----</div> <div>Not required to be performed until 1 hour after associated rod motion.</div> <div>-----</div> </div> <div>Verify sequence and overlap limits specified in the COLR are met for control banks not fully withdrawn from the core.</div> </div>	<div> <div>3</div> <div>3</div> <div> <div><del>12 hours</del></div> <div>OR</div> <div>In accordance with the Surveillance Frequency Control Program</div> </div> </div>

**JUSTIFICATION FOR DEVIATIONS**  
**ITS 3.1.6, CONTROL BANK INSERTION LIMITS**

1. The Improved Standard Technical Specifications (ISTS) contains bracketed information and/or values that are generic to all Westinghouse vintage plants. The brackets are removed and the proper plant specific information/value is provided. Under Nuclear Energy Institute (NEI) Technical Specification Task Force (TSTF) traveler TSTF-547 the NRC approved, in part, the addition of LCO 3.1.6 Condition A (ADAMS Accession No. ML15328A3500). In TSTF-547 it states that the specific number of steps is bracketed and will be replaced with the plant-specific minimum number of steps that the rods must be moved to perform SR 3.1.4.2. Turkey Point's procedure for performing SR 3.1.4.2 states to insert the shutdown bank a minimum of 10 steps to a maximum of 20 steps until movement of all rods is indicated. Therefore, the bracketed value is changed to 20 steps.
2. Changes are made (additions, deletions, and/or changes) to the Improved Standard Technical Specifications (ISTS) that reflect the plant specific nomenclature, number, reference, system description, analysis, or licensing basis description.
3. The ISTS contains bracketed information and/or values that are generic to all Westinghouse vintage plants. The brackets are removed and the proper plant specific information/value is provided. This is acceptable since the information/value is changed to reflect the current licensing basis.

**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

1967 AEC Proposed General Design Criteria, GDC 27, "Redundancy of Reactivity Control," GDC 28, "Reactivity Hot Shutdown Capability," GDC 29, "Reactivity Shutdown Capability," GDC 6, "Reactor Core Design," GDC 32, "Maximum Reactivity Worth of Control Rods," and GDC 33, "Reactor Coolant Pressure Boundary Capability,"

#### 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 SDM, and initial reactivity insertion rate.

8

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. 4), 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.

References 1 and 4

1

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~~ four control banks and ~~at least~~ two 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.

Each unit has

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 fully withdrawn position of 231 steps.~~ The fully withdrawn position is defined in the COLR.

2

is shown on the  
COLR Figure

1

## BASES

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### 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 analysis<sup>e</sup> involving core reactivity and power distributions (Ref. 3).

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).

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 fuel cycles<sup>a</sup> that have sufficiently high ejected RCCA worths.

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).

The insertion limits satisfy Criterion 2 of 10 CFR 50.36(c)(2)(ii), in that they are initial conditions assumed in the safety analysis<sup>e</sup>.

### 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.

The LCO is modified by a Note indicating the LCO requirement is not applicable to control banks being inserted while performing SR 3.1.4.2. This SR verifies the freedom of the rods to move, and may require the control bank to move below the LCO limits, which would normally violate the LCO. This Note applies to each control bank as it is moved below the insertion limit to perform the SR. This Note is not applicable should a malfunction stop performance of the SR.

### APPLICABILITY

2 with  $k_{eff} < 1.0$ ,  
and

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 MODES 3, 4, and 5 is not required, since neither the power distribution nor ejected rod worth assumptions would be exceeded in these MODES.



BASES

ACTIONS

A.1, A.2.1, A.2.2, and A.3

Reviewer's Note

~~The bracketed number [16] in Condition A should be replaced with the plant-specific minimum number of steps that encompasses the rod positions during performance of SR 3.1.4.2.~~

6

If Control Bank A, B, or C is inserted less than or equal to ~~[16]~~ <sup>20</sup> steps below the insertion, sequence, or overlap limits, 24 hours is allowed to restore the control bank to within the limits. 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 a control bank is not within its insertion limit, SDM will be verified by performing a reactivity balance calculation, considering the effects listed in the BASES for SR 3.1.1.1.

7

While the control bank is outside the insertion, sequence, or overlap limits, all shutdown banks must be within their insertion limits to ensure sufficient shutdown margin is available and that power distribution is controlled. The 24 hour Completion Time is sufficient to repair most rod control failures that would prevent movement of a shutdown bank.

Condition A is limited to Control banks A, B, or C. The allowance is not required for Control Bank D because the full power bank insertion limit can be met during performance of the SR 3.1.4.2 control rod freedom of movement (trippability) testing.

B.1.1, B.1.2, B.2, C.1.1, C.1.2, and C.2

When the control banks are outside the acceptable insertion limits for reasons other than Condition A, 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.

5

## BASES

---

### ACTIONS (continued)

Similarly, if the control banks are found to be out of sequence or in the wrong overlap configuration for reasons other than Condition A, 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.

#### D.1

If the Required Actions cannot be completed within the associated Completion Times, the plant must be brought to MODE 2 with  $k_{\text{eff}} < 1.0$ , 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.

---

### 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.

BASES

SURVEILLANCE REQUIREMENTS (continued)

SR 3.1.6.2

in accordance with the Surveillance Frequency Control Program

[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~~.

during

operations

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

~~Reviewer's Note~~

~~The bracketed SR Note is only applicable to plants with an analog rod position indication system.~~

6

[The Surveillance is modified by a Note stating that the SR is not required to be performed for control banks until 1 hour after motion of rods in those banks. Control rod temperature affects the accuracy of the rod position indication system. Due to changes in the magnetic permeability of the drive shaft as a function of temperature, the indicated position is expected to change with time as the drive shaft temperature changes. The ~~one~~ ~~hour~~ period allows control rod temperature to stabilize following rod movement in order to ensure the indicated rod position is accurate.]

one-hour

7

4

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 ~~un~~likely that their sequence and overlap will ~~not~~ be in accordance with requirements provided in the COLR.

5

~~Reviewer's Note~~

~~The bracketed SR Note is only applicable to plants with an analog rod position indication system.~~

6

BASES

SURVEILLANCE REQUIREMENTS (continued)

[The Surveillance is modified by a Note stating that the SR is not required to be performed for control banks until 1 hour after motion of rods in those banks. Control rod temperature affects the accuracy of the rod position indication system. Due to changes in the magnetic permeability of the drive shaft as a function of temperature, the indicated position is expected to change with time as the drive shaft temperature changes. The ~~one~~ <sup>one-hour</sup> hour period allows control rod temperature to stabilize following rod movement in order to ensure the indicated rod position is accurate.]

7

4

~~[A Frequency of 12 hours is consistent with the insertion limit check above in SR 3.1.6.2.]~~

7

~~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

REFERENCES

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

1

2. 10 CFR 50.46.

1967 AEC Proposed General Design Criteria, GDC 6, GDC 27, GDC 28, GDC 29, GDC 32, and GDC 33

U

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

14

U

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

Section 3.1.2

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

WCAP-9272-P-A, "Westinghouse Reload Safety Evaluation Methodology," July 1985.

1

7

1

7

1

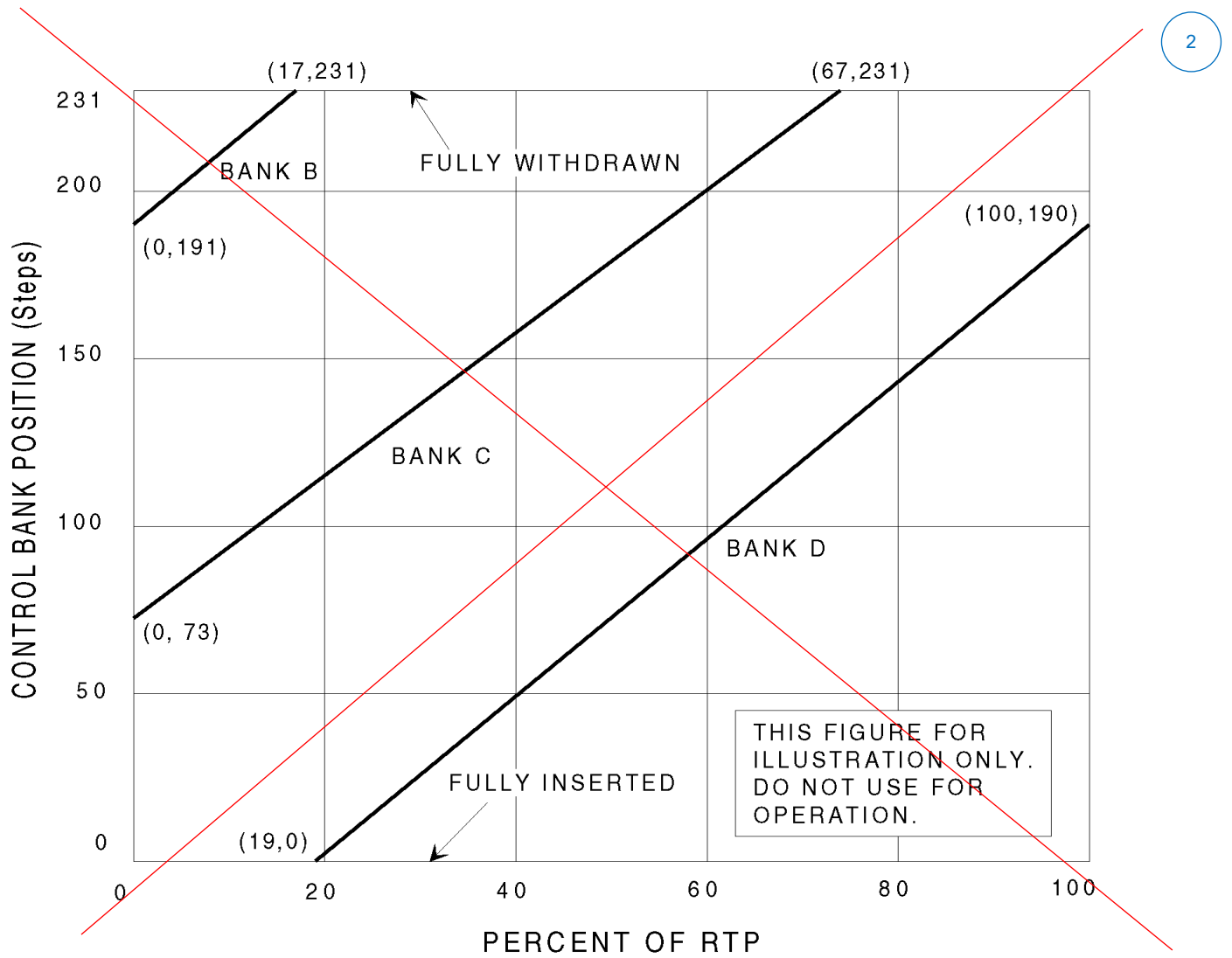


Figure B 3.1.6 (page 1 of 1)  
Control Bank Insertion vs. Percent RTP

**JUSTIFICATION FOR DEVIATIONS**  
**ITS 3.1.6 BASES, CONTROL BANK INSERTION LIMITS**

1. Changes are made (additions, deletions, and/or changes) to the Improved Standard Technical Specifications (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. Turkey Point Nuclear Generating Station (PTN) Improved Technical Specification (ITS) 3.1.6 does not include Figure B 3.1.6-1. The control bank insertion limits for PTN are located in the Core Operating Limits Report (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. 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.

## **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.



## **ATTACHMENT 7**

### **ITS 3.1.7, ROD POSITION INDICATION**

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

# REACTIVITY CONTROL SYSTEMS

## ROD POSITION INDICATION ~~SYSTEMS—OPERATING~~

### LIMITING CONDITION FOR OPERATION (Continued)

LCO 3.1.7 3.1.3.2 The ~~Analog~~ Rod Position Indication 

(RPI)

 System and the Demand Position Indication System shall be OPERABLE ~~and capable of determining the respective actual and demanded shutdown and control rod positions as follows:~~

a. ~~Analog rod position indicators, within one hour after rod motion (allowance for thermal soak);~~

~~All Shutdown Banks: within the Allowed Rod Misalignment of Specification 3.1.3.1 of the group demand counters for withdrawal ranges of 0-30 steps and 200 All Rods Out as defined in the Core Operating Limits Report.~~

~~Control Bank A and B: within the Allowed Rod Misalignment of Specification 3.1.3.1 of the group demand counters for withdrawal ranges of 0-30 steps and 200 All Rods Out as defined in the Core Operating Limits Report.~~

~~Control Banks C and D: within the Allowed Rod Misalignment of Specification 3.1.3.1 of the group demand counters for withdrawal range of 0 All Rods Out as defined in the Core Operating Limits Report.~~

b. ~~Group demand counters;  $\pm$  2 steps.~~

Applicability APPLICABILITY: MODES 1 and 2.

#### ACTION:

- a. With a maximum of one analog 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 8 hours and within one hour 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 Effective Full Power Days thereafter, and within 

4

 hour if rod control system parameters indicate unintended movement, or if the rod with an inoperable position indicator is moved greater than 12 steps, and
  - b). Review the parameters of the rod control system for indications of unintended rod movement for the rod with an inoperable indicator within 8 hours and once per 8 hours thereafter, and
  - c). Determine the position of the non-indicating rod indirectly by the movable incore detectors 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 75% of RATED THERMAL POWER within 8 hours.

ACTION A

REACTIVITY CONTROL SYSTEMSPOSITION INDICATION SYSTEMS - OPERATINGLIMITING CONDITION FOR OPERATION (Continued)ACTION (Continued):

ACTION D

- b. With a maximum of one demand position indicator per bank inoperable either:
1. Verify that all analog 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 the Allowed Rod Misalignment of Specification 3.1.3.1 at least once per 8 hours, or
  2. Reduce THERMAL POWER to less than 75% of RATED THERMAL POWER within 8 hours.

Add proposed ACTION E

M01

~~\*\*Rod position monitoring by Actions a.2.a), a.2.b), and a.2.c) may only be applied to one inoperable rod position indicator per unit and shall only be allowed until an entry into MODE 3.~~

L01

## REACTIVITY CONTROL SYSTEMS

### SURVEILLANCE REQUIREMENTS

---

~~4.1.3.2.1 Each analog rod position indicator shall be determined to be OPERABLE by verifying that the Demand Position Indication System and the Analog Rod Position Indication System agree within the Allowed Rod Misalignment of Specification 3.1.3.1 (allowing for one hour thermal soak after rod motion) in accordance with the Surveillance Frequency Control Program except during time intervals when the Rod Position Deviation Monitor is inoperable, then compare the Demand Position Indication System and the Analog Rod Position Indication System at least once per 4 hours.~~

M02

~~4.1.3.2.2 Each of the above required analog rod position indicator(s) shall be determined to be OPERABLE by performance of a CHANNEL CHECK, CHANNEL CALIBRATION and ANALOG CHANNEL OPERATIONAL TEST performed in accordance with the Table 4.1-1.~~

LA02

M02

← Add proposed SR 3.1.7.1

TABLE 4.1-1ROD POSITION INDICATOR SURVEILLANCE REQUIREMENTS

<u>Functional Unit</u>	<u>—Check—</u>	<u>Calibration</u>	<u>Operational Test</u>
Individual Rod Position	SFCP	SFCP	SFCP
Demand Position	SFCP	N/A	SFCP

M02

## **DISCUSSION OF CHANGES**

### **ITS 3.1.7, ROD POSITION INDICATION**

#### **ADMINISTRATIVE CHANGES**

- A01 In the conversion of the Turkey Point Nuclear Generating Station (PTN) 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. 5.0, "Standard Technical Specifications - Westinghouse Plants" (ISTS).

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 ACTION a states "With a maximum of one analog rod position indicator per bank inoperable either...". ITS Limiting Condition for Operation (LCO) 3.1.7 CONDITION A states "One RPI per bank inoperable in one or more banks." This changes the CTS by including more banks.

The purpose of CTS 3.1.3.2 ACTION a and ITS LCO 3.1.7 CONDITION A is to state the inoperability of the Rod Position Indication (RPI) System. 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 banks to provide for precise reactivity control. The axial position of shutdown rods and control rods are determined by two separate and independent systems: the Demand Position Indication System (commonly called group step counters) and the RPI System. With one RPI per bank inoperable, different types of banks may have one inoperable RPI per type of bank.

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 3.1.3.2 ACTION a does 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 E requires the unit to be placed in MODE 3 with 6 hours if the Required Actions and associated Completion Time of ACTION A or D are not met. 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

## **DISCUSSION OF CHANGES**

### **ITS 3.1.7, ROD POSITION INDICATION**

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.

- M02 CTS 4.1.3.2.1 requires that each "analog rod position indicator shall be determined to be OPERABLE by verifying that the Demand Position Indication System and the Analog Rod Position Indication System agree within the Allowed Rod Misalignment of Specification 3.1.3.1 (allowing for one hour thermal soak after rod motion) in accordance with the Surveillance Frequency Control Program except during time intervals when the Rod Position Deviation Monitor is inoperable, then compare the Demand Position Indication System and the Analog Rod Position Indication System at least once per 4 hours." ITS 3.1.7 does not contain these requirements because they are duplicative of CTS 4.1.3.1.1 (ITS Surveillance Requirement (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 deleting an SR that is duplicated in CTS 4.1.3.1.1 and 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 overall because new requirements are being added to 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 respective actual and demanded shutdown and control rod positions as follows:

- a. Analog rod position indicators, within one hour after rod motion (allowance for thermal soak);

All Shutdown Banks: within the Allowed Rod Misalignment of Specification 3.1.3.1 of the group demand counters for withdrawal ranges of 0-30 steps and 200-All Rods Out as defined in the Core Operating Limits Report.

Control Bank A and B: within the Allowed Rod Misalignment of Specification 3.1.3.1 of the group demand counters for withdrawal ranges of 0-30 steps and 200-All Rods Out as defined in the Core Operating Limits Report.



## **DISCUSSION OF CHANGES**

### **ITS 3.1.7, ROD POSITION INDICATION**

Control Banks C and D: within the Allowed Rod Misalignment of Specification 3.1.3.1 of the group demand counters for withdrawal range of 0-All Rods Out as defined in the Core Operating Limits Report.

- b. Group demand counters;  $\pm 2$  steps.

ITS LCO 3.1.7 requires the analog RPI 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 RPI 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.

- LA02 *(Type 4 – – Removal of LCO, SR, or other TS requirement to the TRM, UFSAR, ODCM, QAP, CLRT Program, IST Program, ISI Program, or Surveillance Frequency Control Program)* CTS SR 4.1.3.2.2 requires a CHANNEL CHECK, CHANNEL CALIBRATION, AND ANALOG CHANNEL CALIBRATION TEST for each analog rod position indicators. ITS 3.1.7 does not contain these SRs for the analog rod position indicators. This changes the CTS by moving the CHANNEL CHECK, CHANNEL CALIBRATION, AND ANALOG CHANNEL CALIBRATION TEST for the analog rod position indicators to the Technical Requirements Manual (TRM).

The removal of these surveillance requirements from the Technical Specifications is acceptable because this requirement is not necessary to be included in the Technical Specifications in order to provide adequate protection of public health and safety. The ITS retains the requirement to verify position of individual rods within the alignment limit and verify rod freedom of movement (trippability) by moving each rod not fully inserted in the core  $\geq 10$  steps in either direction (SR 3.1.4.1 and SR 3.1.4.2, respectively). In addition to ensuring the rods are within their alignment limits, these SRs also provide indication if the analog rod position indication is not operating properly. Also, this change is acceptable because these surveillance requirements will be adequately controlled in the TRM. TRM changes are made under 10 CFR 50.59, which ensures changes are properly evaluated. This change is designated as a less restrictive removal of detail change because TS requirements are being removed from the Technical Specifications.

## 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 analog rod position indicator per bank. CTS 3.1.3.2 does not have an ACTION to cover the inoperability for more than one rod position indicator per bank. CTS 3.1.3.2 ACTION b covers the inoperability for a maximum of one demand position indicator per bank. CTS 3.1.3.2 Note \*\* states "Rod position monitoring by Actions a.2.a), a.2.b), and a.2.c) may only be applied to one inoperable rod position indicator per unit and shall only be allowed until an entry into MODE 3." ITS 3.1.7 ACTIONS are modified by a Note 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 D 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 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 Design Basis Accident (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.

- L02 *(Category 3 – Relaxation of Completion Time)* CTS 3.1.3.7 ACTION requires that with a maximum of one analog rod position indicator per bank inoperable, restore the inoperable indicator or reduce THERMAL POWER within 8 hours. CTS 3.1.3.7 has no ACTION for more than one analog rod position indicator per bank inoperable. ITS 3.1.7 ACTION B requires more than one rod position indicator in one or more banks inoperable to be restored to OPERABLE status such that a maximum of one rod position indicator per group is inoperable within 24 hours. This changes the CTS by allowing 24 hours to restore inoperable rod position indicators to OPERABLE status such that a maximum of one rod position indicator per group is inoperable.

## **DISCUSSION OF CHANGES**

### **ITS 3.1.7, ROD POSITION INDICATION**

The purpose of ITS 3.1.7 is to keep the rod position indication system and demand position indication system OPERABLE. 24 hours is allowed to restore inoperable rod position indicators to OPERABLE status such that a maximum of one rod position indicator per bank is inoperable. This change is acceptable because the Completion Time is consistent with safe operation under the specified Condition, considering the OPERABLE status of the redundant system or features. This includes the capacity and capability of remaining systems or features, a reasonable time for repairs or replacement, and the low probability of a DBA occurring during the allowed Completion Time. The change is the addition of ITS 3.1.7 ACTION B. 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.

- L03 *(Category 7 – Relaxation Of Surveillance Frequency Change - NON-24 MONTH TYPE CHANGE)* CTS LCO 3.1.3.2 a states "...within one hour after rod motion." ITS LCO 3.1.7 Note states "Individual RPIs are not required to be OPERABLE for 1 hour following movement of the associated rods." This changes the CTS by allowing OPERABILITY after 1 hour.

The purpose of CTS 3.1.3.2 is to require OPERABILITY within one hour after rod motion. ITS LCO 3.1.7 Note states RPIs are not required to be OPERABLE for 1 hour following rod movement. This change is acceptable because the new Surveillance Frequency has been evaluated to ensure that it provides an acceptable level of equipment reliability. Allowing OPERABILITY after 1 hour is additional time. This change is designated as less restrictive because Surveillances will be performed less frequently under the ITS than under the CTS.

- L04 *(Category 3 – Relaxation of Completion Time)* CTS 3.1.3.2 a states in part that within 1 hour is allowed if rod control system parameters indicate unintended movement. ITS LCO 3.1.7 ACTION A states in part that 8 hours is allowed for unintended movement or inoperable RPI. This changes the CTS by allowing 8 hours for Completion Time.

The purpose of ITS LCO 3.1.7 ACTION A is verification of rod position of the RPI System. This change is acceptable because the Completion Time is 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 systems or features, a reasonable time for repairs or replacement, and the low probability of a DBA occurring during the allowed Completion Time. Allowing a completion time of 8 hours verses 1 hour is additional time. 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.

- L05 *(Category 3 – Relaxation of Completion Time)* CTS 3.1.3.2 a states, in part, that with a maximum of one analog rod position indicator per bank inoperable, determining that the position of the non-indicating rod within 1 hour is allowed if rod control system parameters indicate unintended movement. CTS 3.1.3.2 does not have an ACTION C. ITS LCO 3.1.7 ACTION C states that 4 hours is allowed for "One or more RPI inoperable in one or more banks and associated rod has been

**DISCUSSION OF CHANGES**  
**ITS 3.1.7, ROD POSITION INDICATION**

moved > 24 steps in one direction since the last determination of the rod's position." This changes the CTS by allowing 4 hours for Completion Time and one or more inoperable RPI.

The purpose of ITS LCO 3.1.7 ACTION C is verification of rod position of one or more RPIs inoperable in one or more banks and the associated rod has been moved > 24 steps in one direction since the last determination of the rod's position. This change is acceptable because the Completion Time is 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 systems or features, a reasonable time for repairs or replacement, and the low probability of a DBA occurring during the allowed Completion Time. Allowing a Completion Time of 4 hours is additional time for one or more inoperable RPI. 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.

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

### 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

DOC L03 ~~Individual RPIs are not required to be OPERABLE for 1 hour following movement of the associated rods.~~

1

Applicability APPLICABILITY: MODES 1 and 2.

#### ACTIONS

DOC L01 ~~Separate Condition entry is allowed for each inoperable ~~D~~RPI and each demand position indicator.~~

1

CONDITION	REQUIRED ACTION	COMPLETION TIME
<p>ACTION a</p> <p>ACTION a.1</p> <p>A. One <del>D</del>RPI per <del>group</del> inoperable in one or more <del>groups</del>.</p>	<p>A.1 Verify the position of the rods with inoperable <del>D</del>RPI indirectly by using movable incore detectors.</p>	<p>Once per 8 hours</p> <p><u>AND</u></p> <p>Within one hour after any motion of the inoperable rod which exceeds 24 steps in one direction since the last determination of the rod's position</p>
	<p><u>OR</u></p> <p>A.2 Verify the position of the rods with inoperable <del>D</del>RPI indirectly by using the moveable incore detectors.</p>	<p>8 hours</p> <p><u>AND</u></p> <p>Once per 31 EFPD thereafter</p> <p><u>AND</u></p> <p>8 hours after discovery of each unintended rod movement</p> <p><u>AND</u></p>

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3

3

ACTION a.2.a)

DOC L04

ACTION a.2.b)

3

ACTIONS (continued)

CONDITION	REQUIRED ACTION	COMPLETION TIME
ACTION a.2.a)		8 hours after each movement of rod with inoperable <del>[D]</del> RPI > 12 steps
ACTION a.2.c)		<u>AND</u> Prior to THERMAL POWER exceeding 50% RTP
		<u>AND</u> 8 hours after reaching RTP
ACTION a.3.	<u>OR</u> A.3 Reduce THERMAL POWER to $\leq 50\%$ RTP.	8 hours
DOC L02	B. More than one <del>[D]</del> RPI per <del>group</del> inoperable in one or more <del>groups</del> .	Immediately
	<u>AND</u> B.2 Restore inoperable <del>[D]</del> RPIs to OPERABLE status such that a maximum of one <del>[D]</del> RPI per group is inoperable.	24 hours

ACTIONS (continued)

	CONDITION	REQUIRED ACTION	COMPLETION TIME	
DOC L05	C. One or more <del>[D]</del> RPI inoperable in one or more <del>groups</del> and associated rod has been moved > 24 steps in one direction since the last determination of the rod's position.	C.1 Verify the position of the rods with inoperable <del>[D]</del> RPIs indirectly by using movable incore detectors.  <u>OR</u> C.2 Reduce THERMAL POWER to ≤ 50% RTP.	<del>[4]</del> hours   8 hours	1 3 1
DOC L01 ACTION C	D. One or more demand position indicators per bank inoperable in one or more banks.	D.1.1 Verify by administrative means all <del>[D]</del> RPIs for the affected banks are OPERABLE.  <u>AND</u> D.1.2 Verify the most withdrawn rod and the least withdrawn rod of the affected banks are ≤ 12 steps apart.  <u>OR</u> D.2 Reduce THERMAL POWER to ≤ <del>50</del> % RTP.	Once per 8 hours   Once per 8 hours   8 hours	1 2 3 3 2
DOC M02	E. Required Action and associated Completion Time not met.	E.1 Be in MODE 3.	6 hours	



SURVEILLANCE REQUIREMENTS

SURVEILLANCE		FREQUENCY
SR 3.1.7.1	<p>----- NOTE -----</p> <p>Not required to be met for {D}RPIs associated with rods that do not meet LCO 3.1.4.</p> <p>-----</p> <p>Verify each {D}RPI agrees within {12} steps of the group demand position for the {full indicated range} of rod travel.</p>	Once prior to criticality after each removal of the reactor head

1

**JUSTIFICATION FOR DEVIATIONS  
ITS 3.1.7, ROD POSITION INDICATION**

1. The Improved Standard Technical Specifications (ISTS) contain 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 A provides compensatory actions when one rod position indicator is inoperable. Turkey Point Nuclear Generating Station (PTN) Improved Technical Specification (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.
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. Editorial changes made for enhanced clarity/consistency.
5. Changes are made to be consistent with the Specification.

**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

1967 AEC Proposed General Design Criteria, GDC 12, "Instrumentation and Control Systems"

References 1 and 4

#### BACKGROUND

According to ~~GDC 43~~ (~~Ref. 4~~), 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 rod position indicators to determine ~~control~~ rod positions and thereby ensure ~~and shutdown~~ 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, ~~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.

resulting from

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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.

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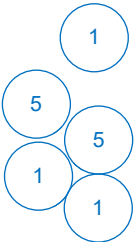
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## BASES

### 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 ( $\pm 1$  step or  $\pm \frac{5}{8}$  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.



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  $\pm 6$  steps ( $\pm 3.75$  inches), and the maximum uncertainty is  $\pm 12$  steps ( $\pm 7.5$  inches). 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.~~



### 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~~ 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.

are

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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.

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## BASES

### LCO

LCO 3.1.7 specifies that one ~~[D]~~RPI System and one Bank 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:

a. The ~~[D]~~RPI System indicates within 12 steps of the group step counter demand position as required by LCO 3.1.4, "Rod Group Alignment Limits,"

b. For the ~~[D]~~RPI System there are no failed coils, and

c. The ~~Bank~~ Demand <sup>Position</sup> Indication System has been calibrated either in the fully inserted position or to the ~~[D]~~RPI System.

The 12 step agreement limit between the ~~Bank~~ Demand Position Indication System and the ~~[D]~~RPI 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.

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.

~~Reviewer's Note~~  
~~The bracketed LCO Note is only applicable to plants with an analog rod position indication system.~~

~~[~~The LCO is modified by a Note stating that the RPI system is not required to be met OPERABLE for 1 hour following movement of the associated rods. Control and shutdown rod temperature affects the accuracy of the RPI System. Due to changes in the magnetic permeability of the drive shaft as a function of temperature, the indicated position is expected to change with time as the drive shaft temperature changes. The one hour period allows temperature to stabilize following rod movement in order to ensure the indicated position is accurate.~~]~~

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## BASES

### APPLICABILITY

The requirements ~~on~~ <sup>of</sup> the ~~[D]~~RPI 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.

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### 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.

#### A.1 and A.2

When one ~~[D]~~RPI channel per ~~group~~ <sup>bank</sup> in one or more groups 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,  $F_{\Delta H}^N$  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.

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Required Action A.1 requires verification of the position of a rod with an inoperable ~~[D]~~RPI once per 8 hours which may put excessive wear and tear on the moveable incore detector system, Required Action A.2 provides an alternative. Required Action A.2 requires verification of rod position using the moveable incore detectors every 31 EFPD, which coincides with the normal use of the system to verify core power distribution.

2

INSERT 1

Required Action A.2 includes six distinct requirements for verification of the position of rods associated with an inoperable ~~[D]~~RPI using the movable incore detectors:

3

2

- a. Initial verification within 8 hours of the inoperability of the ~~[D]~~RPI;

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**INSERT 1**

Required Action A.1 requires that if one or more rods have been significantly moved (more than 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 more than 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 more than 24 steps in one direction since the last determination of the rod's position, this Completion Time begins to be tracked.



## BASES

### ACTIONS (continued)

- b. Re-verification once every 31 Effective Full Power Days (EFPD) thereafter;
- c. Verification within 8 hours if rod control system parameters indicate unintended rod movement. An unintended rod movement is defined as the release of the rod's stationary gripper when no action was demanded either manually or automatically from the rod control system, or a rod motion in a direction other than the direction demanded by the rod control system. Verifying that no unintended rod movement has occurred is performed by monitoring the rod control system stationary gripper coil current for indications of rod movement;
- d. Verification within 8 hours if the rod with an inoperable ~~RD~~RPI is intentionally moved greater than 12 steps;
- e. Verification prior to exceeding 50% RTP if power is reduced below 50% RTP; and
- f. Verification within 8 hours of reaching 100% RTP if power is reduced to less than 100% RTP.

Should the rod with the inoperable ~~RD~~RPI be moved more than 12 steps, or if reactor power is changed, the position of the rod with the inoperable ~~RD~~RPI must be verified.

### A.3

Reduction of THERMAL POWER to  $\leq 50\%$  RTP puts the core into a condition where rod position is not significantly affecting core peaking factors (Ref. 3).

The allowed Completion Time of 8 hours is reasonable, based on operating experience, for reducing power to  $\leq 50\%$  RTP from full power conditions without challenging plant systems and allowing for rod position determination by Required Action A.1 above.

### B.1 and B.4

When more than one ~~RD~~RPI per group in one or more groups fail, additional actions are necessary. Placing the Rod Control System in manual assures unplanned rod motion will not occur.

## BASES

### ACTIONS (continued)

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.

The 24 hour Completion Time provides sufficient time to troubleshoot and restore the ~~[D]~~RPI system to operation while avoiding the plant challenges associated with the shutdown without full rod position indication.

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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.

#### C.1 and C.2

With one ~~[D]~~RPI inoperable in one or more groups and the affected groups have moved greater than 24 steps in one direction since the last determination of rod position, additional actions are needed to verify the position of rods within inoperable ~~[D]~~RPI. Within 4 hours, the position of the rods with inoperable position indication must be determined using the moveable incore detectors to verify 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  $\leq 50\%$  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.

2

#### D.1.1 and D.1.2

With one or more demand position indicators per bank inoperable in one or more banks, 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  $\leq 12$  steps apart within the allowed Completion Time of once every 8 hours is adequate.

## BASES

### ACTIONS (continued)

#### D.2

Reduction of THERMAL POWER to  $\leq 50\%$  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  $\leq 50\%$  RTP.

#### E.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 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 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.

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.

The Surveillance is modified by a Note which states it is not required to be met for  $\{D\}$ RPIs associated with rods that do not meet LCO 3.1.4. If a rod is known to not to be within  $\{12\}$  steps of the group demand position, the ACTIONS of LCO 3.1.4 provide the appropriate Actions.

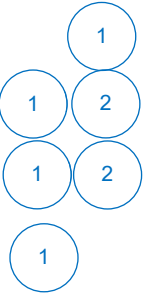
BASES

1967 AEC Proposed General Design Criteria, GDC 12

REFERENCES

1. ~~10 CFR 50, Appendix A, GDC 13.~~
2. FSAR, Chapter ~~15~~.
3. FSAR, Chapter ~~15~~.

4. UFSAR, Section 7.1.1.



**JUSTIFICATION FOR DEVIATIONS**  
**ITS 3.1.7 BASES, ROD POSITION INDICATION**

1. Changes are made (additions, deletions, and/or changes) to the Improved Standard Technical Specifications (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  $F_{\Delta H}^N$  are within the limits provided in the Core Operating Limits Report (COLR), provided the non-indicating rods have not been moved. The statement has been deleted because it allows an alternative method for satisfying Required Actions A.1 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.
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.

## **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.

## **ATTACHMENT 8**

### **ITS 3.1.8, PHYSICS TESTS EXCEPTIONS – MODE 2**



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

SPECIAL TEST EXCEPTIONS

3.1 REACTIVITY CONTROL SYSTEMS

3/4.10.3 PHYSICS TESTS

Exceptions – MODE 2

LIMITING CONDITION FOR OPERATION

INSERT 1

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:

LCO 3.1.8

- a. The THERMAL POWER does not exceed 5% of RATED THERMAL POWER,
- ~~b. The Reactor Trip Setpoints on the OPERABLE Intermediate and Power Range channels are set at less than or equal to 25% of RATED THERMAL POWER, and~~
- 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

Applicability APPLICABILITY: MODE 2.

During PHYSICS TESTS initiated in

ACTION:

Add Proposed ACTION A

- a. With the THERMAL POWER greater than 5% of RATED THERMAL POWER, immediately open the Reactor trip breakers.
- 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.

ACTION D

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 in accordance with the Surveillance Frequency Control Program ~~during PHYSICS TESTS.~~

SR 3.1.8.1 4.10.3.2 Each Intermediate and Power Range channel shall be subjected to an ~~ANALOG~~ CHANNEL OPERATIONAL TEST ~~within 12 hours~~ prior to initiating PHYSICS TESTS.

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 in accordance with the Surveillance Frequency Control Program ~~during PHYSICS TESTS.~~

Add proposed SR 3.1.8.4

~~3/4.10.4 (This specification number is not used)~~

**INSERT 1**

and the number of required channels for LCO 3.3.1, "RTS Instrumentation," Functions 2 and 17.d, may be reduced to 3 required channels,

**DISCUSSION OF CHANGES**  
**ITS 3.1.8, PHYSICS TESTS EXCEPTIONS – MODE 2**

ADMINISTRATIVE CHANGES

- A01 In the conversion of the Turkey Point Nuclear Generating Station (PTN) 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. 5.0, "Standard Technical Specifications - Westinghouse Plants" (ISTS).

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), and Function 17.d (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 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 Channels are set at  $\leq 25\%$  of RATED THERMAL POWER from the test exception.

## **DISCUSSION OF CHANGES**

### **ITS 3.1.8, PHYSICS TESTS EXCEPTIONS – MODE 2**

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 LCO 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% RATED THERMAL POWER (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 LCO 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 in accordance with the Frequency Control Program, and an ACTION (ITS 3.1.8, ACTION A), to follow if the SHUTDOWN MARGIN (SDM) is not met, are also added. 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 Reactor Coolant System (RCS) minimum temperature Specifications are allowed to be suspended. The Bases for ITS 3.1.1, "SHUTDOWN MARGIN," states that during MODE 2, the SDM 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.

#### RELOCATED SPECIFICATIONS

None

**DISCUSSION OF CHANGES  
ITS 3.1.8, PHYSICS TESTS EXCEPTIONS – MODE 2**

REMOVED DETAIL CHANGES

None

LESS RESTRICTIVE CHANGES

- L01    *(Category 7- Relaxation Of Surveillance Frequency Change)* CTS Surveillance Requirement (SR) 4.10.3.2 states "Each Intermediate and Power Range channel shall be subjected to an ANALOG CHANNEL OPERATIONAL TEST within 12 hours prior to initiating PHYSICS TESTS." ITS SR 3.1.8.1 states "Perform a CHANNEL OPERATIONAL TEST..." with Frequency "Prior to initiation of PHYSICS TESTS." This changes the CTS by not requiring 12 hours prior to initiating PHYSICS TESTS.

The purpose of ITS SR 3.1.8.1 is to ensure that the RTS is properly aligned to provide the required degree of core protection during the performance of the PHYSICS TESTS. A CHANNEL OPERATIONAL TEST is performed on each power range and intermediate range channel prior to initiation of the PHYSICS TESTS. This change is acceptable because the new Surveillance Frequency has been evaluated to ensure that it provides an acceptable level of equipment reliability. This change is designated as less restrictive because Surveillances may be performed less frequently under the ITS than under the CTS.

# **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"

may be suspended and the number of required channels for LCO 3.3.1, "RTS Instrumentation," Functions 2, 3, 6 and 18-e, may be reduced to 3 required channels, provided:

- a. RCS lowest loop average temperature is  $\geq 531^{\circ}\text{F}$ ,
- b. SDM is within the limits specified in the COLR, and
- c. THERMAL POWER is  $\leq 5\%$  RTP.

DOC M01

Applicability APPLICABILITY: During PHYSICS TESTS initiated in MODE 2.

ACTIONS

CONDITION	REQUIRED ACTION	COMPLETION TIME
A. SDM not within limit.	A.1 Initiate boration to restore SDM to within limit.	15 minutes
	AND A.2 Suspend PHYSICS TESTS exceptions.	1 hour
B. THERMAL POWER not within limit.	B.1 Open reactor trip breakers.	Immediately
C. RCS lowest loop average temperature not within limit.	C.1 Restore RCS lowest loop average temperature to within limit.	15 minutes

DOC M01

ACTION a

ACTION b



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 <del>{SR 3.3.1.7, SR 3.3.1.8, and Table 3.3.1-1}.</del>	Prior to initiation of PHYSICS TESTS
4.10.3.3	SR 3.1.8.2	Verify the RCS lowest loop average temperature is $\geq$ <del>{531}°F.</del>	<del>{30 minutes}</del>  <del>OR</del>  In accordance with the Surveillance Frequency Control Program <del>}</del>
4.10.3.1	SR 3.1.8.3	Verify THERMAL POWER is $\leq$ 5% RTP.	<del>{30 minutes}</del>  <del>OR</del>  In accordance with the Surveillance Frequency Control Program <del>}</del>

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SURVEILLANCE		FREQUENCY
SR 3.1.8.4	Verify SDM is within the limits specified in the COLR.	<p><del>[ 24 hours</del></p> <p><u>OR</u></p> <p>In accordance with the Surveillance Frequency Control Program }</p>

**JUSTIFICATION FOR DEVIATIONS**  
**ITS 3.1.8, PHYSICS TEST EXCEPTIONS – MODE 2**

1. The Improved Standard Technical Specifications (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. The punctuation corrections have been made consistent with the Writers Guide for the Improved Standard Technical Specifications, NEI 01-03, Section 5.1.3.

**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

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##### 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 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).

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 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.

## 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, ← [ ; ]
- ~~b. Critical Boron Concentration - Control Rods Inserted, ← [ ; ]~~
- b → ~~c.~~ Control Rod Worth, ← [ ; and ]
- c → ~~d.~~ Isothermal Temperature Coefficient (ITC), ← [ and ]
- ~~e. Neutron Flux Symmetry.~~



~~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.

- { 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 ( $k_{\text{eff}} = 1.0$ ), 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.
- ~~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%  $\Delta k/k$  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)

  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.

  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  $\leq 30\%$  RTP (Flux Distribution Method). The Control Rod Worth Symmetry~~

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  $\leq 30\%$  RTP.]~~

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APPLICABLE  
SAFETY  
ANALYSES

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). 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.

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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 the 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  $\leq 5\%$  RTP, the reactor coolant temperature is kept  $\geq 531^\circ\text{F}$ , and SDM is within the limits provided in the COLR.

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4

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~~ <sup>representing</sup> ~~represent~~ initial conditions of the unit safety analyses. Also involved are the movable control components (control and shutdown rods), ~~which~~ <sup>that</sup> are required to shut down the reactor. The limits for these variables are specified for each fuel cycle in the COLR.

4



## 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.~~

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### 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 18.e may be reduced to 3 required channels during the performance of PHYSICS TESTS provided:

- RCS lowest loop average temperature is  $\geq 531^{\circ}\text{F}$ ,
- SDM is within the limits provided in the COLR, and
- THERMAL POWER is  $\leq 5\%$  RTP.

2

### 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.

1

## BASES

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### 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

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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  $\geq 531^{\circ}\text{F}$  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.]~~

2

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.  
-----]~~

3

SR 3.1.8.3

Verification that the THERMAL POWER is  $\leq 5\%$  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.]~~

2

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.~~

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 <sup>or</sup> defect, when above the POAH, and
- i. Doppler defect, when above the POAH.

6

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.~~

2

OR

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

1

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.

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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.
5. WCAP-9273-NP-A, "Westinghouse Reload Safety Evaluation Methodology Report," July 1985.
6. WCAP-11618, including Addendum 1, April 1989.

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**JUSTIFICATION FOR DEVIATIONS**  
**ITS 3.1.8 BASES, PHYSICS TESTS EXCEPTIONS – MODE 2**

1. Changes are made (additions, deletions, and/or changes) to the Improved Standard Technical Specifications (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. 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. Editorial changes made for enhanced clarity/consistency.
5. 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.
6. Typographical/grammatical error corrected.

## **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 3.1.2.1, FLOW PATHS – SHUTDOWN**  
**CTS 3.1.2.2, FLOW PATHS - OPERATING**  
**CTS 3.1.2.3, CHARGING PUMPS - OPERATING**  
**CTS 3.1.2.4, BORATED WATER SOURCE - SHUTDOWN**  
**CTS 3.1.2.5, BORATED WATER SOURCE - OPERATING**

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

## REACTIVITY CONTROL SYSTEMS

### 3/4.1.2 BORATION SYSTEMS

#### FLOW-PATH—SHUTDOWN

#### LIMITING CONDITION FOR OPERATION

~~3.1.2.1 As a minimum, one of the following boron injection flow paths shall be OPERABLE and capable of being powered from an OPERABLE emergency power source:~~

- ~~a. A flow path from the boric acid storage tanks via a boric acid transfer pump and a charging pump to the Reactor Coolant System if the boric acid storage tank in Specification 3.1.2.4a. is OPERABLE, or~~
- ~~b. The flow path from the refueling water storage tank via a charging pump to the Reactor Coolant System if the refueling water storage tank in Specification 3.1.2.4b. is OPERABLE.~~

~~APPLICABILITY: MODES 5 and 6.~~

#### ACTION:

~~With none of the above flow paths OPERABLE or capable of being powered from an OPERABLE emergency power source, suspend all operations involving CORE ALTERATIONS or positive reactivity changes.~~

#### SURVEILLANCE REQUIREMENTS

~~4.1.2.1 At least one of the above required flow paths shall be demonstrated OPERABLE:~~

- ~~a. In accordance with the Surveillance Frequency Control Program by verifying that the temperature of the rooms containing flow path components is greater than or equal to 62°F when a flow path from the boric acid tanks is used, and~~
- ~~b. In accordance with the Surveillance Frequency Control Program by verifying that each valve (manual, power-operated, or automatic) in the flow path that is not locked, sealed, or otherwise secured in position, is in its correct position.~~

R01

## REACTIVITY CONTROL SYSTEMS

### FLOW PATHS – OPERATING

#### LIMITING CONDITION FOR OPERATION

3.1.2.2 The following boron injection flow paths shall be OPERABLE:

- a. ~~The source path from a boric acid storage tank via a boric acid transfer pump to the charging pump suction\*, and~~
- b. ~~At least one of the two source paths from the refueling water storage tank to the charging pump suction; and,~~
- c. ~~The flow path from the charging pump discharge to the Reactor Coolant System via the regenerative heat exchanger.~~

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

#### ACTION:

- a. ~~With no boration source path from a boric acid storage tank OPERABLE,~~
  1. ~~Demonstrate the OPERABILITY of the second source path from the refueling water storage tank to the charging pump suction by verifying the flow path valve alignment; and~~
  2. ~~Restore the boration source path from a boric acid storage tank to OPERABLE status within 70 hours or be in at least HOT STANDBY and borated to a boron concentration equivalent to at least the required SHUTDOWN MARGIN at COLD SHUTDOWN at 200°F within the next 8 hours; restore the boration source path from a boric acid storage tank to OPERABLE status within the next 72 hours or be in COLD SHUTDOWN within the next 30 hours.~~
- b. ~~With only one boration source path OPERABLE or the regenerative heat exchanger flow path to the RCS inoperable, restore the required flow paths to OPERABLE status within 70 hours or be in at least HOT STANDBY and borated to a boron concentration equivalent to at least the required SHUTDOWN MARGIN at COLD SHUTDOWN at 200°F within the next 8 hours; restore at least two boration source paths to OPERABLE status within the next 72 hours or be in COLD SHUTDOWN within the next 30 hours.~~
- c. ~~With the boration source path from a boric acid storage tank and the charging pump discharge path via the regenerative heat exchanger inoperable, within one hour initiate boration to a boron concentration equivalent to the required SHUTDOWN MARGIN at COLD SHUTDOWN at 200°F and go to COLD SHUTDOWN as soon as possible within the limitations of the boration and pressurizer level control functions of the CVCS.~~

\* ~~The flow required in Specification 3.1.2.2.a above shall be isolated from the other unit from the boric acid transfer pump discharge to the charging pump suction.~~

## REACTIVITY CONTROL SYSTEMS

### SURVEILLANCE REQUIREMENTS

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~~4.1.2.2 The above required flow paths shall be demonstrated OPERABLE:~~

- ~~a. In accordance with the Surveillance Frequency Control Program by verifying that the temperature of the rooms containing flow path components is greater than or equal to 62°F when a flow path from the boric acid tanks is used;~~
- ~~b. In accordance with the Surveillance Frequency Control Program by verifying that each valve (manual, power-operated, or automatic) in the flow path that is not locked, sealed, or otherwise secured in position, is in its correct position;~~
- ~~c. In accordance with the Surveillance Frequency Control Program by verifying that the flow path required by Specification 3.1.2.2a. and c. delivers at least 16 gpm to the RCS.~~

R01

## REACTIVITY CONTROL SYSTEMS

### CHARGING PUMPS – OPERATING

#### LIMITING CONDITION FOR OPERATION

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~~3.1.2.3 At least two charging pumps shall be OPERABLE.~~

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

#### ACTION:

~~With only one charging pump OPERABLE, restore at least two charging pumps to OPERABLE status within 70 hours or be in at least HOT STANDBY and borated to a boron concentration equivalent to at least the required SHUTDOWN MARGIN at COLD SHUTDOWN at 200°F within 8 hours; restore at least two charging pumps to OPERABLE status within 72 hours or be in COLD SHUTDOWN within the next 30 hours.~~

#### SURVEILLANCE REQUIREMENTS

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~~4.1.2.3.1 The required charging pumps shall be demonstrated OPERABLE by testing in accordance with the INSERVICE TESTING PROGRAM. The provisions of Specification 4.0.4 are not applicable for entry into MODES 3 and 4.~~

R01

## REACTIVITY CONTROL SYSTEMS

### BORATED WATER SOURCE SHUTDOWN

#### LIMITING CONDITION FOR OPERATION

3.1.2.4 ~~As a minimum, one of the following borated water sources shall be OPERABLE:~~

a. ~~A Boric Acid Storage System with:~~

- ~~1) A minimum indicated borated water volume of 2,900 gallons per unit,~~
- ~~2) A boron concentration between 3.0 wt% (5245 ppm) and 4.0 wt.% (6993 ppm), and~~
- ~~3) A minimum boric acid tanks room temperature of 62°F.~~

b. ~~The refueling water storage tank (RWST) with:~~

- ~~1) A minimum indicated borated water volume of 20,000 gallons,~~
- ~~2) A boron concentration between 2400 ppm and 2600 ppm, and~~
- ~~3) A minimum solution temperature of 39°F.~~

APPLICABILITY: ~~MODES 5 and 6.~~

#### ACTION:

~~With no borated water source OPERABLE, suspend all operations involving CORE ALTERATIONS or positive reactivity changes.~~

#### SURVEILLANCE REQUIREMENTS

4.1.2.4 ~~The above required borated water source shall be demonstrated OPERABLE:~~

a. ~~In accordance with the Surveillance Frequency Control Program by:~~

- ~~1) Verifying the boron concentration of the water,~~
- ~~2) Verifying the indicated borated water volume, and~~
- ~~3) Verifying that the temperature of the boric acid tanks room is greater than or equal to 62°F, when it is the source of borated water.~~

R01



## REACTIVITY CONTROL SYSTEMS

### SURVEILLANCE REQUIREMENTS (Continued)

- b. ~~By verifying the RWST temperature is above its limit whenever the outside air temperature is less than 39° at the following frequencies:~~
- ~~1) Within one hour when the outside temperature is below 39° for 23 consecutive hours, and~~
  - ~~2) At least once per 24 hours when the outside temperature is below 39°.~~

R01

## REACTIVITY CONTROL SYSTEMS

### BORATED WATER SOURCES—OPERATING

#### LIMITING CONDITION FOR OPERATION

3.1.2.5 The following borated water sources shall be OPERABLE:

- a. ~~— A Boric Acid Storage System with:~~
  - 1) ~~— A minimum indicated borated water volume in accordance with Figure 3.1-2,~~
  - 2) ~~— A boron concentration in accordance with Figure 3.1-2, and~~
  - 3) ~~— A minimum boric acid tanks room temperature of 62°F.~~
- b. ~~— The refueling water storage tank (RWST) with:~~
  - 1) ~~— A minimum indicated borated water volume of 320,000 gallons,~~
  - 2) ~~— A boron concentration between 2400 ppm and 2600 ppm.~~
  - 3) ~~— A minimum solution temperature of 39°F, and~~
  - 4) ~~— A maximum solution temperature of 100°F.~~

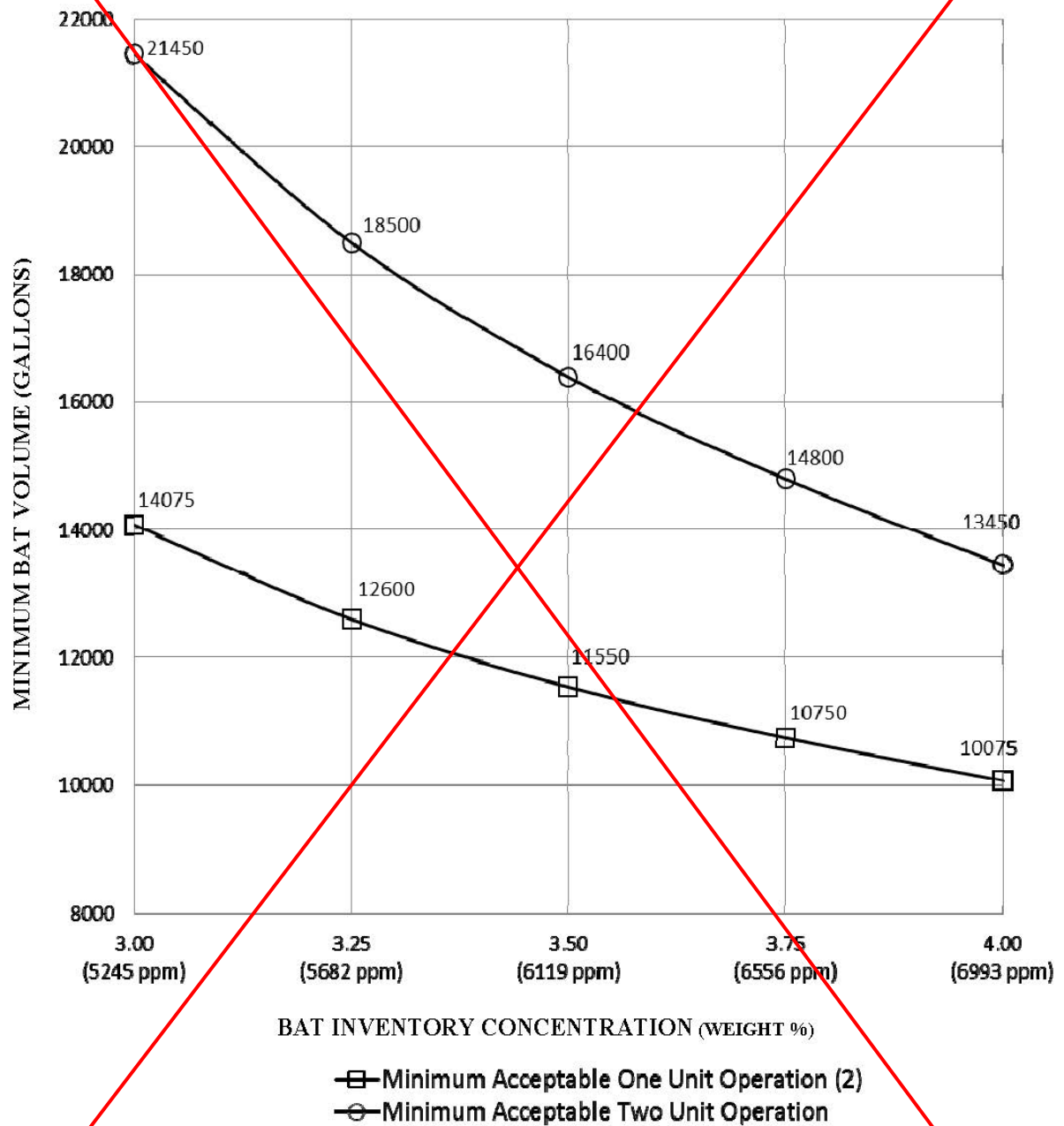
APPLICABILITY: ~~MODES 1, 2, 3, and 4.~~

#### ACTION:

- a. ~~— With the required Boric Acid Storage System inoperable verify that the RWST is OPERABLE; restore the system to OPERABLE status within 70 hours or be in at least HOT STANDBY within the next 8 hours\* and borated to a boron concentration equivalent to at least the required SHUTDOWN MARGIN at COLD SHUTDOWN at 200°F; restore the Boric Acid Storage System to OPERABLE status within the next 72 hours or be in COLD SHUTDOWN within the next 30 hours.~~
- b. ~~— With the RWST inoperable, restore the tank to OPERABLE status within 1 hour or be in at least HOT STANDBY within the next 6 hours and in COLD SHUTDOWN within the following 30 hours.~~
- c. ~~— With the boric acid tank inventory concentration greater than 4.0 wt%, verify that the boric acid solution temperature for boration sources and flow paths is greater than the solubility limit for the concentration.~~

\* ~~If this action applies to both units simultaneously, be in at least HOT STANDBY within the next sixteen hours.~~

Figure 3.1-2  
BORIC ACID TANK MINIMUM VOLUME (1)  
Modes 1, 2, 3 and 4



R01

Notes:

- (1) Combined volume of all available boric acid tanks assuming RWST boron concentration between 2400 ppm and 2600 ppm.
- (2) Includes 2900 gallons for the shutdown unit.

## REACTIVITY CONTROL SYSTEMS

### SURVEILLANCE REQUIREMENTS

---

4.1.2.5 ~~Each borated water source shall be demonstrated OPERABLE:~~

a. ~~In accordance with the Surveillance Frequency Control Program by:~~

- ~~1) Verifying the boron concentration in the water,~~
- ~~2) Verifying the indicated borated water volume of the water source, and~~
- ~~3) Verifying that the temperature of the boric acid tanks room is greater than or equal to 62°F, when it is the source of borated water.~~

b. ~~By verifying the RWST temperature is within limits whenever the outside air temperature is less than 39°F or greater than 100°F at the following frequencies:~~

- ~~1) Within one hour upon the outside temperature exceeding its limit for 23 consecutive hours, and~~
- ~~2) At least once per 24 hours while the outside temperature exceeds its limits.~~

R01

**DISCUSSION OF CHANGES**  
**CTS 3.1.2.1, FLOW PATHS – SHUTDOWN**  
**CTS 3.1.2.2, FLOW PATHS - OPERATING**  
**CTS 3.1.2.3, CHARGING PUMPS - OPERATING**  
**CTS 3.1.2.4, BORATED WATER SOURCE - SHUTDOWN**  
**CTS 3.1.2.5, BORATED WATER SOURCE - OPERATING**

ADMINISTRATIVE CHANGES

None

MORE RESTRICTIVE CHANGES

None

RELOCATED SPECIFICATIONS

- R01 CTS 3.1.2.1 provides the requirements for the minimum boron injection flow paths (one) during shutdown (Modes 5 and 6). CTS 3.1.2.2, provides the requirements for the minimum boron injection flow paths (2) during Operation Modes 1 - 4. CTS 3.1.2.3 provides the requirement to have two charging pumps available during Modes 1 – 4 as the motive means to get the boron inventory to the RCS during normal operation. CTS 3.1.2.4 requires as a minimum one borated water source (Boric Acid Storage System or Refueling Water Storage Tank) to be Operable during Modes 5 and 6. CTS 3.1.2.5 requires both borated water sources (Boric Acid Storage System and Refueling Water Storage Tank) to be Operable during Modes 1 - 4.

The components associated with the boration system technical specifications provide the means to control the chemical neutron absorber (boron) concentration in the RCS and to help maintain the shutdown margin during normal operations. To accomplish this functional requirement, the current boration system technical specifications require a source(s) of borated water, one or more flow paths to inject borated water into the RCS and Charging Pumps to provide the necessary charging head.

The boration systems are not assumed to be operable to mitigate the consequences of a DBA or transient. In the case of a malfunction of a component in the boration systems which causes a boron dilution event, the automatic response, or that required by the operator, is to close the appropriate valves in the reactor makeup system. The automatic plant response to a boron dilution event also includes automatic control rod assembly movement and reactor trip features to ensure shutdown margin is maintained. The boration capabilities of the boration systems are not assumed to mitigate the boron dilution event. The analysis demonstrates that there is not a complete loss of available shutdown margin following a CVCS malfunction event within a specified amount of time for the operator to take action to diagnose the event, terminate the dilution source and initiate boration.

**DISCUSSION OF CHANGES**  
**CTS 3.1.2.1, FLOW PATHS – SHUTDOWN**  
**CTS 3.1.2.2, FLOW PATHS - OPERATING**  
**CTS 3.1.2.3, CHARGING PUMPS - OPERATING**  
**CTS 3.1.2.4, BORATED WATER SOURCE - SHUTDOWN**  
**CTS 3.1.2.5, BORATED WATER SOURCE - OPERATING**

Comparison to Selection Criteria:

1. The boration systems do not constitute an instrumentation system that is used to detect, and indicate in the control room, a significant abnormal degradation of the reactor coolant pressure boundary.
2. The boration systems are not a process variable, design feature, or operating restriction that is an initial condition of a design basis accident or transient analysis that either assumes the failure of or challenge to the integrity of a fission product barrier. This Technical Specification specifies limits on process variables consistent with the structural analysis results. These limits, however, do not reflect initial condition assumptions in the DBA.
3. The boration systems are not a structure, system, or component that is part of the primary success path and which functions or actuates to mitigate a design basis accident or transient that either assumes the failure of or presents a challenge to the integrity of a fission product barrier.
4. The function of injecting borated water to maintain shutdown margin is not risk significant. Operational experience has shown that the boration management system is not a constraint of prime importance in the mitigation of any accident or transient that results in challenging public health and safety. Therefore, the RCS boration management system functions to control boron concentration and maintain shutdown margin do not represent structures, systems, or components which operating experience or probabilistic risk assessment has shown to be significant to public health and safety.

Because the selection criteria have not been satisfied, the boration system LCOs and Surveillances, may be relocated to licensee-controlled documents outside the Technical Specifications. Operability requirements for ensuring adequate Shutdown Margin and supporting minimum boration requirements during plant shutdown, are retained in separate Technical Specifications.

REMOVED DETAIL CHANGES

None

LESS RESTRICTIVE CHANGES

None

## **Specific No Significant Hazards Considerations (NSHCs)**

**DETERMINATION OF NO SIGNIFICANT HAZARDS CONSIDERATIONS**

**CTS 3.1.2.1, FLOW PATHS – SHUTDOWN**

**CTS 3.1.2.2, FLOW PATHS - OPERATING**

**CTS 3.1.2.3, CHARGING PUMPS - OPERATING**

**CTS 3.1.2.4, BORATED WATER SOURCE - SHUTDOWN**

**CTS 3.1.2.5, BORATED WATER SOURCE – OPERATING**

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



### **CTS 3.1.3.3, POSITION INDICATION SYSTEM - SHUTDOWN**

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

## ~~REACTIVITY CONTROL SYSTEMS~~

### ~~POSITION INDICATION SYSTEM – SHUTDOWN~~

#### ~~LIMITING CONDITION FOR OPERATION~~

~~3.1.3.3 The group step counter demand position indicator shall be OPERABLE and capable of determining within  $\pm 2$  steps the demand position for each shutdown and control rod not fully inserted.~~

~~APPLICABILITY: MODES 3\* \*\*, 4\* \*\*, and 5\* \*\*~~

#### ~~ACTION:~~

~~With less than the above required group step counter demand position indicator(s) OPERABLE, open the reactor trip system breakers.~~

#### ~~SURVEILLANCE REQUIREMENTS~~

~~4.1.3.3.1 Each of the above required group step counter demand position indicator(s) shall be determined to be OPERABLE by movement of the associated control rod at least 10 steps in any one direction in accordance with the Surveillance Frequency Control Program.~~

~~4.1.3.3.2 OPERABILITY of the group step counter demand position indicator shall be verified in accordance with Table 4.1-1.~~

~~\* With the Reactor Trip System breakers in the closed position.~~

~~\*\* See Special Test Exceptions Specification 3.10.5.~~

**DISCUSSION OF CHANGES**  
**CTS 3.1.3.3, POSITION INDICATION SYSTEM - SHUTDOWN**

ADMINISTRATIVE CHANGES

None

MORE RESTRICTIVE CHANGES

None

RELOCATED SPECIFICATIONS

- R01 CTS 3.1.3.3 provides the requirements for the group step counter demand position indicator to be OPERABLE and capable of determining within  $\pm 2$  steps the demand position for each shutdown and control rod not fully inserted in Modes 3, 4 and 5 with the reactor trip breakers in the closed position.

Rod position indication ensure OPERABILITY of the control rod position indicators to determine control rod positions and thereby ensure compliance with the control rod alignment and insertion limits. In Modes 3, 4, and 5 SDM is required per LCO 3.1.1; which references the COLR. The COLR requires sufficient reactivity margin to ensure fuel design limits will not be exceeded for normal shutdown and anticipated operational occurrences. This sufficient reactivity margin takes into account rod positions with the single rod cluster assembly of the highest reactivity worth fully withdrawn. 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.

Comparison to Selection Criteria:

1. Control Rod Position Indications in Modes 3, 4, and 5 do not constitute an instrumentation system that is used to detect, and indicate in the control room, a significant abnormal degradation of the reactor coolant pressure boundary.
2. Control Rod Position Indications in Modes 3, 4, and 5 are not a process variable, design feature, or operating restriction that is an initial condition of a design basis accident or transient analysis that either assumes the failure of or challenge to the integrity of a fission product barrier. This Technical Specification specifies limits on process variables consistent with the structural analysis results. These limits, however, do not reflect initial condition assumptions in the DBA.
3. Control Rod Position Indications in Modes 3, 4, and 5 are not a structure, system, or component that is part of the primary success path and which functions or actuates to mitigate a design basis accident or transient that either assumes the failure of or presents a challenge to the integrity of a fission product barrier.

**DISCUSSION OF CHANGES**  
**CTS 3.1.3.3, POSITION INDICATION SYSTEM - SHUTDOWN**

4. Control Rod Position Indications in Modes 3, 4, and 5 were found to be non-significant risk contributor to core damage frequency and offsite releases. These indications are not structures, systems, or components that operating experience or probabilistic safety assessment has shown to be significant to the public health and safety.

Since the selection criteria have not been satisfied, the Control Rod Position indications in Modes 3, 4, and 5 LCO and Surveillances, may be relocated to licensee controlled documents outside the Technical Specifications. Position Indication requirements in Modes 1 and 2 are required by LCO 3.1.7 to ensure the initial conditions of the Safety Analyses are maintained.

REMOVED DETAIL CHANGES

None

LESS RESTRICTIVE CHANGES

None

## **Specific No Significant Hazards Considerations (NSHCs)**

**DETERMINATION OF NO SIGNIFICANT HAZARDS CONSIDERATIONS  
CTS 3.1.3.3, POSITION INDICATION SYSTEM - SHUTDOWN**

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

## **CTS 3/4.10.1, SHUTDOWN MARGIN**



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

### 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 16 gpm of a solution containing greater than or equal to 3.0 wt% (5245 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 fully inserted and the reactor subcritical by less than the above reactivity equivalent, immediately initiate and continue boration at greater than or equal to 16 gpm of a solution containing greater than or equal to 3.0 wt% (5245 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 control rod either partially or fully withdrawn shall be determined in accordance with the Surveillance Frequency Control Program.~~

~~4.10.1.2 Each full-length control rod not fully inserted shall be demonstrated capable of full insertion when tripped from at least the 50% withdrawn position within 7 days prior to reducing the SHUTDOWN MARGIN to less than the limits of Specification 3.1.1.1.~~

M01

**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

## **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.

**CTS 3/4.10.2, GROUP HEIGHT, INSERTION AND POWER  
DISTRIBUTION LIMITS**

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

## 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 Specification 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:~~

- ~~\_\_\_\_\_ 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 in accordance with the Surveillance Frequency Control Program during PHYSICS TESTS.~~

~~4.10.2.2 The requirements of the below listed specifications shall be performed in accordance with the Surveillance Frequency Control Program during PHYSICS TESTS:~~

- ~~\_\_\_\_\_ a. \_\_\_\_\_ Specifications 4.2.2.1 and 4.2.2.5, and~~
- ~~\_\_\_\_\_ b. \_\_\_\_\_ Specification 4.2.3.3.~~

M01



**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

## **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.

## **CTS 3/4.10.5, POSITION INDICATION SYSTEM - SHUTDOWN**

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

## SPECIAL TEST EXCEPTIONS

### 3/4.10.5 POSITION INDICATION SYSTEM – SHUTDOWN

#### LIMITING CONDITION FOR OPERATION

3.10.5 The limitations of Specification 3.1.3.3 may be suspended during the performance of individual full-length shutdown and control rod drop time measurements provided;

- \_\_\_\_\_ a. \_\_\_\_\_ Only one shutdown or control bank is withdrawn from the fully inserted position at a time, and
- \_\_\_\_\_ b. \_\_\_\_\_ The rod position indicator is OPERABLE during the withdrawal of the rods.

APPLICABILITY: \_\_\_\_\_ MODES 3, 4, and 5 during performance of rod drop time measurements.

#### ACTION:

With the Position Indication Systems inoperable or with more than one bank of rods withdrawn, immediately open the Reactor trip breakers.

M01

#### SURVEILLANCE REQUIREMENTS

4.10.5 The above required Position Indication Systems shall be determined to be OPERABLE within 24 hours prior to the start of and in accordance with the Surveillance Frequency Control Program thereafter during rod drop time measurements by verifying the Demand Position Indication System and the Analog Rod Position Indication System agree:

- \_\_\_\_\_ a. \_\_\_\_\_ Within 12 steps when the rods are stationary, and
- \_\_\_\_\_ b. \_\_\_\_\_ Within 24 steps during rod motion.

**DISCUSSION OF CHANGES**  
**CTS 3/4.10.5, POSITION INDICATION SYSTEM - SHUTDOWN**

ADMINISTRATIVE CHANGES

None

MORE RESTRICTIVE CHANGES

M01 CTS 3.10.5 states "The limitations of Specification 3.1.3.3 may be suspended during the performance of individual full-length shutdown and control rod drop time measurements provided;

- a. Only one shutdown or control bank is withdrawn from the fully inserted position at a time, and
- b. The rod position indicator is OPERABLE during the withdrawal of the rods."

The ITS does not contain this special test exception. This changes the CTS by eliminating a special test exception.

This change is acceptable because the performance of individual full-length shutdown and control rod drop time measurements is no longer performed. 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

## **Specific No Significant Hazards Considerations (NSHCs)**



**DETERMINATION OF NO SIGNIFICANT HAZARDS CONSIDERATIONS  
CTS 3/4.10.5, POSITION INDICATION SYSTEM - SHUTDOWN**

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

## **ATTACHMENT 10**

**Improved Standard Technical Specifications (ISTS)  
Not Adopted in the Turkey Point Nuclear Generating Station ITS**

**NONE**