



10 CFR 50.90

NRC 2018-0028

July 30, 2018

ATTN: Document Control Desk  
U.S. Nuclear Regulatory Commission  
Washington, DC 20555-0001

Point Beach Nuclear Plant, Units 1 and 2  
Docket Nos. 50-266 and 50-301

Subject: License Amendment Request 290, Application to Revise Technical Specifications to Adopt TSTF-547, "Clarification of Rod Position Requirements"

Pursuant to 10 CFR 50.90, NextEra Energy Point Beach, LLC (NextEra) is submitting a request for an amendment to the technical specifications (TS) for Point Beach Units 1 and 2. The proposed amendment revises the requirements on control and shutdown rods, and rod bank position indication. The proposed amendment also revises the location of a note that modifies the Actions of Point Beach TS 3.1.4, TS 3.1.5, and TS 3.1.6. NextEra determined that the note is misplaced and should be associated with various surveillance requirements that verify rod positions.

The enclosure to this letter provides a description and assessment of the proposed changes. Attachment 1 provides the existing TS pages marked up to show the proposed changes, and Attachment 2 provides revised (clean) TS pages. Attachment 3 provides existing TS Bases pages marked to show the proposed changes for information only.

As discussed in the evaluation, the proposed change does not involve a significant hazards consideration pursuant to 10 CFR 50.92, and there are no significant environmental impacts associated with the change.

The Point Beach Onsite Review Group has reviewed the proposed license amendment. In accordance with 10 CFR 50.91(b) (1), a copy of this letter is being forwarded to the designee of the State of Wisconsin.

There are no new or revised commitments made in this submittal.

Due to the simplicity and strict conformance to the NRC-endorsed model application contained in TSTF-547, we request accelerated processing to preclude further confusion over the current placement of the note; therefore, NextEra requests NRC review and approval of this license amendment request by April 1, 2019 and implementation within 90 days.

Should you have any questions regarding this letter, please contact Eric Schultz, Licensing Manager, at (920) 755-7854.

I declare under penalty of perjury that the foregoing is true and correct.

Executed on July 30, 2018

Sincerely,

A handwritten signature in black ink, appearing to read "Robert Craven", with a long horizontal flourish extending to the right.

Robert Craven  
Site Director  
NextEra Energy Point Beach, LLC

Enclosure

Attachment 1: Markup of the Technical Specifications

Attachment 2: Retyped Technical Specifications Pages

Attachment 3: Markup of Proposed Bases Changes

cc: Regional Administrator, USNRC, Region III  
Project Manager, USNRC, Point Beach Nuclear Plant  
Resident Inspector, USNRC, Point Beach Nuclear Plant  
Public Service Commission of Wisconsin

## ENCLOSURE

### DESCRIPTION AND ASSESSMENT OF PROPOSED CHANGE

#### 1.0 DESCRIPTION

The proposed amendment revises the requirements on control and shutdown rods, and rod and bank position indication in Technical Specification (TS) 3.1.4, "Rod Group Alignment Limits," TS 3.1.5, "Shutdown Bank Insertion Limits," TS 3.1.6, "Control Bank Insertion Limits," and TS 3.1.7, "Rod Position Indication." The changes provide time to repair rod movement failures that do not affect rod operability, provide time for analog position indication instruments to read accurately after rod movement, correct conflicts between the TS, and increase consistency and improve the presentation.

#### 2.0 ASSESSMENT

##### 2.1 Applicability of Safety Evaluation

NextEra Energy Point Beach, LLC (NextEra) has reviewed the safety evaluation for TSTF-547 provided to the Technical Specifications Task Force in a letter dated March 4, 2016. This review included a review of the NRC staff's evaluation, as well as the information provided in TSTF-547. As described in the subsequent paragraphs, NextEra has concluded that the justifications presented in the TSTF-547 proposal and the safety evaluation prepared by the NRC staff are applicable to Point Beach, Units 1 and 2 and justify this amendment for the incorporation of the changes to the Point Beach TS.

##### 2.2 Variations

NextEra is proposing the following variations from the TS changes described in the TSTF-547 or the applicable parts of the NRC staff's safety evaluation dated March 4, 2016. These variations do not affect the applicability of TSTF-547 or the NRC staff's safety evaluation to the proposed license amendment.

TSTF-547 and the safety evaluation discuss that limiting condition for operation (LCO) 3.1.4, "Rod Group Alignment Limits," requires that individual rod positions must be within 12 steps of their group demand position. However, the Point Beach TS specify different alignment limits ( $\pm 18$  steps and  $\pm 24$  steps of demanded position) depending on bank demand position and power level. This difference in alignment limits does not affect the applicability of TSTF-547 to the Point Beach TS.

Different from the standard TS, Point Beach TS 3.1.4, TS 3.1.5, and TS 3.1.6 contain a note that modifies the Actions. The note is intended to allow one hour for the control rod drive shaft to reach thermal equilibrium following rod movement to ensure accuracy of the indication before using the analog rod position indication (RPI). NextEra determined that the note is misplaced and should be associated with various surveillance requirements that verify rods are positioned within allowable limits. Therefore, NextEra proposes to delete the note that modifies the Actions in TS 3.1.4, TS 3.1.5, and TS 3.1.6, and to incorporate the notes in TSTF-547 that allow time for thermal equilibrium of analog rod position indicators. This administrative correction to the TS does not affect the applicability of TSTF-547 to the Point Beach TS.

LCO 3.1.7, "Rod Position Indication," in TSTF-547 contains Condition A for one RPI per group inoperable in one or more groups and Condition B for more than one RPI inoperable in one or more groups. The traveler modifies Condition A by adding new Required Actions that provide an alternative to frequent verification of rod position using movable incore detectors. NextEra is not adopting this alternative. Excluding this change does not affect the applicability of the other changes in TSTF-547 to the Point Beach TS.

TSTF-547 deletes Required Action B.2 in TS 3.1.7 (monitor and record reactor coolant system temperature). This change is not applicable to the Point Beach TS, which does not contain this Required Action. This variation does not affect the applicability of TSTF-547 to the Point Beach TS.

TSTF-547 revises Condition D in TS 3.1.7 to address one *or more* demand position indicators per bank inoperable for *in* one or more banks. Corresponding Condition C in the current Point Beach TS already includes the provision "or more," so this portion of the change is not needed for Point Beach. In addition, the letter designators for the Conditions in the Point Beach TS 3.1.7 differ from TSTF-547, so the changes to Condition C in TSTF-547 apply to Condition B in the Point Beach TS. These administrative differences do not affect the applicability of TSTF-547 to the Point Beach TS.

TSTF-547 and the safety evaluation discuss the applicable regulatory requirements and guidance, including the 10 CFR 50, Appendix A, General Design Criteria (GDC). Point Beach was not licensed to the 10 CFR 50, Appendix A, GDC. The Atomic Energy Commission published proposed GDCs for public comment in 1967, and the Atomic Industrial Forum (AIF) reviewed these proposed criteria and recommended changes. The Point Beach GDCs, which are documented in Table 1.3-1 of the Updated Final Safety Analysis Report, are similar in content to the AIF version of the Proposed 1967 GDCs. This variation does not affect the applicability of TSTF-547 to the Point Beach TS.

### **3.0 REGULATORY ANALYSIS**

#### **3.1 No Significant Hazards Consideration Analysis**

NextEra Energy Point Beach, LLC (NextEra) requests adoption of TSTF-547, "Clarification of Rod Position Requirements," which is an approved change to the Standard Technical Specifications, into the Point Beach Units 1 and 2 Technical Specifications (TS). The proposed change revises the requirements on control and shutdown rods, and rod and bank position indication to provide time to repair rod movement failures that do not affect rod Operability, to provide time for analog position indication instruments to read accurately after rod movement, to correct conflicts between the TS, and to increase consistency and to improve the presentation.

NextEra has evaluated whether or not a significant hazards consideration is involved with the proposed amendment(s) by focusing on the three standards set forth in 10 CFR 50.92, "Issuance of amendment," as discussed below:

1. Does the proposed amendment involve a significant increase in the probability or consequences of an accident previously evaluated?

**Response: No**

Control and shutdown rods are assumed to insert into the core to shut down the reactor in evaluated accidents. Rod insertion limits ensure that adequate negative reactivity is available to provide the assumed shutdown margin (SDM). Rod alignment and overlap limits maintain an appropriate power distribution and reactivity insertion profile.

Control and shutdown rods are initiators to several accidents previously evaluated, such as rod ejection. The proposed change does not change the limiting conditions for operation for the rods or make any technical changes to the Surveillance Requirements (SRs) governing the rods. Therefore, the proposed change has no significant effect on the probability of any accident previously evaluated.

Revising the TS Actions to provide a limited time to repair rod movement control has no effect on the SDM assumed in the accident analysis as the proposed Action require verification that SDM is maintained. The effects on power distribution will not cause a significant increase in the consequences of any accident previously evaluated as all TS requirements on power distribution continue to be applicable.

Therefore, the assumptions used in any accidents previously evaluated are unchanged and there is no significant increase in the consequences.

The consequences of an accident that might occur during the one-hour period provided for the analog rod position indication to stabilize after rod movement are no different from the consequences of the accident under the existing actions with the rod declared inoperable.

The proposed change to resolve the conflicts in the TS ensure that the intended Actions are followed when equipment is inoperable. Actions taken with inoperable equipment are not assumptions in the accidents previously evaluated and have no significant effect on the consequences.

The proposed change to increase consistency within the TS has no effect on the consequences of accidents previously evaluated as the proposed change clarifies the application of the existing requirements and does not change the intent.

Therefore, the proposed change does not involve a significant increase in the probability or consequences of an accident previously evaluated.

2. Does the proposed amendment create the possibility of a new or different kind of accident from any previously evaluated?

**Response: No**

The proposed change does not involve a physical alteration of the plant (i.e., no new or different type of equipment will be installed). The change does not alter assumptions made in the safety analyses. The proposed change does not alter the limiting conditions for operation for the rods or make any technical changes to the SRs governing the rods. The proposed change to actions maintains or improves safety when equipment is inoperable and does not introduce new failure modes.

Therefore, the proposed change does not create the possibility of a new or different kind of accident from any previously evaluated.

3. Does the proposed amendment involve a significant reduction in a margin of safety?

**Response: No**

The proposed change to allow time for rod position indication to stabilize after rod movement and to allow an alternative method of verifying rod position has no effect on the safety margin, as actual rod position is not affected. The proposed change to provide time to repair rods that are operable but immovable does not result in a significant reduction in the margin of safety because all rods must be verified to be operable, and all other banks must be within the insertion limits. The remaining proposed changes to make the requirements internally consistent and to eliminate unnecessary actions do not affect the margin of safety as the changes do not affect the ability of the rods to perform their specified safety function.

Therefore, the proposed change does not involve a significant reduction in a margin of safety.

Based on the above, NextEra concludes that the proposed change presents no significant hazards consideration under the standards set forth in 10 CFR 50.92(c), and, accordingly, a finding of "no significant hazards consideration" is justified.

### 3.2 Conclusion

In conclusion, based on the considerations discussed above, (1) there is reasonable assurance that the health and safety of the public will not be endangered by operation in the proposed manner, (2) such activities will be conducted in compliance with the Commission's regulations, and (3) the issuance of the amendment will not be inimical to the common defense and security or to the health and safety of the public.

## 4.0 ENVIRONMENTAL EVALUATION

The proposed change would change a requirement with respect to installation or use of a facility component located within the restricted area, as defined in 10 CFR 20, or would change an inspection or surveillance requirement. However, the proposed change does not involve (i) a significant hazards consideration, (ii) a significant change in the types or significant increase in the amounts of any effluents that may be released offsite, or (iii) a significant increase in individual or cumulative occupational radiation exposure. Accordingly, the proposed change meets the eligibility criterion for categorical exclusion set forth in 10 CFR 51.22(c)(9). Therefore, pursuant to 10 CFR 51.22(b), no environmental impact statement or environmental assessment need be prepared in connection with the proposed change.

Attachment 1

Markup of the Technical Specifications

(14 pages follow)

### 3.1 REACTIVITY CONTROL SYSTEMS

#### 3.1.4 Rod Group Alignment Limits

LCO 3.1.4 All shutdown and control rods shall be OPERABLE, with individual rod positions within limits.

APPLICABILITY: MODES 1 and 2.

#### ACTIONS

~~NOTE~~

~~One hour is allowed following rod motion prior to verifying rod operability and group alignment limits.~~


CONDITION	REQUIRED ACTION	COMPLETION TIME
A. One or more rod(s) inoperable.	A.1.1 Verify SDM to be within the limits provided 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

(continued)



ACTIONS (continued)

CONDITION	REQUIRED ACTION	COMPLETION TIME
B. One rod not within alignment limits.	<del>B.1 Restore rod to within alignment limits.</del>	1 hour
	<u>OR</u>	
	B.2.1.1 Verify SDM to be within the limits provided in the COLR.	1 hour
	<u>OR</u>	
	B.2.1.2 Initiate boration to restore SDM to within limit.	1 hour
	<u>AND</u>	
	B.2.2 Reduce THERMAL POWER to $\leq 75\%$ RTP.	2 hours
	<u>AND</u>	
	B.2.3 Verify SDM to be within the limits provided in the COLR.	Once per 12 hours
	<u>AND</u>	
	3.2.1.1, 3.2.1.2, and 3.2.2.1.	
	B.2.4 Perform SR <del>3.2.1.1</del> and <del>SR 3.2.1.2.</del>	72 hours
	<u>AND</u>	
	B.2.5 Perform <del>SR 3.2.2.1.</del>	72 hours
	<u>AND</u>	
		(continued)

ACTIONS		
CONDITION	REQUIRED ACTION	COMPLETION TIME
B. (continued)	B.2.6 Re-evaluate safety analyses and confirm results remain valid for duration of operation under these conditions. 	5 days
C. Required Action and associated Completion Time of Condition B not met.	C.1 Be in MODE 3.	6 hours
D. More than one rod not within alignment limit.	D.1.1 Verify SDM to be within the limits provided in the COLR.	1 hour
	<u>OR</u>	
	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

# NOTES

1. Not required to be performed for rods associated with inoperable rod position indicator or demand position indicator.
2. Not required to be performed until 1 hour after associated rod motion.

## Rod Group Alignment Limits 3.1.4

### SURVEILLANCE REQUIREMENTS

position of individual rods

SURVEILLANCE		FREQUENCY
SR 3.1.4.1	<p>Verify individual rod positions are within the following alignment limits:</p> <ul style="list-style-type: none"> <li>a. <math>\pm 18</math> steps of demanded position (as allowed by Table 3.1.4-1) in MODE 1 &gt; 85 percent RTP when bank demand position is &lt; 215 steps;</li> </ul> <p><u>AND</u></p> <ul style="list-style-type: none"> <li>b. <math>\pm 24</math> steps of demanded position (as allowed by Table 3.1.4-2) in MODE 1 &gt; 85 percent RTP when bank demand position is <math>\geq 215</math> steps;</li> </ul> <p><u>AND</u></p> <ul style="list-style-type: none"> <li>c. <math>\pm 24</math> steps of demanded position in MODE 1 <math>\leq 85</math> percent RTP or in MODE 2.</li> </ul>	<p>In accordance with the Surveillance Frequency Control Program</p>
SR 3.1.4.2	<p>Verify rod freedom of movement (trippability) by moving each rod not fully inserted in the core <math>\geq 10</math> steps in either direction.</p>	<p>In accordance with the Surveillance Frequency Control Program</p>
SR 3.1.4.3	<p>Verify rod drop time of each rod, from the fully withdrawn position, is <math>\leq 2.2</math> seconds from the beginning of decay of stationary gripper coil voltage to dashpot entry, with:</p> <ul style="list-style-type: none"> <li>a. <math>T_{avg} \geq 500^{\circ}\text{F}</math>; and</li> <li>b. All reactor coolant pumps operating.</li> </ul>	<p>Prior to reactor criticality after each removal of the reactor head</p>

# Shutdown Bank Insertion Limits 3.1.5

## 3.1 REACTIVITY CONTROL SYSTEMS

### 3.1.5 Shutdown Bank Insertion Limits

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

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

APPLICABILITY: MODES 1 and 2

**NOTE**  
~~This LCO is not applicable while performing SR 3.1.4.2.~~

## ACTIONS

**NOTE**  
~~One hour is allowed following rod motion prior to verifying bank insertion limits.~~

CONDITION		REQUIRED ACTION	COMPLETION TIME
<div> <div>INSERT 3.1.5</div> <div>A.</div> <div>B</div> <div>One or more shutdown banks not within limits.</div> <div>for reasons other than Condition A.</div> </div>	A.1.1	Verify SDM to be within the limits provided in the COLR.	1 hour
	<div> <div>B</div> <div>OR</div> <div>A.1.2</div> </div>	Initiate boration to restore SDM to within limit.	1 hour
	<div> <div>AND</div> <div>A.2</div> </div>	Restore shutdown banks to within limits.	2 hours
<div> <div>B.</div> <div>Required Action and associated Completion Time not met.</div> </div>	B.1	Be in MODE 3.	6 hours

### INSERT 3.1.5

A. One shutdown bank inserted $\leq 10$ steps beyond the insertion limits specified in the COLR.	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>	1 hour
	A.2.2 Initiate boration to restore SDM to within limit.	
	<u>AND</u>	
	A.3 Restore the shutdown bank to within the insertion limits specified in the COLR	24 hours

NOTE  
Not required to be performed until 1 hour after associated rod motion.

Shutdown Bank Insertion Limits  
3.1.5

SURVEILLANCE REQUIREMENTS

SURVEILLANCE		FREQUENCY
SR 3.1.5.1	Verify each shutdown bank is within the limits specified in the COLR.	In accordance with the Surveillance Frequency Control Program

3.1 REACTIVITY CONTROL SYSTEMS

3.1.6 Control Bank Insertion Limits

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

LCO 3.1.6      Control banks shall be within the insertion, sequence, and overlap limits specified in the COLR.

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

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

ACTIONS

-----NOTE-----  
~~One hour is allowed following rod motion prior to verifying bank insertion limits.~~  
-----

INSERT 3.1.6	CONDITION	REQUIRED ACTION	COMPLETION TIME
	A. Control bank insertion limits not met.  for reasons other than Condition A	A.1.1    Verify SDM to be within the limits provided in the COLR.	1 hour
		A.1.2    Initiate boration to restore SDM to within limit.	1 hour
		A.2      Restore control bank(s) to within limits.	2 hours

(continued)

### **INSERT 3.1.6**

A. Control bank A, B, or C inserted $\leq$ 10 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
B. Control bank sequence or overlap limits not met. <div><div>C</div><div>for reasons other than Condition A</div></div>	B.1.1 Verify SDM to be within the limits provided in the COLR.  OR B.1.2 <div>C</div> Initiate boration to restore SDM to within limit.  AND B.2 Restore control bank sequence and overlap to within limits.	1 hour  1 hour  2 hours
C. Required Action and associated Completion Time not met. <div>D</div>	C.1 Be in MODE 2 with $k_{eff} < 1.0$ .	6 hours

SURVEILLANCE REQUIREMENTS

SURVEILLANCE	FREQUENCY
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
SR 3.1.6.2 Verify each control bank insertion is within the limits specified in the COLR.	In accordance with the Surveillance Frequency Control Program

NOTE  
Not required to be performed until 1 hour after associated rod motion.

(continued)

NOTE

Not required to be performed until 1 hour after associated rod motion.

Control Bank Insertion Limits  
3.1.6

SURVEILLANCE REQUIREMENTS (continued)

SURVEILLANCE		FREQUENCY
SR 3.1.6.3	Verify sequence and overlap limits specified in the COLR are met for control banks not fully withdrawn from the core.	In accordance with the Surveillance Frequency Control Program

-----NOTE-----  
 Individual RPIs are not required to be OPERABLE for 1 hour following movement of the associated rods.

Rod Position Indication  
 3.1.7

### 3.1 REACTIVITY CONTROL SYSTEMS

#### 3.1.7 Rod Position Indication

LCO 3.1.7 Individual control rod position indication and bank demand indication shall be OPERABLE.

APPLICABILITY: MODES 1 and 2.

ACTIONS

-----NOTE-----  
 Separate Condition entry is allowed for each inoperable rod position indicator per group and each bank demand position indicator per bank.

CONDITION	REQUIRED ACTION	COMPLETION TIME
A. One or more RPI(s) per group inoperable for one or more groups. <div style="text-align: center;"> <div style="border: 1px solid black; padding: 2px;">in</div> <div style="font-size: 2em; margin: 0 10px;">↑</div> </div>	A.1.1 Verify the position of the rods with inoperable position indicators by using movable incore detectors.	8 hours
	<div style="border: 1px solid black; padding: 2px;">RPIs</div> <div style="font-size: 2em; margin: 0 10px;">→</div>	
	AND A.1.2 Verify the position of the rods with inoperable position indicators.	Once per 8 hours
	OR A.2 Reduce THERMAL POWER to ≤ 50% RTP.	8 hours

(continued)

One or more RPIs inoperable in one or more groups and associated rod has

Rod Position Indication  
3.1.7

ACTIONS (continued)

CONDITION	REQUIRED ACTION	COMPLETION TIME
<p>B. <del>One or more rods with inoperable position indicators have been moved in excess of 24 steps in one direction since the last determination of the rod's position.</del></p> <p>&gt;</p>	<p>B.1 Verify the position of the rods with inoperable <del>position indicators.</del></p> <p>RPIs</p> <p><u>OR</u></p> <p>B.2 Reduce THERMAL POWER to <math>\leq 50\%</math> RTP.</p>	<p>4 hours</p> <p>8 hours</p>
<p>C. One or more bank demand position indicator(s) per bank inoperable for one or more banks.</p> <p>in</p>	<p>C.1.1 Verify by administrative means all RPIs for the affected banks are OPERABLE.</p> <p><u>AND</u></p> <p>C.1.2 Verify the most withdrawn rod and the least withdrawn rod of the affected banks are: <math>\leq 12</math> steps apart when RTP is <math>&gt; 85</math> percent, and <math>\leq 24</math> steps apart when RTP is <math>\leq 85</math> percent.</p> <p><u>OR</u></p> <p>C.2 Reduce THERMAL POWER to <math>\leq 50\%</math> RTP.</p>	<p>Once per 8 hours</p> <p>Once per 8 hours</p> <p>8 hours</p>
<p>D. Required Action and associated Completion Time not met.</p>	<p>D.1 Be in MODE 3.</p>	<p>6 hours</p>

-----NOTE-----  
Not required to be met for RPIs associated  
with rods that do not meet LCO 3.1.4.  
-----

Rod Position Indication  
3.1.7

SURVEILLANCE REQUIREMENTS

SURVEILLANCE		FREQUENCY
SR 3.1.7.1	Perform CHANNEL CALIBRATION of each RPI.	Once prior to criticality after each removal of the reactor head.

Attachment 2

Retyped Technical Specifications Pages

(13 pages follow)

### 3.1 REACTIVITY CONTROL SYSTEMS

#### 3.1.4 Rod Group Alignment Limits

LCO 3.1.4 All shutdown and control rods shall be OPERABLE, with individual rod positions within limits.

APPLICABILITY: MODES 1 and 2.

#### ACTIONS

CONDITION	REQUIRED ACTION	COMPLETION TIME
A. One or more rod(s) inoperable.	A.1.1 Verify SDM to be within the limits provided 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

(continued)

ACTIONS (continued)

CONDITION	REQUIRED ACTION	COMPLETION TIME
B. One rod not within alignment limits.	B.1.1 Verify SDM to be within the limits provided in the COLR.  <u>OR</u>	1 hour
	B.1.2 Initiate boration to restore SDM to within limit.  <u>AND</u>	1 hour
	B.2 Reduce THERMAL POWER to $\leq 75\%$ RTP.  <u>AND</u>	2 hours
	B.3 Verify SDM to be within the limits provided in the COLR.  <u>AND</u>	Once per 12 hours
	B.4 Perform SR 3.2.1.1, 3.2.1.2., and 3.2.2.1.  <u>AND</u>	72 hours
	B.2.5 Re-evaluate safety analyses and confirm results remain valid for duration of operation under these conditions.	5 days
C. Required Action and associated Completion Time of Condition B not met.	C.1 Be in MODE 3.	6 hours

(continued)



ACTIONS (continued)

CONDITION	REQUIRED ACTION	COMPLETION TIME
D. More than one rod not within alignment limit.	D.1.1 Verify SDM to be within the limits provided in the COLR.	1 hour
	<u>OR</u>	
	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
<p>SR 3.1.4.1</p> <p>----- NOTES-----</p> <ol style="list-style-type: none"> <li>1. Not required to be performed for rods associated with inoperable rod position indicator or demand position indicator.</li> <li>2. Not required to be performed until 1 hour after associated rod motion.</li> </ol> <p>-----</p> <p>Verify position of individual rods within the following alignment limits:</p> <ol style="list-style-type: none"> <li>a. <math>\pm 18</math> steps of demanded position (as allowed by Table 3.1.4-1) in MODE 1 &gt; 85 percent RTP when bank demand position is &lt; 215 steps;</li> </ol> <p><u>AND</u></p> <ol style="list-style-type: none"> <li>b. <math>\pm 24</math> steps of demanded position (as allowed by Table 3.1.4-2) in MODE 1 &gt; 85 percent RTP when bank demand position is <math>\geq 215</math> steps;</li> </ol> <p><u>AND</u></p> <ol style="list-style-type: none"> <li>c. <math>\pm 24</math> steps of demanded position in MODE 1 <math>\leq 85</math> percent RTP or in MODE 2.</li> </ol>	<p>In accordance with the Surveillance Frequency Control Program</p>
<p>SR 3.1.4.2</p> <p>Verify rod freedom of movement (trippability) by moving each rod not fully inserted in the core <math>\geq 10</math> steps in either direction.</p>	<p>In accordance with the Surveillance Frequency Control Program</p>
<p>SR 3.1.4.3</p> <p>Verify rod drop time of each rod, from the fully withdrawn position, is <math>\leq 2.2</math> seconds from the beginning of decay of stationary gripper coil voltage to dashpot entry, with:</p> <ol style="list-style-type: none"> <li>a. <math>T_{avg} \geq 500^{\circ}\text{F}</math>; and</li> <li>b. All reactor coolant pumps operating.</li> </ol>	<p>Prior to reactor criticality after each removal of the reactor head</p>

Table 3.1.4-1  
Allowable Alignment Limits As A Function Of Measured Peaking Factor Margin ( $F_Q(Z)$ ,  $F_{\Delta H}^N$ )  
At Power Levels > 85% Of Rated Power And Bank D Demand < 215 Steps Withdrawn

ALIGNMENT LIMITS (STEPS)*	REQUIRED MARGIN TO $F_{\Delta H}^N$ LIMIT (%)	REQUIRED MARGIN TO $F_Q(Z)$ LIMIT (%)
12	0.00	0.00
13	0.33	0.83
14	0.67	1.67
15	1.00	2.50
16	1.33	3.33
17	1.67	4.17
18	2.00	5.00

\* Between the bank demand position and the RPI System.

Table 3.1.4-2  
Allowable Alignment Limits As A Function Of Measured Peaking Factor Margin ( $F_Q(Z)$ ,  $F_{\Delta H}^N$ )  
At Power Levels > 85% Of Rated Power And Bank D Demand  $\geq$  215 Steps Withdrawn

ALIGNMENT LIMITS (STEPS)*	REQUIRED MARGIN TO $F_{\Delta H}^N$ LIMIT (%)	REQUIRED MARGIN TO $F_Q(Z)$ LIMIT (%)
12	0.00	0.00
13	0.33	0.83
14	0.67	1.67
15	1.00	2.50
16	1.33	3.33
17	1.67	4.17
18	2.00	5.00
19	2.33	5.83
20	2.67	6.67
21	3.00	7.50
22	3.33	8.33
23	3.67	9.17
24	4.00	10.0

\* Between the bank demand position and the RPI System.

### 3.1 REACTIVITY CONTROL SYSTEMS

#### 3.1.5 Shutdown Bank Insertion Limits

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

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

APPLICABILITY: MODES 1 and 2

#### ACTIONS

CONDITION	REQUIRED ACTION	COMPLETION TIME
A. One shutdown bank inserted $\leq$ 10 steps beyond the insertion limits specified in the COLR	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

(continued)

CONDITION	REQUIRED ACTION	COMPLETION TIME
B. One or more shutdown banks not within limits for reasons other than Condition A.	B.1.1 Verify SDM to be within the limits provided 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 shutdown banks to within limits.	2 hours
C. Required Action and associated Completion Time not met.	C.1 Be in MODE 3.	6 hours

#### SURVEILLANCE REQUIREMENTS

SURVEILLANCE	FREQUENCY
SR 3.1.5.1 ----- NOTE ----- Not required to be performed until 1 hour after associated rod motion. ----- Verify each shutdown bank is within the limits specified in the COLR.	In accordance with the Surveillance Frequency Control Program

3.1 REACTIVITY CONTROL SYSTEMS

3.1.6 Control Bank Insertion Limits

LCO 3.1.6 Control banks shall be within the insertion, sequence, and overlap limits specified in the COLR.

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

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

ACTIONS

CONDITION	REQUIRED ACTION	COMPLETION TIME
A. Control bank A, B, or C inserted $\leq 10$ 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 limits specified in the COLR.	24 hours

(continued)

CONDITION	REQUIRED ACTION	COMPLETION TIME
B. Control bank insertion limits not met for reasons other than Condition A.	B.1.1 Verify SDM to be within the limits provided 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
C. Control bank sequence or overlap limits not met for reasons other than Condition A.	C.1.1 Verify SDM to be within the limits provided 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
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
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
SR 3.1.6.2	<p>----- NOTE -----            Not required to be performed until 1 hour after associated rod motion.            -----</p> <p>Verify each control bank insertion is within the limits specified in the COLR.</p>	In accordance with the Surveillance Frequency Control Program
SR 3.1.6.3	<p>----- NOTE -----            Not required to be performed until 1 hour after associated rod motion.            -----</p> <p>Verify sequence and overlap limits specified in the COLR are met for control banks not fully withdrawn from the core.</p>	In accordance with the Surveillance Frequency Control Program



### 3.1 REACTIVITY CONTROL SYSTEMS

#### 3.1.7 Rod Position Indication

LCO 3.1.7 Individual control rod position indication(RPI) and bank demand indication shall be OPERABLE.

----- NOTE -----  
Individual RPIs are not required to be OPERABLE for 1 hour following movement of the associated rods.  
-----

APPLICABILITY: MODES 1 and 2.

#### ACTIONS

----- NOTE -----  
Separate Condition entry is allowed for each inoperable RPI per group and each bank demand position indicator per bank.  
-----

CONDITION	REQUIRED ACTION	COMPLETION TIME
A. One or more RPI(s) per group inoperable in one or more groups.	A.1.1 Verify the position of the rods with inoperable RPIs by using movable incore detectors.	8 hours
	<u>AND</u>	
	A.1.2 Verify the position of the rods with inoperable RPIs.	Once per 8 hours
	<u>OR</u>	
	A.2 Reduce THERMAL POWER to $\leq 50\%$ RTP	8 hours

(continued)

ACTIONS (continued)

CONDITION	REQUIRED ACTION	COMPLETION TIME
B. One or more RPIs inoperable in one or more groups and associated rod has been moved >24 steps in one direction since the last determination of the rod's position.	B.1 Verify the position of the rods with inoperable RPIs.	4 hours
	<u>OR</u>  B.2 Reduce THERMAL POWER to $\leq 50\%$ RTP.	8 hours
C. One or more bank demand position indicator(s) per bank inoperable in one or more banks.	C.1.1 Verify by administrative means all RPIs for the affected banks are OPERABLE.	Once per 8 hours
	<u>AND</u>  C.1.2 Verify the most withdrawn rod and the least withdrawn rod of the affected banks are: $\leq 12$ steps apart when RTP is $> 85$ percent, and $\leq 24$ steps apart when RTP is $\leq 85$ percent.	Once per 8 hours
	<u>OR</u>  C.2 Reduce THERMAL POWER to $\leq 50\%$ RTP.	8 hours
D. Required Action and associated Completion Time not met.	D.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>Perform CHANNEL CALIBRATION of each RPI.</p>	Once prior to criticality after each removal of the reactor head.

Attachment 3

Markup of Proposed Bases Changes

(13 pages follow)

BASES

ACTIONS

The ACTIONS table is modified by a Note indicating that verification of rod operability and the comparison of bank demand position and RPI System may take place at any time up to one hour after rod motion, at any power level. The Note is applicable only to those rods that were moved within that one hour. This allows up to one hour of thermal soak time to allow the control rod drive shaft to reach a thermal equilibrium and thus present a consistent position indication. For purposes of invoking this allowance, a substantial rod movement is required. Substantial rod movement is considered to be 10 or more steps in one direction in less than or equal to one hour.

A.1.1 and A.1.2

When one or more rods are inoperable, 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.

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 ← B.1.1 and B.1.2

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

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

BASES

ACTIONS (continued) B.2.1.1 and B.2.1.2

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

In many cases, realigning the remainder of the group to the misaligned rod may not be desirable. For example, realigning control bank B to a rod that is misaligned 25 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.

Power operation may continue with one RCCA misaligned, provided that SDM is verified within 1 hour. The Completion Time of 1 hour represents the time necessary for determining the actual unit SDM and, if necessary, aligning and starting the necessary systems and components to initiate boration.

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

5

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

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. 4). The Completion Time of 2 hours gives the operator sufficient time to accomplish an orderly power reduction without challenging the Reactor Protection System.

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  $F_Q^C(Z)$ ,  $F_Q^W(Z)$  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  $F_Q^C(Z)$ ,  $F_Q^W(Z)$  and  $F_{\Delta H}^N$ .

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

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.

## Rod Group Alignment Limits B 3.1.4

orderly manner and without challenging plant systems.

### SURVEILLANCE REQUIREMENTS

#### SR 3.1.4.1

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

#### SR 3.1.4.2

Verifying each control rod is OPERABLE would require that each rod be tripped. However, in MODES 1 and 2, 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 Surveillance Frequency is controlled under the Surveillance Frequency Control Program. 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.

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.

The Surveillance is modified by a Note which states that the SR is not required to be performed until one 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

### **INSERT B 3.1.5**

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

If one shutdown bank is inserted less than or equal to 10 steps beyond 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.



The LCO is modified by a Note indicating the LCO requirement is not applicable to shutdown banks 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.

## Shutdown Bank Insertion Limits B 3.1.5

### LCO

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

The shutdown bank insertion limits are defined in the COLR.

### APPLICABILITY

The shutdown banks must be within their insertion limits, with the reactor in MODES 1 and 2. This ensures that a sufficient amount of negative reactivity is available to shut down the reactor and maintain the required SDM following a reactor trip. The shutdown banks do not have to be within their insertion limits in MODE 3, unless an approach to criticality is being made. In MODE 3, 4, 5, or 6, the shutdown banks 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.

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

### ACTIONS

~~The ACTIONS table is modified by a Note indicating that up to one hour after rod motion is allowed for comparison of the bank insertion limits and the RPI System, at any power level. This allows up to one hour of thermal soak time to allow the control rod drive shaft to reach a thermal equilibrium and thus present a consistent position indication. This comparison is sufficient to verify that the shutdown banks are above the insertion limits and thus assures the presence of sufficient shutdown margin to satisfy the assumptions of the safety analyses. For purposes of invoking this allowance, a substantial rod movement is required. Substantial rod movement is considered to be 10 or more steps in one direction in less than or equal to one hour.~~

for reasons other than Condition A

INSERT B 3.1.5

B

A.1.1, A.1.2 and A.2

When one or more shutdown banks is not within insertion limits, 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

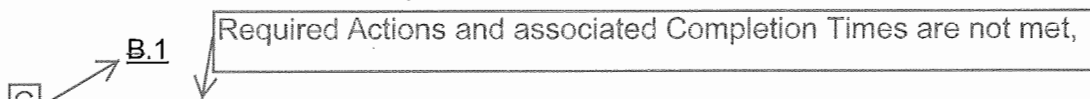
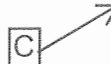
BASES

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ACTIONS (continued) SDM will be verified by performing a reactivity balance calculation, considering the following listed reactivity effects:

- a. RCS boron concentration;
- b. Control bank position;
- c. Power defect;
- d. Fuel burnup;
- e. Xenon concentration; and
- f. Samarium concentration.

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

  
**B.1** Required Actions and associated Completion Times are not met,  
  
If the shutdown banks cannot be restored to within their insertion limits within 2 hours, the unit must be brought to a MODE where the LCO is not applicable. The allowed Completion Time of 6 hours is reasonable, based on operating experience, for reaching the required MODE from full power conditions in an orderly manner and without challenging plant systems.

---

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. Typically, the individual rod position indicators are used to confirm shutdown bank insertion limits.

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

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.

### INSERT B 3.1.6

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

If Control Bank A, B, or C is inserted less than or equal to 10 steps beyond 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.

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.

BASES

INSERT B 3.1.6

ACTIONS

The ACTIONS table is modified by a Note indicating that up to one hour after rod motion is allowed for comparison of the bank insertion limits and the RPI System, at any power level. This allows up to one hour of thermal soak time to allow the control rod drive shaft to reach a thermal equilibrium and thus present a consistent position indication. This comparison is sufficient to verify that the control banks are above the insertion limits and thus assures the presence of sufficient shutdown margin to satisfy the assumptions of the safety analyses. For purposes of invoking this allowance, a substantial rod movement is required. Substantial rod movement is considered to be 10 or more steps in one direction in less than or equal to one hour.

B

A.1.1, A.1.2, A.2, B.1.1, B.1.2, and B.2

C

When the control banks are outside the acceptable insertion limits, they must be restored to within those limits. This restoration can occur in two ways:

- a. Reducing power to be consistent with rod position; or
- b. Moving rods to be consistent with power.

for reasons other than Condition A,

Also, verification of SDM or initiation of boration to regain SDM is required within 1 hour, since the SDM in MODES 1 and 2 with  $K_{eff} \geq 1.0$  is 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 following listed reactivity effects:

- a. RCS boron concentration;
- b. Control bank position;
- c. Power defect;
- d. Fuel burnup;
- e. Xenon concentration; and
- f. Samarium concentration.

Similarly, if the control banks are found to be out of sequence or in the wrong overlap configuration, they must be restored to meet the limits.

The LCO is modified by a Note indicating the LCO requirement is not applicable to control banks 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.

## Control Bank Insertion Limits B 3.1.6

### BASES

#### APPLICABLE SAFETY ANALYSES (continued)

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. 3).

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 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. 3).

The insertion limits satisfy Criterion 2 of the NRC Policy Statement, in that they are initial conditions assumed in the safety analysis.

#### LCO

The limits on control banks sequence, overlap, and physical insertion, as defined in the COLR, must be maintained because they serve the function of preserving power distribution, ensuring that the SDM is maintained, ensuring that ejected rod worth is maintained, and ensuring adequate negative reactivity insertion is available on trip. The overlap between control banks provides more uniform rates of reactivity insertion and withdrawal and is imposed to maintain acceptable power peaking during control bank motion.

#### APPLICABILITY

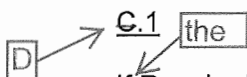
The control bank sequence, overlap, and physical insertion limits shall be maintained with the reactor in MODES 1 and 2 with  $k_{eff} \geq 1.0$ . These limits must be maintained, since they preserve the assumed power distribution, ejected rod worth, SDM, and reactivity rate insertion assumptions. Applicability in MODE 2 with  $K_{eff} < 1.0$  and MODES 3, 4, and 5 is not required, since neither the power distribution nor ejected rod worth assumptions would be exceeded in these MODES.

~~The applicability requirements have been modified by a Note indicating the LCO requirements are suspended during the performance of SR 3.1.4.2. This SR verifies the freedom of the rods to move, and requires the control bank to move below the LCO limits, which would violate the LCO.~~

## BASES

ACTIONS (continued) 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 → C.1 the

If Required Actions A.1 and A.2, or B.1 and B.2 cannot be completed within the associated Completion Times, the plant must be brought to MODE 2 with  $K_{eff} < 1.0$ , where the LCO is not applicable. The allowed Completion Time of 6 hours is reasonable, based on operating experience, for reaching the required MODE from full power conditions in an orderly manner and without challenging plant systems.

## SURVEILLANCE REQUIREMENTS

### SR 3.1.6.1

This Surveillance is required to ensure that the reactor does not achieve criticality with the control banks below their insertion limits.

The estimated critical position (ECP) depends upon a number of factors, one of which is xenon concentration. If the ECP was calculated long before criticality, xenon concentration could change to make the ECP substantially in error. Conversely, determining the ECP immediately before criticality could be an unnecessary burden. There are a number of unit parameters requiring operator attention at that point. Performing the ECP calculation within 4 hours prior to criticality avoids a large error from changes in xenon concentration, but allows the operator some flexibility to schedule the ECP calculation with other startup activities.

### SR 3.1.6.2

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

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.

BASES

SURVEILLANCE  
REQUIREMENTS  
(continued)

SR 3.1.6.3

When control banks are maintained within their insertion limits as checked by SR 3.1.6.2 above, it is unlikely that their sequence and overlap will not be in accordance with requirements provided in the COLR. The Surveillance Frequency is controlled under the Surveillance Frequency Control Program. Control banks which are fully withdrawn from the core as specified in the COLR, do not have to be verified. In the fully withdrawn position, sequence and overlap can no longer be verified.

REFERENCES

1. FSAR, Section 3.1.
2. 10 CFR 50.46.
3. FSAR, Chapter 14.

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.

BASES

APPLICABLE SAFETY ANALYSES (continued)	The control rod position indicator channels satisfy Criterion 2 of the NRC Policy Statement. The control rod position indicators monitor control rod position, which is an initial condition of the accident.
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LCO	<p>LCO 3.1.7 specifies that one RPI System and one Bank Demand Position Indication System be OPERABLE for each control rod.</p> <p>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.</p> <p>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).</p> <p><del>The comparison of bank demand position and RPI System may take place at any time up to one hour after rod motion, at any power level. This allows up to one hour of thermal soak time to allow the control rod drive shaft to reach a thermal equilibrium and thus present a consistent position indication. A similar time period (up to one hour after rod motion) is allowed for comparison of the bank insertion limits and the RPI System. Based on this allowance, position indication may be considered OPERABLE during the thermal soak time to allow for position indication to stabilize.</del></p> <p>These requirements ensure that control rod position indication during power operation and PHYSICS TESTS is accurate, and that design assumptions are not challenged.</p>
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APPLICABILITY

The requirements on the 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.

The LCO is modified by a Note stating that the RPI system is not required to be 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.



BASES

SURVEILLANCE  
REQUIREMENTS

SR 3.1.7.1

A CHANNEL CALIBRATION of the individual rod position indicators is performed to ensure that the rod position indicators respond within the necessary range and accuracy.

This surveillance is performed prior to reactor criticality after each removal of the reactor head as there is potential for unnecessary plant transients if the SR were performed with the reactor at power.

REFERENCES

1. FSAR. Section 7.1.2.
2. FSAR. Chapter 14.

The Surveillance is modified by a Note which states it is not required to be met for RPIs associated with rods that do not meet LCO 3.1.4. If a rod is known to not to be within  $\pm 18$  steps (for power operation above 85% and bank demand position less than 215 steps) or within  $\pm 24$  steps (for power operation greater than 85% and bank demand position greater than or equal to 215 steps) of the group demand position, the ACTIONS of LCO 3.1.4 provide the appropriate Actions.