NEXTera ENERGY SEABROOK

10 CFR 50.90

SBK-L-18094

October 04, 2018

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

Seabrook Station
Docket No. 50-443

Subject: License Amendment Request 18-02, Application to Revise the Technical Specifications Associated with Movable Control Rods

Pursuant to 10 CFR 50.90, NextEra Energy Seabrook, LLC (NextEra) is submitting License Amendment Request (LAR) 18-02 to revise the Seabrook Station Technical Specifications (TS). The proposed change revises the TS associated with the control rods. The LAR will adopt changes provided in TSTF-234, "Add Action for More than One [D]RPI Inoperable"; TSTF-547, "Clarification of Rod Position Requirements"; and make various other changes to align the Seabrook TS more closely with NUREG-1431, "Standard Technical Specifications Westinghouse Plants."

The enclosure to this letter provides NextEra's evaluation of the proposed change. Attachment 1 to the enclosure provides a markup of the TS showing the proposed changes. Attachment 2 provides existing TS Bases pages marked up to show the proposed changes. The changes to the TS Bases are provided for information only and will be incorporated in accordance with the plant's TS Bases Control Program upon implementation of the approved amendment. Retyped TS pages containing the proposed changes will be provided when requested by the NRC Project Manager.

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 Station Operation Review Committee 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 New Hampshire.

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

NextEra requests NRC review and approval of this license amendment request following a one-year review and implementation within 90 days following approval.

Should you have any questions regarding this letter, please contact Mr. Ken Browne, Licensing Manager, at (603) 773-7932.

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

Executed on 10/02, 2018

Sincerely,

Robert Harrsch
Acting Site Director
NextEra Energy Seabrook, LLC

Enclosure: Evaluation of the Proposed Change

cc: NRC Region I Administrator
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NRC Senior Resident Inspector

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Enclosure

NextEra Energy Seabrook's Evaluation of the Proposed Change

Subject: License Amendment Request 18-02, Application to Revise the Technical Specifications Associated with Movable Control Rods

Evaluation of the Proposed Change

1.0 SUMMARY DESCRIPTION

NextEra Energy Seabrook, LLC (NextEra) is submitting License Amendment Request (LAR) 18-02 to revise the Seabrook Station Technical Specification (TS) associated with the control rods. The LAR will adopt changes provided in TSTF-234, "Add Action for More than One [D]RPI Inoperable"; TSTF-547, "Clarification of Rod Position Requirements"; and make various other changes to align the Seabrook TS more closely with NUREG-1431, "Standard Technical Specifications Westinghouse Plants."

2.0 DETAILED DESCRIPTION

2.1 System Design and Operation

The rod cluster control assemblies (RCCA), or rods, are moved by their control rod drive mechanisms (CRDM). Each CRDM moves its RCCA one step (approximately 5/8 inch) at a time, but at varying rates depending on the signal output from the rod control system. 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. 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. Seabrook has four control banks and five shutdown banks.

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 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 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 can also be manually controlled. The control banks must be maintained above insertion limits and are typically near the fully withdrawn position during normal full power operations.

The axial position of shutdown rods and control rods is indicated by two separate and independent systems, 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 relatively precise (± 1 step or ± 5/8 inch). If a rod does not move one step for each demand pulse, the step counter will still count the pulse but incorrectly reflect the position of the rod.

However, the DRPI system provides a more accurate indication of actual rod position, but at a lower precision than the step counters. DRPI measures the actual position of each full-length rod using a detector that consists of discrete coils mounted concentrically with the rod drive pressure housing. The coils are located axially along the pressure housing and magnetically sense the entry and presence of the rod drive shaft through its centerline. For each detector, the coils are interlaced into two data channels, and are connected to the containment electronics (Data A and B) by separate multi-conductor cables. By employing two separate channels of information, the digital rod position indication system can continue to function (at reduced accuracy) if one channel fails.

2.2 Current TS Requirements

The TS associated with the control rods and relevant to this change include:

- **TS 3.1.1.1, "Shutdown Margin - Tavg Greater than 200°F"**

  4.1.1.1.1 The SHUTDOWN MARGIN shall be determined to be greater than or equal to the limiting value:

  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 keff greater than or equal to 1 in accordance with the Surveillance Frequency Control Program by verifying that control bank withdrawal is within the limits of Specification 3.1.3.6;

- **TS 3.1.1.2, "Shutdown Margin - Tavg Less than or Equal to 200°F"**

  4.1.1.2 The SHUTDOWN MARGIN shall be determined to be greater than or equal to the limit specified in the COLR and the Reactor Coolant System boron concentration shall be determined to be greater than or equal to the limit specified in the COLR when the reactor coolant loops are in a drained condition:

  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

- **TS 3.1.3.1, "Group Height"**

  3.1.3.1 All full-length shutdown and control rods shall be OPERABLE and positioned within $\pm$ 12 steps (indicated position) of their group step counter demand position.

  a. With one or more full-length rods inoperable because of 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.

b. With one full-length rod trippable but inoperable due to causes other than addressed by ACTION a., above, or misaligned from its group step counter demand height by more than ± 12 steps (indicated position), POWER OPERATION may continue provided that within 1 hour:

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

2. The rod is declared inoperable and the remainder of the rods in the group with the inoperable rod are aligned to within ± 12 steps 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. A reevaluation of each accident analysis of Table 3.1-1 is performed within 5 days; this reevaluation shall confirm that the previously analyzed results of these accidents remain valid for the duration of operation under these conditions;

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

   c. A power distribution map is obtained from the Incore Detector System and $F_Q(Z)$ and $FN^N_{\Delta H}$ are verified to be within their limits within 72 hours; and

   d. The THERMAL POWER level is reduced to less than or equal to 75% of RATED THERMAL POWER within the next hour and within the following 4 hours the High Neutron Flux Trip Setpoint is reduced to less than or equal to 85% of RATED THERMAL POWER.

c. With more than one rod trippable but inoperable due to causes other than addressed by ACTION a. above, POWER OPERATION may continue provided that:

1. Within 1 hour, the remainder of the rods in the bank(s) with the inoperable rods are aligned to within ± 12 steps of the inoperable rods 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, and

2. The inoperable rods are restored to OPERABLE status within 72 hours.

- **TS 3.1.3.2, "Position Indication Systems – Operating"**

  a. With a maximum of one digital rod position indicator per bank inoperable, either:

     1. Determine the position of the nonindicating rod(s) indirectly by the Incore Detector System at least once per 8 hours and immediately after any motion of the nonindicating rod which exceeds 24 steps in one direction since the last determination of the rod's position, or

     2. Reduce THERMAL POWER to less than 50% of RATED THERMAL POWER within 8 hours.

  b. With a maximum of one demand position indicator per bank inoperable, either:

     1. Verify that all digital rod position indicators for the affected bank are OPERABLE and that the most withdrawn rod and the least withdrawn rod of the bank are within a maximum of 12 steps of each other at least once per 8 hours, or

     2. Reduce THERMAL POWER to less than 50% of RATED THERMAL POWER within 8 hours.

  4.1.3.2 Each digital rod position indicator shall be determined to be OPERABLE by verifying that the Demand Position Indication System and the Digital Rod Position Indication System agree within 12 steps 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 Digital Rod Position Indication System at least once per 4 hours.

- **TS 3.1.3.3, "Position Indication System-Shutdown"**

  3.1.3.3 One digital rod position indicator (excluding demand position indication) shall be OPERABLE and capable of determining the control rod position within ± 12 steps for each shutdown or control rod not fully inserted.

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

  ACTION:

  With less than the above required position indicator(s) OPERABLE, immediately open the Reactor Trip System breakers.

  SURVEILLANCE REQUIREMENTS

  4.1.3.3 Each of the above required digital rod position indicator(s) shall be determined to be OPERABLE by verifying that the digital rod position indicators agree with the demand position indicators within 12 steps when exercised over the full range of rod travel in accordance with the Surveillance Frequency Control Program.

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

**See Special Test Exceptions Specification 3.10.5.

- **TS 3.1.3.5, "Shutdown Rod Insertion Limit"**

3.1.3.5 All shutdown rods shall be fully withdrawn# as specified in the CORE OPERATING LIMITS REPORT (COLR).

ACTION:

With a maximum of one shutdown rod not fully withdrawn#, except for surveillance testing pursuant to Specification 4.1.3.1.2, within 1 hour either:

a. Fully withdraw the rod, or

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

SURVEILLANCE REQUIREMENTS

4.1.3.5 Each shutdown rod shall be determined to be fully withdrawn# as specified in the COLR:

#The fully withdrawn position is defined as the interval within 225 to the mechanical fully withdrawn position, inclusive.

- **TS 3.1.3.6, "Control Rod Insertion Limits"**

3.1.3.6 The control banks shall be limited in physical insertion as specified in the CORE OPERATING LIMITS REPORT (COLR).

ACTION:

With the control banks inserted beyond the insertion limits specified in the COLR, except for surveillance testing pursuant to Specification 4.1.3.1.2:

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

b. Reduce THERMAL POWER within 2 hours to less than or equal to that fraction of RATED THERMAL POWER which is allowed by the bank position using the insertion limits specified in the COLR, or

c. Be in at least HOT STANDBY within 6 hours.

- **TS 3.10.5, "Position Indication System - Shutdown"**

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 withdraw, immediately open the Reactor trip breakers.

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 Digital Rod Position Indication System agree within 12 steps when the rods are stationary.

*This requirement is not applicable during the initial calibration of the Digital Rod Position Indication System provided: (1) keff is maintained less than or equal to 0.95, and (2) only one shutdown or control rod bank is withdrawn from the fully inserted position at one time.

- **TS 6.8.1.6.b, "CORE OPERATING LIMITS REPORT"**

  TS 6.8.1.b contains numerous references to TS 3.1.3.5, " Shutdown Rod Insertion Limit."

2.3 Reason for the Proposed Change

The proposed change adopts in part the changes provided in TSTF-547, "Clarification of Rod Position Requirements," which resolves a conflict between surveillance requirements in TS 3.1.3.1, "Group Height," and TS 3.1.3.2, Position Indications Systems-Operating." The change also relocates TS 3.1.3.3, Position Indication System – Shutdown because it does not meet the criteria for inclusion in the TS. In addition, the proposed amendment clarifies operability requirements for the control rods and eliminates duplicate surveillance requirements to reduce burden on the operators who implement the TS.

2.4 Description of the Proposed Change

The proposed changes to the TS are shown below. New text is shown in bold italics and deleted text has a strikethrough.

- **TS 3.1.1.1, "Shutdown Margin - Tavg Greater than 200°F"**

  4.1.1.1.1 The SHUTDOWN MARGIN shall be determined to be greater than or equal to the limiting value:

  ~~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 keff greater than or equal to 1 in accordance with the Surveillance Frequency Control Program by verifying that control bank withdrawal is within the limits of Specification 3.1.3.6;~~

- **TS 3.1.1.2, "Shutdown Margin - Tavg Less than or Equal to 200°F"**

4.1.1.2 The SHUTDOWN MARGIN shall be determined to be greater than or equal to the limit specified in the COLR and the Reactor Coolant System boron concentration shall be determined to be greater than or equal to the limit specified in the COLR when the reactor coolant loops are in a drained condition:

~~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~~

- **TS 3.1.3.1, "Group Height"**

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

a. With one or more full-length rods inoperable because of being immovable as a result of excessive friction or mechanical interference or known to be untrippable, determine that the SHUTDOWN MARGIN ~~requirement~~ ***is within the limits specified in the COLR*** ~~of Specification 3.1.1.1 is satisfied~~ within 1 hour and be in HOT STANDBY within 6 hours.

b. With one full-length rod ~~trippable but inoperable due to causes other than addressed by ACTION a., above, or~~ misaligned from its group step counter demand height by more than ± 12 steps ~~(indicated position)~~, POWER OPERATION may continue provided that within 1 hour:

~~1. The rod is restored to OPERABLE status within the above alignment requirements, or~~

~~2.~~ ***1.*** The ~~rod is declared inoperable and the~~ remainder of the rods in the group with the ~~inoperable~~ ***misaligned*** rod are aligned to within ± 12 steps of the ~~inoperable~~ ***misaligned*** 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.~~ ***2.*** The ~~rod is declared inoperable and the~~ SHUTDOWN MARGIN ***is within the limits specified in the COLR*** ~~requirement of Specification 3.1.1.1 is satisfied~~. POWER OPERATION may then continue provided that:

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

b. The SHUTDOWN MARGIN ~~requirement of Specification 3.1.1.1 is determined~~ ***is verified within the limits specified in the COLR*** at least once per 12 hours;

c. A power distribution map is obtained from the Incore Detector System and $F_Q(Z)$ and $FN^N_{\Delta H}$ are verified to be within their limits within 72 hours; and

d. The THERMAL POWER level is reduced to less than or equal to 75% of RATED THERMAL POWER within the next hour and within the following 4 hours the High Neutron Flux Trip Setpoint is reduced to less than or equal to 85% of RATED THERMAL POWER.

c. ***DELETED*** ~~With more than one rod trippable but inoperable due to causes other than addressed by ACTION a. above, POWER OPERATION may continue provided that:~~

~~1. Within 1 hour, the remainder of the rods in the bank(s) with the inoperable rods are aligned to within ± 12 steps of the inoperable rods while maintaining the rod sequence and insertion limits of Specification 3.1.3.6. The THERMAL POWER level shall be restricted pursuant to~~

~~2. Specification 3.1.3.6 during subsequent operation, and~~

~~3. The inoperable rods are restored to OPERABLE status within 72 hours.~~

d. With more than one rod misaligned from its group step counter demand height by more than ± 12 steps ~~(indicated position), be in HOTSTANDBY within 6 hours.~~***:***

1. Within 1 hour, verify SHUTDOWN MARGIN is within the limits specified in the COLR, and

2. Be in HOT STANDBY within 6 hours.

The change also revises surveillance requirement (SR) 4.1.3.1.1 and adds a modifying note:

----------*NOTE*----------
Surveillance Requirement 4.1.3.1.1 is not required to be performed for rods associated with inoperable digital position indicator or demand position indicator.

4.1.3.1.1 The position of each full-length rod shall be determined to be within the group demand limit by verifying the individual rod positions in accordance with the Surveillance

Frequency Control Program~~, except during time intervals when the rod position deviation monitor is inoperable; then verify the group positions at least once per 4 hours~~.

- **TS 3.1.3.2, "Position Indication Systems-Operating"**

  3.1.3.2 The Digital Rod Position Indication ***(DRPI)*** System and the Demand Position Indication System shall be OPERABLE and capable of determining the control rod positions within ± 12 steps.

  a. With a maximum of one ***DRPI*** ~~digital rod position indicator~~ per ~~bank~~ ***group*** inoperable ***in one or more groups***, either:

     1. Determine the position of the nonindicating rod(s) indirectly by the Incore Detector System at least once per 8 hours ~~and immediately after any motion of the nonindicating rod which exceeds 24 steps in one direction since the last determination of the rod's position~~, or

     2. Reduce THERMAL POWER to less than 50% of RATED THERMAL POWER within 8 hours.

  b. With more than one DRPI per group inoperable in one or more groups:

     1. Immediately place the control rods in manual control,

     2. Verify the position of the rods with inoperable DRPIs once per 8 hours, or reduce THERMAL POWER to less that 50% RATED THERMAL POWER, and

     3. Within 24 hours, restore inoperable DRPIs to OPERABLE status such that a maximum of one DRPI per group is inoperable, or be in MODE 3 in 6 hours.

  c. When one or more rods with inoperable DRPI have moved greater than 24 steps in one direction since the last determination of the rods' position:

     1. Verify the position of the rods with inoperable DRPI using the incore detector system within 4 hours, or

     2. Reduce THERMAL POWER to less that 50% RATED THERMAL POWER within 8 hours.

  ~~b~~ ***d.*** With ~~a maximum of~~ one ***or more*** demand position indicator***s*** per bank inoperable ***in one or more banks***, either:

     1. Verify that all ~~digital rod position indicators~~ ***DRPIs*** for the affected bank***s*** are OPERABLE and that the most withdrawn rod and the least withdrawn rod of the bank are within a maximum of 12 steps of each other at least once per 8 hours, or

SR 4.1.3.2 is replaced with current SR 4.1.3.3.

~~4.1.3.2 Each digital rod position indicator shall be determined to be OPERABLE by verifying that the Demand Position Indication System and the Digital Rod Position Indication System agree within 12 steps 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 Digital Rod Position Indication System at least once per 4 hours.~~

SR 4.1.3.2 is modified by the following note:

> ----------*NOTE*----------
>
> ***Surveillance Requirements 4.1.3.2 is not required to be met for DRPIs associated with rods that do not meet Specification 3.1.3.1***
>
> ----------

~~4.1.3.3~~ ***SR 4.1.3.2*** Each of the above required digital rod position indicator(s) shall be determined to be OPERABLE by verifying that the digital rod position indicators agree with the demand position indicators within 12 steps when exercised over the full range of rod travel in accordance with the Surveillance Frequency Control Program.

- **"TS 3.1.3.3, Position Indication System-Shutdown"**

~~3.1.3.3 One digital rod position indicator (excluding demand position indication) shall be OPERABLE and capable of determining the control rod position within ± 12 steps for each shutdown or control rod not fully inserted.~~

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

~~ACTION:~~

~~With less than the above required position indicator(s) OPERABLE, immediately open the Reactor Trip System breakers.~~

~~SURVEILLANCE REQUIREMENTS~~

~~4.1.3.3 Each of the above required digital rod position indicator(s) shall be determined to be OPERABLE by verifying that the digital rod position indicators agree with the demand position indicators within 12 steps when exercised over the full range of rod travel in accordance with the Surveillance Frequency Control Program.~~

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

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

- **TS 3.1.3.5, "Shutdown ~~Rod~~ *Bank* Insertion Limit"**

3.1.3.5 All shutdown ~~rods~~ ***banks*** shall be fully withdrawn# as specified in the CORE OPERATING LIMITS REPORT (COLR)

----------*NOTE*----------
Not applicable to shutdown banks inserted while performing Surveillance Requirement 4.1.3.1.2

ACTION:

a. With ~~a maximum of~~ one ***or more*** shutdown ~~rod~~ ***banks*** not fully withdrawn~~#~~ ***for reasons other than ACTION b***~~, except for surveillance testing pursuant to Specification 4.1.3.1.2, within 1 hour either~~:

1. ~~Fully withdraw the rod, or~~ ***Within 1 hour, verify SHUTDOWN MARGIN is within the limit specified in the COLR, or initiate boration to restore SHUTDOWN MARGIN to within limit, and***
2. ~~Declare the rod to be inoperable and apply Specification 3.1.3.1~~ ***Within 2 hours, restore the shutdown banks to fully withdrawn as specified in the COLR, or be in HOT STANDBY within the next 6 hours.***

b. With one shutdown bank inserted ≤ 10 steps beyond fully withdrawn as specified in the COLR:

1. ***Within 1 hour, verify all control banks are within the insertion limits specified in the COLR,***
2. ***Within 1 hour, verify SHUTDOWN MARGIN is within the limits specified in the COLR, or initiate boration to restore SHUTDOWN MARGIN to within limit, and***
3. ***Within 24 hours, restore the shutdown bank to fully withdrawn as specified in the COLR, or be in HOT STANDBY within 6 hours.***

~~#The fully withdrawn position is defined as the interval within 225 to the mechanical fully withdrawn position, inclusive.~~

SURVEILLANCE REQUIREMENTS

4.1.3.5 Each shutdown ~~rod~~ ***bank*** shall be determined to be fully withdrawn~~#~~ as specified in the COLR:

- **TS 3.1.3.6, "Control Rod Insertion Limits"**

3.1.3.6 The control banks shall be limited in physical insertion as specified in the CORE OPERATING LIMITS REPORT (COLR).

----------*NOTE*----------
Not applicable to control banks inserted while performing Surveillance Requirement 4.1.3.1.2

ACTION:

a. With the control banks inserted beyond the insertion limits specified in the COLR ***for reasons other than ACTION b***~~, except for surveillance testing pursuant to Specification 4.1.3.1.2~~:

1. ***Within 1 hour, verify SHUTDOWN MARGIN is within the limits specified in the COLR, or initiate boration to restore SHUTDOWN MARGIN to within limit, and***
2. Restore the control banks to within the limits within 2 hours, or
3. Reduce THERMAL POWER within 2 hours to less than or equal to that fraction of RATED THERMAL POWER which is allowed by the bank position using the insertion limits specified in the COLR, or
4. Be in at least HOT STANDBY within 6 hours.

b. ***With control bank A, B, or C inserted ≤ 10 steps beyond the insertion limit specified in the COLR:***

1. ***Within 1 hour, verify all shutdown banks are fully withdrawn as specified in the COLR,***
2. ***Within 1 hour, verify SHUTDOWN MARGIN is within the limits specified in the COLR, or initiate boration to restore SHUTDOWN MARGIN to within limit, and***
3. ***Within 24 hours, restore the control bank to within the insertion limits specified in the COLR, or be in HOT STANDBY within 6 hours.***

SR 4.1.3.6

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~~.

- **TS 3.10.5, "Position Indication System - Shutdown"**

~~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:~~

~~c. Only one shutdown or control bank is withdrawn from the fully inserted position at a time, and~~

~~d. 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 withdraw, immediately open the Reactor trip breakers.~~

~~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 Digital Rod Position Indication System agree within 12 steps when the rods are stationary.~~

~~*This requirement is not applicable during the initial calibration of the Digital Rod Position Indication System provided: (1) keff is maintained less than or equal to 0.95, and (2) only one shutdown or control rod bank is withdrawn from the fully inserted position at one time.~~

- **TS 6.8.1.6.b, "CORE OPERATING LIMITS REPORT"**

  3.1.3.5 - Shutdown ~~Rod~~ ***Bank*** Insertion Limit

3.0 TECHNICAL EVALUATION

3.1 Control Rod Operability

Current TS 3.1.3.1, "Movable Control Assemblies – Group Height," provides operability requirements and alignment requirements for the control rods. With regard to operability requirements, surveillance requirement (SR) 4.1.3.1.2 demonstrates control rod operability by periodically moving each control rod at least ten steps in any one direction. The inability to move a control rod(s), i.e., a failure to meet SR 4.1.3.1.2, would result in a failure to meet the limiting condition for operation (LCO) of TS 3.1.3.1 and require entering the Action for an inoperable control rod(s) even if the rod(s) remained capable of tripping within the required rod drop time. The current TS contains Actions that address control rods that are trippable but inoperable. This LAR proposes to revise and clarify the operability requirements for the control rods.

The negative reactivity insertion following a reactor trip is a function of the acceleration of the RCCAs and the variation in rod worth as a function of rod position. With respect to the accident analyses, the critical parameter is the time from beginning of RCCA insertion to dashpot entry, or approximately 85% of the RCCA travel. For the accident analyses, the insertion time from fully withdrawn to dashpot entry is 2.4 seconds from the beginning of stationary gripper coil voltage decay as specified in TS 3.1.3.4, "Rod Drop Time." Therefore, the control rod operability requirement is satisfied provided the rod will insert in the required rod drop time assumed in the safety analysis. Further, control rod malfunctions that result in the inability to move a rod but do not affect trippability, such as an electrical failure in the control system or a lift coil failure, do not render the control rod inoperable.

The current TS places a burden on the operators and imposes an unnecessary restriction on plant operation based on inappropriate control rod operability requirements. For a condition in which one or more control rods are immovable due to a rod control system malfunction while continuing to meet the specified alignment requirements and remaining trippable, the station staff would be required to perform the actions for inoperable control rods, including a plant shutdown after 72 hours with more than one rod inoperable. The proposed change provides a more appropriate and accurate requirement for control rod operability so that a control rod is operable if it will insert in the required rod drop time assumed in the safety analysis. The change eliminates the notion that control rods may be "trippable but inoperable"; a control rod that is immovable but trippable remains operable. As discussed in the TS Bases, the discovery of an immovable control rod must be accompanied with a determination of trippability.

The proposed change regarding control rod operability is consistent with NUREG-1431, Standard Technical Specifications Westinghouse Plants [Reference 1]. The Bases for TS 3.1.4, "Rod Group Alignment Limits," in NUREG 1431 discuss that the control rod operability requirements (i.e., trippability) are separate from the alignment requirements. 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 with no impact to trippability do not result in rod inoperability. TSTF-107-A, "Separate Control Rods that are Untrippable versus Inoperable," [Reference 2] revised NUREG-1431 to clarify that the alignment limit is separate from the operability of the rod; a rod can remain operable even though it may be beyond the 12-step alignment limit.

3.2 TS 3.1.1.1, "Shutdown Margin - Tavg Greater than 200°F"

3.2.1 SR 4.1.1.1.1.a

SR 4.1.1.1.1.a requires verifying shutdown margin:

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);

The proposed change deletes this SR because it is a duplicate requirement. TS 3.1.3.1, Actions a and b.3 currently require a shutdown margin determination within one hour of detection of an inoperable control rod, and the proposed changes to TS 3.1.3.1 retain the shutdown margin determination. While SR 4.1.1.1.1.a contains additional details concerning the need to account for untrippable rod worth in the shutdown margin determination, this detailed information is not included in TS 3.1.3.1 and will be more appropriately included in the TS Bases rather than the SR.

The TS containing SR 4.1.1.1.1.a is applicable in Modes 1 through 4 while the duplicate requirement in TS 3.1.3.1 is applicable in Modes 1 and 2. The proposed change removes the requirement to perform a shutdown margin determination for an inoperable rod in Modes 3 and 4. This change is appropriate because the control rods are only required to be operable in Modes 1 and 2. Since there are no operability requirements for controls rods in Modes 3 and 4, it is meaningless for an Action to require performing a shutdown margin determination

upon detection of an inoperable control rod in Modes 3 and 4. In Modes 3 and 4, the shutdown margin determination considers the factors listed in SR 4.1.1.11.e, which includes control rod position.

NextEra determined that the proposed change is appropriate because it eliminates a duplicate requirement. The change is also consistent with the standard TS in NUREG-1431, where the Required Actions in TS 3.1.4, "Rod Group Alignment Limits," direct verifying shutdown margin when rods are inoperable or outside alignment limits, and the Bases discuss including the worth of an untrippable rod in the shutdown margin determination.

3.2.2 SR 4.1.1.1.1.b

SR 4.1.1.1.1.b requires verifying shutdown margin:

> b. When in MODE 1 or MODE 2 with k_{eff} greater than or equal to 1 in accordance with the Surveillance Frequency Control Program by verifying that control bank withdrawal is within the limits of Specification 3.1.3.6;

The proposed change deletes this SR because it is also a duplicate requirement. TS 3.1.3.6, "Control Rod Insertion Limits," which is also applicable in Modes 1 and 2 with K_{eff} greater than or equal to 1, requires that the position of each control bank shall be determined to be within the insertion limits in accordance with the Surveillance Frequency Control Program.

This change is administrative in nature because it only eliminates a duplicate requirement and makes no technical changes to the requirement. The proposed change reduces burden on the operators by eliminating the need to comply with duplicate requirements in different TS.

3.3 TS 3.1.1.2, "Shutdown Margin - Tavg Less than or Equal to 200°F"

SR 4.1.1.2.a requires verifying shutdown margin in Mode 5:

> 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

The proposed change removes the requirement to perform a shutdown margin determination for an inoperable rod in Mode 5. This change is appropriate because the control rods are only required to be operable in Modes 1 and 2. Since there are no operability requirements for control rods in Mode 5, it is meaningless for an Action to require performing a shutdown margin determination upon detection of an inoperable control rod in Mode 5 where control rod operability is not a consideration. In Mode 5, the shutdown margin determination considers the factors listed in SR 4.1.1.2.a, which includes control rod position.

3.4 TS 3.1.3.1, "Group Height"

The LCO and Actions b and d use the term *(indicated position)* when discussing the control rod alignment requirement: "positioned within ± 12 steps (indicated position) of their group step counter demand position." The proposed change deletes the term *(indicated position)* from TS 3.1.3.1. The term is not necessary to clarify the requirement in the TS because it is obvious

that rod position indication is used to determine rod position. SR 4.1.3.1.1 verifies rod alignment by verifying individual rod positions are within the group demand limit. This editorial change, which is consistent with NUREG-1431, deletes the unnecessary term.

3.4.1 Action a

TS 3.1.3.1, Action a requires a determination that the shutdown margin requirement of Specification 3.1.1.1 is satisfied within one hour following discovery of an untrippable control rod. This change proposes to delete the reference to Specification 3.1.1.1 and replace it with a reference to the Core Operating Limits Report (COLR). Specification 3.1.1.1 requires that shutdown margin is within the limit specified in the COLR; therefore, revising Action a to verify that shutdown margin is within the limit specified in the COLR is appropriate. This change does not alter any technical requirements and is administrative in nature. It reduces burden on the operators by eliminating the need to reference TS 3.1.1.1 and refers the TS user directly to the COLR.

3.4.2 Action b

TS 3.1.3.1, Action b addresses the condition in which a control rod is trippable but inoperable or misaligned. This Action is revised to address only the condition that a control rod is misaligned. As discussed earlier in section 3.1 above, the control rod operability requirement is satisfied provided the rod will insert in the required rod drop time assumed in the safety analysis. Therefore, the concept that a control rod is trippable but inoperable no longer applies.

This change proposes to delete Action b.1, which requires restoring an inoperable or misaligned rod to operable status within the alignment requirement within one hour. Restoring compliance with an LCO is an available option and an Action that directs restoration is superfluous. The remaining items in Action b provide remedial measures if compliance with the LCO is not restored within one hour. This proposed change is appropriate because it eliminates an unnecessary Action. The change is also consistent with TSTF-547, "Clarification of Rod Position Requirements." [Reference 3] TSTF-547 deleted Required Action B.1 in TS 3.1.4, "Rod Group Alignment Limits," which required restoring a misaligned rod to within alignment limits within one hour, on the basis that restoring equipment to operable status is understood to be an option and does not require an Action.

Action b.2 is renumbered as Action b.1 and revised to address only the condition that a control rod is misaligned. The requirement to declare inoperable a trippable or misaligned rod is deleted consistent with the previous discussion that a rod that is trippable is not inoperable.

Action b.3 is renumbered as Action b.2 and is also revised to address only the condition that a control rod is misaligned. The requirement to declare inoperable a trippable or misaligned rod is deleted consistent with the previous discussion that a rod that is trippable is not inoperable. Current Action 3.b is revised to delete the reference to Specification 3.1.1.1 and replace it with a reference to the COLR, similar to the change made to Action a.

3.4.2 Action c

Action c applies when more than one control rod is trippable but inoperable. As discussed earlier in section 3.1 above, the control rod operability requirement is satisfied provided the rod will insert in the required rod drop time assumed in the safety analysis. Therefore, the concept that a control rod is trippable but inoperable no longer applies, and Action c is deleted.

3.4.3 Action d

Action d is revised by adding a new requirement to verify that shutdown margin is within limits within one hour. The proposed action is appropriate because misalignment of more than one rod has the potential to affect shutdown margin. One hour is a reasonable time to evaluate shutdown margin. The proposed Action is consistent with NUREG-1431 for the condition that more than one rod is misaligned.

3.4.4 SR 4.1.3.1.1

SR 4.1.3.1.1 requires periodic verification that individual rod positions (DRPI) are within the group demand limit. However, this SR cannot be performed for rods with an inoperable group demand position indicator or inoperable DRPI. This situation would require entry into TS 3.1.3.1, Action d for more than one misaligned rod, which would require a shutdown to Mode 3 within six hours. On the other hand, TS 3.1.3.2, "Position Indication Systems – Operating," would allow continued operation with an inoperable group demand position indicator provided DRPIs for the affected group are operable and the affected rods are within 12 steps of each other, or power is reduced to less than 50%. Similarly, TS 3.1.3.2 would allow continued operation with DRPI inoperable provided position of the affected rods is periodically verified using the incore detector system or power is reduced to less than 50%.

To address the conflicting requirements in TS 3.1.3.1 and 3.1.3.2, a new note provides an exception to performing SR 4.1.3.1.1 for rods associated with inoperable DRPI or demand position indicators. The change is acceptable because the Actions in TS 3.1.3.2 provide the appropriate compensatory measures for inoperable DRPIs or demand position indicators. In addition, the proposed change is also consistent with a change approved in TSTF-547. SR 3.1.4.1 in NUREG-1431 is similar to Seabrook SR 4.1.3.1.1 and requires verifying individual rod positions are within alignment limits. TSTF-547 modified SR 3.1.4.1 with a note that says the SR is not required to be performed for rods associated with inoperable rod position indicator or demand position indicator.

SR 4.1.3.1.1 includes an action in the form of an increased surveillance frequency for an inoperable rod position deviation monitor, which is proposed for deletion. TSTF-110, 'Delete SR Frequencies Based in Inoperable Alarms," [Reference 4] removed this requirement from NUREG 1431 on the basis that the alarms only provide indication, there are no underlying reliability issues associated with this change, no adverse effect results from using the normal surveillance frequency, and no safety functions are adversely affected by this change. The Surveillance Frequency Control Program establishes the frequency for SR 4.1.3.1.1, and the additional details regarding the event-driven frequency are not required to be included in the TS. A plant procedure provides actions in response to a loss of computer functions, including

the rod position deviation monitor, and directs increased monitoring to compensate for the unavailable functions. The requirement for increased monitoring to compensate for loss of alarm capability is appropriately addressed in plant procedures, and this level of detail is not needed in the TS to ensure protection of public health and safety.

3.5 TS 3.1.3.2, "Position Indication Systems-Operating"

3.5.1 Action a

This change revises the basis for entry into Action a of TS 3.1.3.2 from "per bank" to "per group" "in one or more groups" consistent with NUREG-1431. The current Seabrook TS were developed based upon NUREG-0452, Standard Technical Specifications for Westinghouse Pressurized Water Reactors. Through approval of NUREG-1431, the NRC revised the action associated with rod position indication from bank to group. LCO 3.1.3.2 ensures operability of the DRPIs to determine the position of the rods in each group and ensure compliance with group alignment and bank insertion limits. Individual rods in a group receive the same demand signal and step simultaneously; therefore, the rods in a group should all be at the same position indicated by the group step counter for that group. Therefore, entry into the TS Action for inoperable DRPI is appropriately "per group."

Action a.1 is revised consistent with NUREG-1431 to relocate to a new Action c (discussed below) the requirement to verify rod position following motion of a non-indicating rod greater than 24 steps in one direction.

TS 3.1.3.2 is revised to include use of the acronym DRPI (digital rod position indication). This is an editorial change and does not alter any technical requirements in the TS.

3.5.2 Action b

Current Action b in TS 3.1.3.2 is changed to Action d, and new Action b addresses the condition that more than one DRPI in one or more groups is inoperable. This proposed change is consistent with NUREG-1431, TSTF-547, and TSTF-234, "Add Action for More Than One [D]RPI Inoperable."

With more than one DRPI per group inoperable, new Action b provides 24 hours to restore DRPI to operable status so that a maximum of one DRPI per group is inoperable. To prevent unplanned automatic rod motion while in this condition, the Action requires immediately placing the rod control system in manual. The 24-hour completion time is appropriate considering that the rods will be in manual control, rod position will be verified every eight hours to ensure the rod alignment and insertion limits are met, and other indirect means of monitoring changes in rod position, such as reactor coolant system temperature changes. The 24-hour completion time provides sufficient time to troubleshoot and restore the DRPI system to operation while avoiding the plant challenges associated with performing a plant shutdown without full rod position indication.

3.5.3 Action c

Consistent with NUREG-1431, the proposed change to TS 3.1.3.2, Action a.1 relocates the requirement for verifying rod position for a rod with an inoperable position indicator when the

rod has moved in excess of 24 steps in one direction to a separate Action. New Action c, which applies when one or more rods with inoperable DRPI have moved greater than 24 steps in one direction since the last determination of the rods' position, verifies position of the non-indicating rods within fours hours using the incore detector system. The four-hour completion time is consistent with NUREG-1431 and provides an acceptable period to verify the rod positions.

If the rod positions are not determined within fours hours, the Action requires reducing power to less than or equal to 50% within eight hours to avoid undesirable power distributions that could result from continued operation above 50% power with one or more rods misaligned by more than 24 steps.

3.5.4 Action d

Current Action b is changed to Action d and revised to address more than one inoperable demand position indicator in one or more banks. The current TS Action addresses the situation in which a maximum of one demand position indicator per bank is inoperable. However, a demand position indicator is provided for each group of control rods, so control rod banks consisting of two rod groups have two demand position indicators. Limiting the applicability of the Action to a maximum of one inoperable demand position indicator per bank is unnecessarily restrictive and could result in an unnecessary shutdown.

Operation with one inoperable demand position indicator per bank is permissible because the Actions provide appropriate compensatory measures. These include verifying that all DRPIs for the affected bank are operable and that the most withdrawn and least withdrawn rods are within 12 steps of each other. Alternatively, the Action requires reducing power to less than 50%. These compensatory measures can be applied to two inoperable demand position indicators in the same control bank the same as they are applied to inoperable demand position indicators in in separate banks. The proposed change is consistent with the changes approved in TSTF-547.

3.5.5 Surveillance Requirements

This change proposes to delete SR 4.1.3.2, which is intended to demonstrate DRPI operability by verifying that DRPI and demand position indications agree within 12 steps. This SR duplicates SR 4.1.3.1.1, which verifies that individual rods are within the group demand limit ($\pm$12 steps). Furthermore, this SR is not a good assessment of operability of DRPI. For example, if a control rod becomes misaligned from its group, the difference between DRPI for that rod and the demand position indication could be greater than 12 steps while both the DRPI and demand position indication remain operable. A difference of greater than 12 steps between the indicators does not necessarily mean that DRPI is inoperable; therefore, this SR is deleted. SR 4.1.3.1.1 will continue to verify that DRPI are within the group demand limit to confirm proper control rod alignment.

Current SR 4.1.3.3 demonstrates DRPI operability by verifying that DRPI agrees with demand position indication within 12 steps when the rods are exercised over their full range of travel. This SR replaces current SR 4.1.3.2 to demonstrate DRPI operability and is modified by a note that states the SR is not required to be met for rods that do not meet Specification 3.1.3.1. If a

control rod is misaligned and not within 12 steps of its demand position indication, SR 4.1.3.2 would not be met, and consequently, LCO 3.1.3.2 would not be met. However, the Actions in TS 3.1.3.2 only address inoperable DRPI and demand position indications, but in this situation, the rod position indicators are operable and accurately reflect rod position. With no Action in TS 3.1.3.2 for this condition, TS 3.0.3 would require a plant shutdown. The note that modifies SR 4.1.3.2 resolves this conflict.

The proposed changes are consistent with TS 3.1.4, "Rod Group Alignment Limits," and TS 3.1.7, "Rod Position Indication," in NUREG-1431. Similar to the proposed changes, SR 3.1.4.1 in NUREG-1431 verifies individual rod positions are within alignment limits to meet LCO 3.1.4, and SR 3.1.7.1 verifies DRPI agrees with demand position indication over the full range of rod travel to demonstrate DRPI operability. The addition of the note that modifies SR 4.1.3.2 was a change approved in TSTF-547.

3.6 TS 3.1.3.3 and TS 3.10.5, "Position Indication System-Shutdown"

3.6.1 TS 3.1.3.3

TS 3.1.3.3, with the exception of SR 4.1.3.3, is relocated to the licensee control in the Technical Requirements Manual. (SR 4.1.3.3 is relocated to SR 4.1.3.2 as discussed above.) DRPI does not meet the criteria in 10 CFR 50.36 for mandatory inclusion in the TS in Mode 3 and below.

Criterion 1: *Installed instrumentation that is used to detect, and indicate in the control room, a significant abnormal degradation of the reactor coolant pressure boundary.*

The DRPI does not detect and indicate abnormal degradation of the reactor coolant pressure boundary and consequently, does not meet Criterion 1.

Criterion 2: *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 presents a challenge to the integrity of a fission product barrier.*

The purpose of Criterion 2 is to capture those process variables that have initial values assumed in the design basis accident and transient analyses and that are monitored and controlled during power operation. This criterion also includes active design features and operating restrictions needed to preclude unanalyzed accidents and transients.

Control rod position indication is required to determine control rod positions and thereby ensure compliance with the control rod alignment and insertion limits. The requirement for DRPI is only applicable in Modes 1 and 2 (consistent with TS 3.1.3.1, "Group Height"; TS 3.1.3.5, "Shutdown Rod Insertion Limits"; and TS 3.1.3.6 "Control Rod Insertion Limits") because these are the only Modes in which power is generated, and the alignment of rods has the potential to affect the safety of the plant. In Mode 3 and below, the reactor is shutdown with rods inserted and the rod alignment limits do not apply. Therefore, DRPI does not meet Criterion 2 during operation in Mode 3, 4, 5, and 6.

Criterion 3: *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.*

The purpose of Criterion 3 is to capture only those structures, systems, and components that are part of the primary success path of the safety analysis (the actions required to mitigate the consequences of the design basis accidents and transients). The primary success path of a safety analysis consists of the combinations and sequences of equipment needed to operate so that the plant responses to the design basis accident and the transients limit the consequences of these events within the appropriate acceptance criteria. Also captured by this criterion are those support and actuation systems that are necessary in the primary success path, but this criterion does not include backup and diverse equipment.

DRPI is required only in Modes 1 and 2 to ensure that rods are within alignment limits. The DRPI does not function or actuate to mitigate a design basis event. Therefore, DRPI does not meet Criterion 3 during operation in Mode 3, 4, 5, and 6.

Criterion 4: *A structure, system, or component which operating experience or probabilistic risk assessment has shown to be significant to public health and safety.*

DRPI is not modeled in the Seabrook PRA and is not a system that is significant to public health and safety in Mode 3 and below. Therefore, DRPI does not meet Criterion 4.

In response to the Commission's Interim Policy Statement on Technical Specification Improvements, published in February 1987, the nuclear steam supply system owners groups submitted for NRC review a report that proposed relocating certain TS (Split Report). Following a review of the reports, the NRC staff published its conclusion in May 1988 [Reference 5], which concurred with the proposal that TS 3.1.3.3, "Position Indication System – Shutdown," may be relocated from the TS. The NRC also noted that if the associated SRs are necessary to meet the operability requirements for a retained LCO, the SR should be relocated to the retained LCO. Consistent with this stipulation, the proposed change retains SR 4.1.3.3 and relocates it to TS 3.1.3.2. NUREG-1431 does not include a TS for DRPI in Mode 3 and below.

3.6.2 TS 3.10.5

Consistent with the proposed change to remove TS 3.1.3.3 from the TS, the proposed change also deletes special test exception 3.10.5 associated with TS 3.1.3.3. The requirements of TS 3.10.5 will be relocated to the Technical Requirements Manual without change except for the surveillance frequency that refers to the Surveillance Frequency Control Program (SFCP). The SFCP controls the frequencies of surveillance requirements (SRs) contained in the TS but does not apply to frequencies of activities outside the TS. Therefore, with the relocation of the SR 4.10.5 from the TS, the reference to the SFCP will be replaced by the actual surveillance frequency (24 hours) specified in the SFCP.

3.7 TS 3.1.3.5, "Shutdown Rod Insertion Limit"; TS 3.1.3.6, "Control Rod Insertion Limits"; and TS 6.8.1.6, "Core Operating Limits Report"

As approved in TSTF-547, this change adds new Actions 3.1.3.5.b and 3.1.3.6.b that apply when one shutdown bank or control bank, respectively, is inserted less than or equal to 10 steps. The number of steps specified in these Actions is a bracketed number in TSTF-547 that is replaced with the plant-specific number of steps that the rods must be moved to satisfy SR 3.1.4.2. Seabrook SR 4.1.3.1.2, which is the equivalent of SR 3.1.4.2 in NUREG-1431, requires movement of the rods by at least 10 steps. The Actions provide 24 hours to restore the control rod bank to within the insertion limits.

During the limited 24-hour period, the new Actions verify or establish the required shutdown margin. In addition, if the LCO is not met for a shutdown bank, the control banks must be within the insertion limits. Similarly, if the LCO is not met for a control bank, the shutdown banks must be within the insertion limits. These requirements ensure that the shutdown margin assumed in the accident analyses is available and minimize the effect on core power distribution. While in the Actions, the TS requirements on core power distribution continue to apply to ensure the core power distribution remains within the assumptions of the accident analysis. The proposed change protects the assumptions in the safety analysis and reduces the likelihood of a plant shutdown without automatic rod bank overlap control, while providing a reasonable amount of time to repair a rod bank that cannot be moved.

With the addition of the new Actions, current Actions a and b in TS 3.1.3.5 and 3.1.3.6 are revised to indicate that they are applicable when the LCO is not met for reasons other than Action b. This is an administrative change necessary to support addition of the new Actions.

3.7.1 TS 3.1.3.5

The LCO in TS 3.1.3.5 is revised to require that all shutdown *banks* rather than all shutdown *rods* are fully withdrawn. Consistent with this change to the LCO, SR 4.1.3.5 is revised to require that each shutdown bank shall be determined to be fully withdrawn as specified in the COLR. Similarly, Action a is revised to address the condition in which one or more shutdown banks are not fully withdrawn. The proposed change is consistent with TS 3.1.3.6, which addresses control rod banks rather than single control rods, and TS 3.1.5, "Shutdown Bank Insertion Limits," in NUREG-1431. The proposed change is appropriate because TS 3.1.3.1 addresses individual rod positions and deviations.

Currently, Action a addresses the condition that a maximum of one shutdown rod is not fully withdrawn and provides an exception to this Action for surveillance testing pursuant to SR 4.1.3.1.2. However, during the surveillance test, the rods are inserted in a bank, which results in more than one rod not being fully withdrawn. Therefore, the exception contained in Action a is inadequate and misplaced. The appropriate exception for the TS is an exception from meeting the LCO when shutdown banks are inserted while performing Surveillance Requirement 4.1.3.1.2. The proposed change deletes the exception from Action a and adds a note that modifies the LCO accordingly. The change is consistent with TSTF-547, where a misplaced note is relocated to modify the LCO in TS 3.1.5, "Shutdown Bank Insertion Limits," in NUREG-1431 to provide an exception from meeting the LCO while performing Surveillance Requirement 3.1.4.2.

In addition, the proposed change deletes the footnote in TS 3.1.3.5 regarding the fully withdrawn position. The LCO requires the rods to be fully withdrawn as specified in the COLR, and the COLR specifies the fully withdrawn position for the shutdown rods as the interval within 225 steps withdrawn to the mechanical fully withdrawn position inclusive. The footnote provides an unnecessary level of detail and duplicates the information contained in the COLR; consequently, removal of the footnote is acceptable.

The proposed change designates current Action a as Action a.1 and replaces the action to fully withdraw the rod with a one-hour Action to verify shutdown margin is within limits or initiate boration to restore shutdown margin. Maintaining the shutdown banks above the rod insertion limits ensures shutdown margin is maintained. Therefore, the new Action to verify adequate shutdown margin or borate if necessary is appropriate when the insertion limit is not met.

Action b in current TS 3.1.3.5 provides the option of declaring inoperable a shutdown rod that is not fully withdrawn. However, consistent with the change discussed earlier in section 3.1 (a control rod that is immovable but trippable remains operable), the proposed change deletes the direction to declare the rod inoperable. In addition, the Action to apply specification 3.1.3.1 is not applicable because the proposed change revises TS 3.1.3.5 to address shutdown banks rather than an individual shutdown rod. New Action a.2 requires restoring the shutdown banks to fully withdrawn within two hours, which 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. The two-hour allowance for restoring the shutdown banks is consistent with the time provided in TS 3.1.3.6 for restoring a control bank and with the Completion Time for restoring a shutdown bank in TS 3.1.5 in NUREG-1431.

3.7.2 TS 6.8.1.6.b

The proposed change revises the title of TS 3.1.3.5 to replace shutdown *rods* with shutdown *banks* as discussed above. A conforming change is made to the title in the five references to TS 3.1.3.5 in TS 6.8.1.6.b.

3.7.3 TS 3.1.3.6

This change adds a new requirement to TS 3.1.3.6 as Action a.1 to verify shutdown margin is within limits or initiate boration within one hour. Maintaining the control banks above the rod insertion limits ensures shutdown margin is maintained. Therefore, the new Action to verify adequate shutdown margin or borate if necessary is appropriate when the insertion limit is not met. This change is consistent with NUREG-1431 and new Action b in TS 3.1.3.6, which is adopted from TSTF-547.

Currently, the Action provides an exception for surveillance testing pursuant to SR 4.1.3.1.2; however, the exception is misplaced. The appropriate exception for the TS is an exception from meeting the LCO when control banks are inserted beyond the insertion limit while performing Surveillance Requirement 4.1.3.1.2. The proposed change deletes the exception from the Action and adds a note that modifies the LCO accordingly. The change is consistent with TSTF-547, where a misplaced note is relocated to modify the LCO in TS 3.1.6, "Control

Bank Insertion Limits," in NUREG-1431 to provide an exception to meeting the LCO while performing Surveillance Requirement 3.1.4.2.

SR 4.1.3.6 includes an action in the form of an increased surveillance frequency for an inoperable rod insertion limit monitor, which is proposed for deletion. TSTF-110, 'Delete SR Frequencies Based in Inoperable Alarms," removed this requirement from NUREG 1431 on the basis that the alarms only provide indication, there are no underlying reliability issues associated with this change, no adverse effect results from using the normal surveillance frequency, and no safety functions are adversely affected by this change. The Surveillance Frequency Control Program establishes the frequency for SR 4.1.3.6, and the additional details regarding the event-driven frequency are not required to be included in the TS. A plant procedure provides actions in response to a loss of computer functions, including the rod insertion limit monitor, and directs increased monitoring to compensate for the unavailable functions. The requirement for increased monitoring to compensate for loss of alarm capability is appropriately addressed in plant procedures, and this level of detail is not needed in the TS to ensure protection of public health and safety.

4.0 REGULATORY EVALUATION

4.1 Applicable Regulatory Requirements/Criteria

- 10 CFR 50.36, "Technical specifications," requires that the TS include administrative control, which are the provisions relating to organization and management, procedures, recordkeeping, review and audit, and reporting necessary to assure operation of the facility in a safe manner.

- 10 CFR 50, Appendix A, General Design Criteria (GDC) 13 specifies that instrumentation shall be provided to monitor variables and systems over their operating ranges during normal operation, anticipated operational occurrences, and accident conditions.

- 10 CFR 50, Appendix A, GDC 26, "Reactivity control system redundancy and capability," states that control rods, preferably including a positive means for inserting the rods, shall be capable of reliably controlling reactivity changes to assure that under conditions of normal operation, including anticipated operational occurrences, and with appropriate margin for malfunctions such as stuck rods, specified acceptable fuel design limits are not exceeded.

- 10 CFR 50, Appendix A, GDC 28, "Reactivity limits," states that the reactivity control systems shall be designed with appropriate limits on the potential amount and rate of reactivity increase to assure that the effects of postulated reactivity accidents can neither (1) result in damage to the reactor coolant pressure boundary greater than limited local yielding nor (2) sufficiently disturb the core, its support structures or other reactor pressure vessel internals to impair significantly the capability to cool the core.

The proposed change does not affect the ability to satisfy these design criteria and is consistent with the above regulatory requirements.

4.2 Precedent

1. TSTF-547 revised the TS associated with the control rods and rod position indication. This LAR adopts a number of the changes that were approved in TSTF-547. The table below identifies the applicable changes that were included in TSTF-547 and shows the corresponding proposed change to the Seabrook TS.

Change Included in TSTF-547	**Corresponding Change to Seabrook TS**
Deletes Required Action B.1 in TS 3.1.4 (Restore rod to within alignment limits)	Deletes Action 3.1.3.1.b.1 (The rod is restored to OPERABLE status within the above alignment limits)
Adds Note to SR 3.1.4.1: *Not required to be performed for rods associated with inoperable rod position indicator or demand position indicator.*	Adds Note to SR 4.1.3.1.1: *Surveillance Requirement 4.1.3.1.1 is not required to be performed for rods associated with inoperable digital position indicator or demand position indicator.*
TS 3.1.5, adds new Condition A for one shutdown bank inserted ≤[16] steps beyond the insertion limit specified in the COLR. Relocates an improperly worded and misplaced Note to provide an exception to the LCO while performing SR 3.1.4.2.	TS 3.1.3.5, adds new Action 3.1.3.5.b for one shutdown bank inserted ≤ 10 steps beyond the insertion limit specified in the COLR Deleted exception from the Action and added a Note to provide an exception to the LCO while performing SR 4.1.3.1.2.
TS 3.1.6, adds new Condition A for control bank A, B, or C inserted ≤[16] steps beyond the insertion, sequence, or overlap limits specified in the COLR. Relocates an improperly worded and misplaced Note to provide an exception to the LCO while performing SR 3.1.4.2.	TS 3.1.3.6, adds new Action 3.1.3.6.b for one control bank inserted ≤ 10 steps beyond the insertion limit specified in the COLR except for surveillance testing pursuant to Specification 4.1.3.1.2 Deleted exception from the Action and added a Note to provide an exception to the LCO while performing SR 4.1.3.1.2.
TS 3.1.7, Condition D modified to apply to one *or more* demand position indicators	TS 3.1.3.2, current Action b modified to apply with one *or more* position indicators inoperable
Adds Note to SR 3.1.7.1: *Not required to be met for [D]RPIs associated with rods that do not meet LCO 3.1.4.*	Adds Note to new SR 4.1.3.2: *SR 4.1.3.2 not required to be met for rods that do not meet Specification 3.1.3.1*

2. The proposed change includes the addition of a new Action to TS 3.1.3.2 that addresses the condition that more than one DRPI per group is inoperable. This change is consistent with TSTF-234, "Add Action for More Than One [D]RPI Inoperable," as modified by TSTF-547.

3. In Amendments 324 and 305 [Reference 6], the NRC approved changes to Salem, Unit Nos. 1 and 2, TS 3.1.3.2.1, "Position Indication Systems - Operating," to modify the TS action for more than one inoperable analog rod position indicator from one hour to 24

hours consistent with Technical Specification Task Force (TSTF) traveler TSTF-234-A, Revision 1, "Add Action for More Than One [D]RPI Inoperable," [Reference 7] and to align the TS actions with NUREG-1431, Revision 4, "Standard Technical Specifications - Westinghouse Plants." The NRC approved the changes on the basis that they meet the requirements of 10 CFR 50.36(c)(2) and 50.36(c)(3) because the minimum performance level of equipment needed for safe operation of the facility is contained in the LCO and the appropriate remedial measures are specified if the LCO is not met.

4.3 No Significant Hazards Consideration

The proposed change will adopt changes provided in TSTF-234, "Add Action for More than One [D]RPI Inoperable"; TSTF-547, "Clarification of Rod Position Requirements"; and make various other changes to align the Seabrook TS more closely with NUREG-1431, "Standard Technical Specifications Westinghouse Plants."

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

1. Does the proposed change 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 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 governing the rods. Therefore, the proposed change has no significant effect on the probability of any accident previously evaluated.

   Adding new TS Actions to provide a limited time to repair rod control system failures has no effect on the SDM assumed in the accident analysis as the proposed Actions 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.

   The proposed change to resolve the conflicts in the TS ensures 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 capability of any operable TS-required equipment to perform its specified safety function is not impacted by the proposed change. As a result, the outcomes of accidents previously evaluated are unaffected. Therefore, the proposed changes do not result in a significant increase in the probability or consequences of an accident previously evaluated.

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

   Response: No

   The proposed change does not challenge the integrity or performance of any safety-related systems. No plant equipment is installed or removed, and the changes do not alter the design, physical configuration, or method of operation of any plant system or component. No physical changes are made to the plant, so no new causal mechanisms are introduced. Therefore, the proposed changes to the TS do not create the possibility of a new or different kind of accident from any accident previously evaluated.

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

   Response: No.

   The ability of the control rods to perform their designated safety function is unaffected by the proposed changes. The proposed changes do not alter any safety analyses assumptions, safety limits, limiting safety system settings, or method of operating the plant. 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 changes do not adversely affect plant operating margins or the reliability of equipment credited in the safety analyses. Therefore, the proposed changes do not involve a significant reduction in the margin of safety.

Based on the above, NextEra concludes that the proposed amendment 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.

4.4 Conclusion

In conclusion, based on the considerations 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 general public.

5.0 ENVIRONMENTAL CONSIDERATION

NextEra has evaluated the proposed amendment for environmental considerations. The review has determined that the proposed amendment 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 amendment does not involve (i) a significant hazards consideration, (ii) a significant change in the types or significant

increase in the amounts of any effluent that may be released offsite, or (iii) a significant increase in individual or cumulative occupational radiation exposure. Accordingly, the proposed amendment 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 needs to be prepared in connection with the proposed amendment.

6.0 REFERENCES

1. NUREG-1431, Standard Technical Specifications Westinghouse Plants, Revision 4.0, April 2012
2. TSTF-107-A, "Separate Control Rods that are Untrippable versus Inoperable," Revision 4, July 26, 1999
3. TSTF-547-A, Clarification of Rod Position Requirements, Revision 1, March 4, 2016
4. TSTF-110-A, Delete SR Frequencies Based on Inoperable Alarms, Revision 0, October 3, 1997
5. NRC letter from T. Murley to W. Wilgus, "NRC Staff Review of Nuclear Steam Supply System Vendor Owners Groups' Application of the Commission's Interim Policy Statement Criteria to Standard Technical Specifications," May 9, 1988
6. NRC letter "Salem Nuclear Generating Station, Unit Nos. 1 and 2 – Issuance of Amendment Nos. 324 and 305 Re: Revise Technical Specification Actions for Rod Position Indicators (EPID L-2018-LLA-0038)," April 18, 2018 (ML180858198)
7. TSTF-234-A, "Add Action for More than One [D]RPI Inoperable, Revision 1, January 11, 1999

Attachment 1

Markup of the Technical Specifications

3/4.1 REACTIVITY CONTROL SYSTEMS

3/4.1.1 BORATION CONTROL

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

LIMITING CONDITION FOR OPERATION

3.1.1.1 The SHUTDOWN MARGIN for four-loop operation shall be greater than or equal to the limit specified in the CORE OPERATING LIMITS REPORT (COLR).

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

ACTION:

With the SHUTDOWN MARGIN less than the limiting value, immediately initiate and continue boration equivalent to 30 gpm at a boron concentration greater than or equal to the limit specified in the COLR for the Boric Acid Storage System until the required SHUTDOWN MARGIN is restored.

SURVEILLANCE REQUIREMENTS

4.1.1.1.1 The SHUTDOWN MARGIN shall be determined to be greater than or equal to the limiting value:

DELETED

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 in accordance with the Surveillance Frequency Control Program by verifying that control bank withdrawal is within the limits of Specification 3.1.3.6;~~

c. When in MODE 2 with k_{eff} less than 1, 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

BORATION CONTROL

SHUTDOWN MARGIN -T_{avg} LESS THAN OR EQUAL TO 200°F

LIMITING CONDITION FOR OPERATION

3.1.1.2 The SHUTDOWN MARGIN shall be greater than or equal to the limit specified in the CORE OPERATING LIMITS REPORT (COLR). Additionally, the Reactor Coolant System boron concentration shall be greater than or equal to the limit specified in the COLR when the reactor coolant loops are in a drained condition.

APPLICABILITY: MODE 5.

ACTION:

With the SHUTDOWN MARGIN less than the limit specified in the COLR or the Reactor Coolant System boron concentration less than the limit specified in the COLR, immediately initiate and continue boration equivalent to 30 gpm at a boron concentration greater than or equal to the limit specified in the COLR for the Boric Acid Storage System until the required SHUTDOWN MARGIN and boron concentration are restored.

SURVEILLANCE REQUIREMENTS

4.1.1.2 The SHUTDOWN MARGIN shall be determined to be greater than or equal to the limit specified in the COLR and the Reactor Coolant System boron concentration shall be determined to be greater than or equal to the limit specified in the COLR when the reactor coolant loops are in a drained condition:

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~~

DELETED

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.

REACTIVITY CONTROL SYSTEMS

3/4.1.3 MOVABLE CONTROL ASSEMBLIES

GROUP HEIGHT

LIMITING CONDITION FOR OPERATION

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

APPLICABILITY: MODES 1* and 2*.

ACTION:

a. With one or more full-length rods inoperable because of 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~~ is within the limits specified in the COLR within 1 hour and be in HOT STANDBY within 6 hours.

b. With one full-length rod ~~trippable but inoperable due to causes other than addressed by ACTION a., above, or~~ misaligned from its group step counter demand height by more than ± 12 steps ~~(indicated position)~~, POWER OPERATION may continue provided that within 1 hour:

~~1. The rod is restored to OPERABLE status within the above alignment requirements, or~~

1. 2. The ~~rod is declared inoperable and the~~ remainder of the rods in the group with ~~the~~ misaligned ~~inoperable~~ rod are aligned to within ± 12 steps 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

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

b) The SHUTDOWN MARGIN ~~requirement of Specification 3.1.1.1 is determined~~ is verified within the limits specified in the COLR at least once per 12 hours;

*See Special Test Exceptions Specifications 3.10.2 and 3.10.3.

REACTIVITY CONTROL SYSTEMS

MOVABLE CONTROL ASSEMBLIES

GROUP HEIGHT

LIMITING CONDITION FOR OPERATION

3.1.3.1 ACTION b.3 (Continued)

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

d) The THERMAL POWER level is reduced to less than or equal to 75% of RATED THERMAL POWER within the next hour and within the following 4 hours the High Neutron Flux Trip Setpoint is reduced to less than or equal to 85% of RATED THERMAL POWER.

Deleted

c. ~~With more than one rod trippable but inoperable due to causes other than addressed by ACTION a. above, POWER OPERATION may continue provided that:~~

~~1. Within 1 hour, the remainder of the rods in the bank(s) with the inoperable rods are aligned to within ± 12 steps of the inoperable rods 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, and~~

~~2. The inoperable rods are restored to OPERABLE status within 72 hours.~~

d. With more than one rod misaligned from its group step counter demand height by more than ± 12 steps ~~(indicated position)~~, ~~be in HOT STANDBY within 6 hours.~~

:

----------NOTE----------
Surveillance Requirement 4.1.3.1.1 is not required to be performed for rods associated with inoperable digital rod position indicator or demand position indicator.

SURVEILLANCE REQUIREMENTS

4.1.3.1.1 The position of each full-length rod shall be determined to be within the group demand limit by verifying the individual rod positions in accordance with the Surveillance Frequency Control Program, ~~except during time intervals when the rod position deviation monitor is inoperable; then verify the group positions at least once per 4 hours.~~

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.

1. Within 1 hour, verify SHUTDOWN MARGIN is within the limits specified in the COLR, and
2. Be in HOT STANDBY within 6 hours.

REACTIVITY CONTROL SYSTEMS

MOVABLE CONTROL ASSEMBLIES

POSITION INDICATION SYSTEMS - OPERATING

LIMITING CONDITION FOR OPERATION

3.1.3.2 The Digital Rod Position Indication System and the Demand Position Indication System shall be OPERABLE and capable of determining the control rod positions within ± 12 steps.

(DRPI)

in one or more groups

APPLICABILITY: MODES 1 and 2.

group

ACTION:

a. With a maximum of one ~~digital rod position indicator~~ per ~~bank~~ inoperable, either:

1. Determine the position of the nonindicating rod(s) indirectly by the Incore Detector System at least once per 8 hours ~~and immediately after any motion of the nonindicating rod which exceeds 24 steps in one direction since the last determination of the rod's position~~, or

INSERT 3.1.3.2

2. Reduce THERMAL POWER to less than 50% of RATED THERMAL POWER within 8 hours.

or more

s

in one or more banks

~~b~~. With ~~a maximum of~~ one demand position indicator per bank inoperable, either:

d

DRPIs

s

1. Verify that all ~~digital rod position indicators~~ for the affected bank are OPERABLE and that the most withdrawn rod and the least withdrawn rod of the bank are within a maximum of 12 steps of each other at least once per 8 hours, or

2. Reduce THERMAL POWER to less than 50% of RATED THERMAL POWER within 8 hours.

----------NOTE----------
Surveillance Requirement 4.1.3.2 is not required to be met for DRPIs associated with rods that do not meet Specification 3.1.3.1.

SURVEILLANCE REQUIREMENTS

4.1.3.2 ~~Each digital rod position indicator shall be determined to be OPERABLE by verifying that the Demand Position Indication System and the Digital Rod Position Indication System agree within 12 steps 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 Digital Rod Position Indication System at least once per 4 hours.~~

Each of the required digital rod position indicator(s) shall be determined to be OPERABLE by verifying that the digital rod position indicators agree with the demand position indicators within 12 steps when exercised over the full range of rod travel in accordance with the Surveillance Frequency Control Program.

INSERT 3.1.3.2

b. With more than one DRPI per group inoperable in one or more groups:

1. Immediately place the control rods in manual control,
2. Verify the position of the rods with inoperable DRPIs indirectly using the Incore Detector System once per 8 hours, or reduce THERMAL POWER to less that 50% RATED THERMAL POWER, and
3. Within 24 hours, restore inoperable DRPIs to OPERABLE status such that a maximum of one DRPI per group is inoperable, or be in MODE 3 in 6 hours.

c. When one or more rods with inoperable DRPI have moved greater than 24 steps in one direction since the last determination of the rods' position:

1. Verify the position of the rods with inoperable DRPI using the incore detector system within 4 hours, or
2. Reduce THERMAL POWER to less that 50% RATED THERMAL POWER within 8 hours.

REACTIVITY CONTROL SYSTEMS

MOVABLE CONTROL ASSEMBLIES

~~POSITION INDICATION SYSTEM - SHUTDOWN~~

3/4.1.3.3 THIS SPECIFICATION NUMBER IS NOT USED

~~LIMITING CONDITION FOR OPERATION~~

~~3.1.3.3 One digital rod position indicator (excluding demand position indication) shall be OPERABLE and capable of determining the control rod position within ± 12 steps for each shutdown or control rod not fully inserted.~~

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

~~ACTION:~~

~~With less than the above required position indicator(s) OPERABLE, immediately open the Reactor Trip System breakers.~~

~~SURVEILLANCE REQUIREMENTS~~

~~4.1.3.3 Each of the above required digital rod position indicator(s) shall be determined to be OPERABLE by verifying that the digital rod position indicators agree with the demand position indicators within 12 steps when exercised over the full range of rod travel in accordance with the Surveillance Frequency Control Program.~~

Relocate to TS 3.1.3.2 as SR 4.1.3.2

~~*With the Reactor Trip System breakers in the closed position.~~
~~**See Special Test Exceptions Specification 3.10.5.~~

REACTIVITY CONTROL SYSTEMS

MOVABLE CONTROL ASSEMBLIES

SHUTDOWN ~~ROD~~ INSERTION LIMIT

BANK

----------NOTE----------
Not applicable to shutdown banks inserted while performing Surveillance Requirement 4.1.3.1.2

LIMITING CONDITION FOR OPERATION

banks

3.1.3.5 All shutdown ~~rods~~ shall be fully withdrawn~~#~~ as specified in the CORE OPERATING LIMITS REPORT (COLR).

APPLICABILITY: MODES 1* and 2* **.

for reasons other than ACTION b

ACTION:

or more

a. With ~~a maximum of~~ one shutdown ~~rod~~ not fully withdrawn~~#~~ ~~, except for surveillance testing pursuant to Specification 4.1.3.1.2, within 1 hour either~~:

Within 1 hour, verify SHUTDOWN MARGIN is within the limits specified in the COLR, or initiate boration to restore SHUTDOWN MARGIN to within limit, and

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

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

Within 2 hours, restore the shutdown banks to fully withdrawn as specified in the COLR or be in HOT STANDBY within the next 6 hours.

INSERT 3.1.3.5.b

SURVEILLANCE REQUIREMENTS

bank

4.1.3.5 Each shutdown ~~rod~~ shall be determined to be fully withdrawn~~#~~ as specified in the COLR:

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

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

*See Special Test Exceptions Specifications 3.10.2 and 3.10.3.

**With k_{eff} greater than or equal to 1.

~~#The fully withdrawn position is defined as the interval within 225 to the mechanical fully withdrawn position, inclusive.~~

INSERT 3.1.3.5.b

b. With one shutdown bank inserted $\leq$ 10 steps beyond fully withdrawn as specified in the COLR:

1. Within 1 hour, verify all control banks are within the insertion limits specified in the COLR,
2. Within 1 hour, verify SHUTDOWN MARGIN is within the limits specified in the COLR, or initiate boration to restore SHUTDOWN MARGIN to within limit, and
3. Within 24 hours, restore the shutdown bank to fully withdrawn as specified in the COLR, or be in HOT STANDBY within 6 hours.

REACTIVITY CONTROL SYSTEMS

MOVABLE CONTROL ASSEMBLIES

CONTROL ROD INSERTION LIMITS

----------NOTE----------
Not applicable to control banks inserted while performing Surveillance Requirement 4.1.3.1.2

LIMITING CONDITION FOR OPERATION

3.1.3.6 The control banks shall be limited in physical insertion as specified in the CORE OPERATING LIMITS REPORT (COLR).

APPLICABILITY: MODES 1* and 2* **.

for reasons other than ACTION b:

ACTION:

1. Within 1 hour, verify SHUTDOWN MARGIN is within the limits specified in the COLR, or initiate boration to restore SHUTDOWN MARGIN to within limit, and

a. With the control banks inserted beyond the insertion limits specified in the COLR~~, except for surveillance testing pursuant to Specification 4.1.3.1.2:~~

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

3. ~~b.~~ Reduce THERMAL POWER within 2 hours to less than or equal to that fraction of RATED THERMAL POWER which is allowed by the bank position using the insertion limits specified in the COLR, or

INSERT 3.1.3.6.b

4. ~~c.~~ Be in at least HOT STANDBY within 6 hours.

SURVEILLANCE REQUIREMENTS

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.
**With k_{eff} greater than or equal to 1.

INSERT 3.1.3.6.b

b. With control bank A, B, or C inserted $\leq$ 10 steps beyond the insertion limit specified in the COLR:

   1. Within 1 hour, verify all shutdown banks are fully withdrawn as specified in the COLR,
   2. Within 1 hour, verify SHUTDOWN MARGIN is within the limits specified in the COLR, or initiate boration to restore SHUTDOWN MARGIN to within limit, and
   3. Within 24 hours, restore the control bank to within the insertion limits specified in the COLR, or be in HOT STANDBY within 6 hours.

THIS SPECIFICATION NUMBER IS NOT USED

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.~~

~~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 Digital Rod Position Indication System agree within 12 steps when the rods are stationary.~~

~~*This requirement is not applicable during the initial calibration of the Digital Rod Position Indication System provided: (1) k_{eff} is maintained less than or equal to 0.95, and (2) only one shutdown or control rod bank is withdrawn from the fully inserted position at one time.~~

6.8.1.6.b The analytical methods used to determine the core operating limits shall be those previously reviewed and approved by the NRC in:

1. WCAP-12945P-A, "Code Qualification Document for Best Estimate LOCA Analysis," Volume 1, Revision 2, and Volumes 2 through 5, Revision 1; Bajorek, S. M., et al, 1998.

   Methodology for Specification:
   3.2.2 - Heat Flux Hot Channel Factor

2. WCAP-10079-P-A, (Proprietary) and WCAP-10080-A (Nonproprietary), "NOTRUMP: A Nodal Transient Small Break and General Network Code", August 1985.

   Methodology for Specification:
   3.2.2 - Heat Flux Hot Channel Factor

3. YAEC-1363-A, "CASMO-3G Validation," April, 1988.

   YAEC-1659-A, "SIMULATE-3 Validation and Verification," September, 1988.

   WCAP-11596-P-A, (Proprietary), "Qualification of the PHOENIX-P/ANC Nuclear Design System for Pressurized Water Reactor Cores", June, 1988.

   WCAP-10965-P-A, (Proprietary), "ANC: A Westinghouse Advanced Nodal Computer Code", September, 1986.

   Methodology for Specifications:
   3.1.1.1 - SHUTDOWN MARGIN for MODES 1,2, 3, and 4
   3.1.1.2 - SHUTDOWN MARGIN for MODE 5
   3.1.1.3 - Moderator Temperature Coefficient
   3.1.3.5 - Shutdown ~~Rod~~ Bank Insertion Limit
   3.1.3.6 - Control Rod Insertion Limits
   3.2.1 - AXIAL FLUX DIFFERENCE
   3.2.2 - Heat Flux Hot Channel Factor
   3.2.3 - Nuclear Enthalpy Rise Hot Channel Factor

4. Seabrook Station Updated Final Safety Analysis Report, Section 15.4.6, "Chemical and Volume Control System Malfunction That Results in a Decrease in the Boron Concentration in the Reactor Coolant System".

   Methodology for Specifications:
   3.1.1.1 - SHUTDOWN MARGIN for MODES 1, 2, 3, and 4
   3.1.1.2 - SHUTDOWN MARGIN for MODE 5

6.8.1.6.b (Continued)

5. YAEC-1241, "Thermal-Hydraulic Analysis of PWR Fuel Elements Using the CHIC-KIN Code", R. E. Helfrich, March, 1981.

   WCAP-14565-P-A, (Proprietary), "VIPRE-01 Modeling and Qualification for Pressurized Water Reactor Non-LOCA Thermal-Hydraulic Safety Analysis", October, 1999.

   WCAP-15025-P-A, "Modified WRB-2 Correlation, WRB-2M, for Predicting Critical Heat Flux in 17x17 Rod Bundles with Modified LPD Mixing Vane Grids," April 1999.

   Methodology for Specification:
   2.1 - Safety Limits
   3.2.1 - AXIAL FLUX DIFFERENCE
   3.2.2 - Heat Flux Hot Channel Factor
   3.2.3 - Nuclear Enthalpy Rise Hot Channel Factor
   3.2.5 - DNB Parameters

6. YAEC-1849P, "Thermal-Hydraulic Analysis Methodology Using VIPRE-01 For PWR Applications," October, 1992.

   WCAP-11397-P-A, (Proprietary), "Revised Thermal Design Procedure", April, 1989.

   WCAP-8745-P-A, Design Basis for the Thermal Overpower ΔT and Thermal Overtemperature ΔT Trip Functions," September 1986.

   Methodology for Specification:
   2.2.1 - Limiting Safety System Settings
   3.2.1 - AXIAL FLUX DIFFERENCE
   3.2.2 - Heat Flux Hot Channel Factor
   3.2.3 - Nuclear Enthalpy Rise Hot Channel Factor

7. YAEC-1854P, "Core Thermal Limit Protection Function Setpoint Methodology For Seabrook Station," October, 1992

   Methodology for Specification:
   2.2.1 - Limiting Safety System Settings
   3.1.3.5 - Shutdown ~~Rod~~ Bank Insertion Limit
   3.1.3.6 - Control Rod Insertion Limits
   3.2.1 - AXIAL FLUX DIFFERENCE
   3.2.2 - Heat Flux Hot Channel Factor
   3.2.3 - Nuclear Enthalpy Rise Hot Channel Factor

6.8.1.6.b (Continued)

8. YAEC-1856P, "System Transient Analysis Methodology Using RETRAN for PWR Applications," December, 1992.

   Methodology for Specification:
   2.2.1 - Limiting Safety System Settings
   3.1.1.3 - Moderator Temperature Coefficient
   3.1.3.5 - Shutdown ~~Rod~~ Bank Insertion Limit
   3.1.3.6 - Control Rod Insertion Limits
   3.2.1 - AXIAL FLUX DIFFERENCE
   3.2.2 - Heat Flux Hot Channel Factor
   3.2.3 - Nuclear Enthalpy Rise Hot Channel Factor

9. YAEC-1752, "STAR Methodology Application for PWRs, Control Rod Ejection, Main Steam Line Break," October, 1990.

   Methodology for Specification:
   3.1.1.3 - Moderator Temperature Coefficient
   3.1.3.5 - Shutdown ~~Rod~~ Bank Insertion Limit
   3.1.3.6 - Control Rod Insertion Limits
   3.2.1 - AXIAL FLUX DIFFERENCE
   3.2.2 - Heat Flux Hot Channel Factor
   3.2.3 - Nuclear Enthalpy Rise Hot Channel Factor

10. YAEC-1855PA, "Seabrook Station Unit 1 Fixed Incore Detector System Analysis," October, 1992.

    ANP-3243P, "Seabrook Station Unit 1 Fixed Incore Detector System Analysis Supplement to YAEC-1855PA," Revision 1, May 2014.

    Methodology for Specification:
    3.2.1 - AXIAL FLUX DIFFERENCE
    3.2.2 - Heat Flux Hot Channel Factor
    3.2.3 - Nuclear Enthalpy Rise Hot Channel Factor

11. YAEC-1624P, "Maine Yankee RPS Setpoint Methodology Using Statistical Combination of Uncertainties - Volume 1 - Prevention of Fuel Centerline Melt," March, 1988.

    Methodology for Specification:
    3.2.1 - AXIAL FLUX DIFFERENCE
    3.2.2 - Heat Flux Hot Channel Factor
    3.2.3 - Nuclear Enthalpy Rise Hot Channel Factor

6.8.1.6.b (Continued)

12. NYN-95048, Letter from T. C. Feigenbaum (NAESCo) to NRC, "License Amendment Request 95-05: Positive Moderator Temperature Coefficient", May 30, 1995.

    Methodology for Specification:
    3.1.1.3 - Moderator Temperature Coefficient

13. WCAP-12610-P-A, "VANTAGE + Fuel Assembly Reference Core Report". April, 1995, (Westinghouse Proprietary).

    WCAP-12610-P-A & CENPD-404-P-A, Addendum 1-A, "Optimized ZIRLO™", July 2006.

    Methodology for Specification:
    3.2.2 - Heat Flux Hot Channel Factor

14. WCAP-10216-P-A, Revision 1A (Proprietary), "Relaxation of Constant Axial Offset Control F_Q Surveillance Technical Specification", February, 1994.

    Methodology for Specification:
    3.2.1 - AXIAL FLUX DIFFERENCE
    3.2.2 - Heat Flux Hot Channel Factor

15. WCAP-9272-P-A, (Proprietary), "Westinghouse Reload Safety Evaluation Methodology", July, 1985.

    Methodology for Specifications:
    2.1 - Safety Limits
    3.1.1.1 - SHUTDOWN MARGIN for MODES 1,2,3, and 4
    3.1.1.2 - SHUTDOWN MARGIN for MODE 5
    3.1.1.3 - Moderator Temperature Coefficient
    3.1.2.7 - Isolation of Unborated Water Sources - Shutdown
    3.1.3.5 - Shutdown ~~Rod~~ Bank Insertion Limit
    3.1.3.6 - Control Rod Insertion Limits
    3.2.1 - AXIAL FLUX DIFFERENCE
    3.2.2 - Heat Flux Hot Channel Factor
    3.2.3 - Nuclear Enthalpy Rise Hot Channel Factor
    3.2.5 - DNB Parameters
    3.5.1.1 - Accumulators for MODES 1, 2, and 3
    3.5.4 - Refueling Water Storage Tank for MODES 1, 2, 3, and 4
    3.9.1 - Boron Concentration

16. WCAP-13749-P-A, (Proprietary) "Safety Evaluation Supporting the Conditional Exemption of the Most Negative Moderator Temperature Coefficient Measurement," March, 1997.

    Methodology for Specifications:
    3.1.1.3 - Moderator Temperature Coefficient

Attachment 2

Markups of Proposed Bases Changes

3/4.1.3 MOVABLE CONTROL ASSEMBLIES

~~The specifications of this section ensure that: (1) acceptable power distribution limits are maintained, (2) the minimum SHUTDOWN MARGIN is maintained, and (3) the potential effects of rod misalignment on associated accident analyses are limited. OPERABILITY of the control rod position indicators is required to determine control rod positions and thereby ensure compliance with the control rod alignment and insertion limits. Verification that the Digital Rod Position Indicator agrees with the demanded position within ± 12 steps at 24, 48, 120, and 228 steps withdrawn for the Control Banks and 18, 210, and 228 steps withdrawn for the Shutdown Banks provides assurances that the Digital Rod Position Indicator is operating correctly over the full range of indication. Since the Digital Rod Position Indication System does not indicate the actual shutdown rod position between 18 steps and 210 steps, only points in the indicated ranges are picked for verification of agreement with demanded position.~~

~~The ACTION statements which permit limited variations from the basic requirements are accompanied by additional restrictions which ensure that the original design criteria are met. Misalignment of a rod requires measurement of peaking factors and a restriction in THERMAL POWER. These restrictions provide assurance of fuel rod integrity during continued operation. In addition, those safety analyses affected by a misaligned rod are reevaluated to confirm that the results remain valid during future operation.~~

~~The maximum rod drop time restriction is consistent with the assumed rod drop time used in the safety analyses. Measurement with rods at their individual mechanical fully withdrawn position, T_{avg} greater than or equal to 551°F and all reactor coolant pumps operating ensures that the measured drop times will be representative of insertion times experienced during a Reactor trip at operating conditions.~~

~~The fully withdrawn position of shutdown and control banks can be varied between 225 and the mechanical fully withdrawn position (up to 231 steps), inclusive. Westinghouse guidance allows a selected bank to be withdrawn one step beyond the mechanical full out position for an indicated 232 steps; however, to avoid misalignment of the rod control system bank overlap unit, control bank D step counters, the P/A converter, and MPCS position indication, withdrawal should be limited to 231 steps. The 225 to 231 step interval allows axial repositioning to minimize RCCA wear.~~

~~Control rod positions and OPERABILITY of the rod position indicators are required to be verified in accordance with the Surveillance Frequency Control Program with more frequent verifications required if an automatic monitoring channel is inoperable. These verification frequencies are adequate for assuring that the applicable LCOs are satisfied.~~

~~For Specification 3.1.3.1 ACTIONS b. and c., it is incumbent upon the plant to verify the trippability of the inoperable control rod(s). Trippability is defined in Attachment C to a letter dated December 21, 1984, from E. P. Rahe (Westinghouse) to C. 0. Thomas (NRC). This may be by verification of a control system failure, usually electrical in nature, or that the failure is associated with the control rod stepping mechanism. In the event the plant is unable to verify the rod(s) trippability, it must be assumed to be untrippable and thus falls under the requirements of ACTION a. Assuming a controlled shutdown from 100% RATED THERMAL POWER, this allows approximately 4 hours for this verification.~~

INSERT BASES

3/4.1.3.1 Group Height

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 shutdown margin (SDM). The specifications of this section ensure that: (1) acceptable power distribution limits are maintained, (2) the minimum SHUTDOWN MARGIN is maintained, and (3) the potential effects of rod misalignment on associated accident analyses are limited.

The limits on control rod alignment ensure that the assumptions in the safety analysis will remain valid. The requirement for control rod OPERABILITY ensures 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.

ACTION a

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 boration and restoring SDM. The SDM verification must include the worth of the untrippable rod, as well as a rod of maximum worth.

ACTION b

When entering ACTION b, it is incumbent upon the plant to verify the trippability of the inoperable control rod(s). Trippability is defined in Attachment C to a letter dated December 21, 1984, from E. P. Rahe (Westinghouse) to C. 0. Thomas (NRC). This may be by verification of a control system failure, usually electrical in nature, or that the failure is associated with the control rod stepping mechanism. In the event the plant is unable to verify the rod(s) trippability, it must be assumed to be untrippable and thus falls under the requirements of ACTION a.

Surveillance Requirement (SR) 4.1.3.1.1

Verifying that the position of individual rods is within alignment limits is performed in accordance with the Surveillance Frequency Control Program. 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. TS 3.1.3.2, "Rod Position Indication System - Operating," provides Actions to verify the rods are in alignment when one or more rod position indicators are inoperable.

SR 4.1.3.1.2

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

Between required performances of SR 4.1.3.2 (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.

3/4.1.3.2 Position Indication Systems – Operating

OPERABILITY of the control rod position indicators is required to determine control rod positions and thereby ensure compliance with the control rod alignment and insertion limits. 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. The requirements for position indication are only applicable in MODES 1 and 2 (consistent with TS 3.1.3.1, 3.1.3.5, and 3.1.3.6) 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.

ACTION a

When one DRPI channel per group in one or more groups fails, the position of the rod may still be determined indirectly by use of the incore detectors. Based on experience, normal power operation does not require excessive movement of banks. If a bank has been moved significantly, ACTION c is applicable. Verification of RCCA position within 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.

ACTION b

When more than one DRPI 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. 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 inoperable DRPIs must be restored, such that a maximum of one DRPI per group is inoperable, within 24 hours. Twenty-four hours provides sufficient time to troubleshoot and restore

the DRPI system to operation while avoiding the plant challenges associated with a plant shutdown without full rod position indication. Based on operating experience, normal power operation does not require excessive rod movement. If one or more rods have been moved significantly, ACTION c is applicable.

ACTION c

With one DRPI inoperable in one or more groups and the affected groups 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 DRPI. Within 4 hours, the position of the rods with inoperable position indication must be determined using the incore detector system 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 ≤ 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 time of 4 hours provides an acceptable period of time to verify the rod positions.

ACTION d

With one or more demand position indicators per bank inoperable in one or more banks, the rod positions can be determined by the DRPI system. Since normal power operation does not require excessive movement of rods, verification by administrative means that the rod position indicators are OPERABLE and the most withdrawn rod and the least withdrawn rod are ≤ 12 steps apart once every 8 hours is adequate.

SR 4.1.3.2

Verification that the DRPI agrees with the demanded position within ± 12 steps at 24, 48, 120, and 228 steps withdrawn for the control banks and 18, 210, and 228 steps withdrawn for the shutdown banks provides assurances that the DRPI is operating correctly over the full range of indication. Since the DRPI does not indicate the actual shutdown rod position between 18 steps and 210 steps, only points in the indicated ranges are used for verification of agreement with demanded position.

The Surveillance is modified by a Note that states it is not required to be met for DRPIs associated with rods that do not meet LCO 3.1.3.1. If a rod is known to not to be within 12 steps of the group demand position, the ACTIONS of LCO 3.1.3.1 provide the appropriate Actions.

3/4.1.3.4 Rod Drop Time

The maximum rod drop time restriction is consistent with the assumed rod drop time used in the safety analyses. Measurement with rods at their individual mechanical fully withdrawn position, Tavg greater than or equal to 551°F and all reactor coolant pumps operating ensures that the measured drop times will be representative of insertion times experienced during a reactor trip at operating conditions.

3/4.1.3.5 Shutdown Rod Insertion Limit

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 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.

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 4.1.3.1.2. 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.

ACTION a

When one or more shutdown banks is not within insertion limits for reasons other than ACTION b, two 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.

ACTION b

If one shutdown bank is inserted less than or equal to 10 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. In addition, 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. 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 SR 4.1.1.1.1e. 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 hours provided is sufficient time to repair most rod control failures that would prevent movement of a shutdown bank.

3/4.1.3.6

LCO

The limits on control banks physical insertion, as defined in the COLR, must be maintained to ensure that SDM is maintained, ejected rod worth is maintained, and adequate negative reactivity insertion is available on trip.

The LCO is modified by a Note indicating the LCO requirement is not applicable to control banks being inserted while performing SR 4.1.3.1.2. 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.

ACTION a

When the control banks are outside the acceptable insertion limits for reasons other than ACTION b, they must be restored to within 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.

In addition, verification of SDM or initiation of boration to regain SDM is required within 1 hour, since the SDM in MODES 1 and 2 is ensured by adhering to the control and shutdown bank insertion limits. 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 SR 4.1.1.1.1e.

ACTION b

If control bank A, B, or C is inserted less than or equal to 10 steps below the insertion limit, 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. 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 SR 4.1.1.1.1e.

While the control bank is outside the insertion limit, 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. Action b s 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.

3/4.10 SPECIAL TEST EXCEPTIONS

BASES

3/4.10.1 SHUTDOWN MARGIN

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.

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

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.

3/4.10.3 PHYSICS TESTS

This special test exception permits PHYSICS TESTS to be performed at less than or equal to 5% of RATED THERMAL POWER with the RCS T_{avg} slightly lower than normally allowed so that the fundamental nuclear characteristics of the core and related instrumentation can be verified. In order for various characteristics to be accurately measured, it is at times necessary to operate outside the normal restrictions of these Technical Specifications. For instance, to measure the moderator temperature coefficient at BOL, it is necessary to position the various control rods at heights which may not normally be allowed by Specification 3.1.3.6 and the RCS T_{avg} may be below the minimum temperature of Specification 3.1.1.4 during the measurement.

3/4.10.4 (THIS SPECIFICATION NUMBER IS NOT USED)

THIS SPECIFICATION NUMBER IS NOT USED

~~3/4.10.5 POSITION INDICATION SYSTEM - SHUTDOWN~~

~~This special test exception permits the Position Indication Systems to be inoperable during rod drop time measurements. The exception is required since the data necessary to determine the rod drop time are derived from the induced voltage in the position indicator coils as the rod is dropped. This induced voltage is small compared to the normal voltage and, therefore, cannot be observed if the Position Indication Systems remain OPERABLE.~~