

November 21, 2016

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50-364 50-425

NL-16-1026

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

Joseph M. Farley Nuclear Plant – Units 1 & 2
Vogtle Electric Generating Plant – Units 1 & 2
Application to Revise Technical Specifications To Adopt TSTF-547,
"Clarification of Rod Position Requirements"

Ladies and Gentlemen:

Pursuant to 10 CFR 50.90, Southern Nuclear Operating Company (SNC) is submitting a request for an amendment to the Technical Specifications (TS) for Joseph M. Farley Nuclear Plant (FNP) Units 1 and 2, and for Vogtle Electric Generating Plant (VEGP) Units 1 and 2.

The proposed amendment revises the requirements on control and shutdown rods, and rod and bank position indication. Attachment 1 provides a description and assessment of the proposed changes. Attachment 2 provides the existing FNP TS pages marked up to show the proposed changes. Attachment 3 provides revised (clean) FNP TS pages. Attachment 4 provides existing FNP TS Bases pages marked to show the proposed changes for information only. Attachment 5 provides the existing VEGP TS pages marked up to show the proposed changes. Attachment 6 provides revised (clean) VEGP TS pages. Attachment 7 provides existing VEGP TS Bases pages marked to show the proposed changes for information only.

Approval of the proposed amendment is requested by June 1, 2017. Once approved, the amendment shall be implemented within 90 days. In accordance with 10 CFR 50.91, a copy of this application, with attachments, is being provided to the designated Alabama and Georgia Officials.

This letter contains no NRC commitments. If you have any questions, please contact Ken McElroy at (205) 992-7369.

Mr. C. R. Pierce states he is Regulatory Affairs Director for Southern Nuclear Operating Company, is authorized to execute this oath on behalf of Southern Nuclear Operating Company and, to the best of his knowledge and belief, the facts set forth in this letter are true.

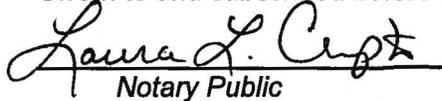
Respectfully submitted,



C. R. Pierce
Regulatory Affairs Director



Sworn to and subscribed before me this 21 day of November, 2016.



Notary Public

My commission expires: 10-8-2017

CRP/RMJ

- Attachments:
1. Description and Assessment
 2. Proposed FNP Technical Specification Changes (Mark-Up)
 3. Revised FNP Technical Specification Pages
 4. Proposed FNP Technical Specification Bases Changes (Mark-Up)
 5. Proposed VEGP Technical Specification Changes (Mark-Up)
 6. Revised VEGP Technical Specification Pages
 7. Proposed VEGP Technical Specification Bases Changes (Mark-Up)

cc: Southern Nuclear Operating Company
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RType: Farley=CFA04.054; Vogtle=CVC7000

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**Joseph M. Farley Nuclear Plant – Units 1 & 2
Vogtle Electric Generating Plant – Units 1 & 2
Application To Revise Technical Specifications To Adopt TSTF-547,
"Clarification of Rod Position Requirements"**

Attachment 1

Description and Assessment

1.0 DESCRIPTION

The proposed amendment revises the requirements on control and shutdown rods, and rod and bank position indication in Technical Specification (TS) 3.1.4, "Rod Group Alignment Limits," TS 3.1.5, "Shutdown Bank Insertion Limits," TS 3.1.6, "Control Bank Insertion Limits," and TS 3.1.7, "Rod Position Indication," to provide time to repair rod movement failures that do not affect rod Operability, to provide an alternative to frequent use of the movable incore detector system when position indication for a rod is inoperable, to correct conflicts between the TS, to eliminate an unnecessary action, and to increase consistency and to improve the presentation.

2.0 ASSESSMENT

2.1 Applicability of Safety Evaluation

Southern Nuclear Operating Company (SNC) has reviewed the safety evaluation for TSTF-547 provided to the Technical Specifications Task Force in a letter dated March 4, 2016. This review included a review of the NRC staff's evaluation, as well as the information provided in TSTF-547. As described in the subsequent paragraphs, SNC has concluded that the justifications presented in the TSTF-547 proposal and the safety evaluation prepared by the NRC staff are applicable to Joseph M. Farley Nuclear Plant (FNP) Units 1 and 2, and for Vogtle Electric Generating Plant (VEGP) Units 1 and 2 and justify this amendment for the incorporation of the changes to the FNP Units 1 and 2 and VEGP Units 1 and 2 TS.

2.2 Variations

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

- TSTF-547 deletes former TS 3.1.4 Required Action (RA) B.1 "Restore rod to within alignment limits." Stating this RA is not necessary since restoring equipment to operable status is understood to always be an option. VEGP does not have a corresponding TS 3.1.4 RA B.1, so these changes are not applicable to VEGP.
- TSTF-547 makes the following editorial change to TS 3.1.7 RA A.1 (with underline added for effect):
Verify the position of the rods with inoperable DRPI position indicators indirectly by using movable incore detectors.
FNP's corresponding RA was consistent with NUREG-1431 Rev. 4, except that it already replaced "position indicators" with "DRPIs". To be consistent with making "rods" singular ("rod"), "DRPIs" is being changed to "DRPI".
- TSTF-547 contains the following oversight in new RA A.2.1 to TS 3.1.7 (with underline added for effect):
Verify the position of the rods with inoperable DRPI indirectly by using movable incore detectors.
To be consistent with the changes made to RA A.1, "rod" (singular) should have been used instead of "rods" (plural). The VEGP and FNP markups correct this oversight by using "rod" (singular) for this RA.

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Description and Assessment

- The current VEGP TS 3.1.7 Condition B states "More than one DRPI group inoperable.". This should have stated "More than one DRPI per group inoperable." This was an obvious oversight from when VEGP adopted TSTF-234, which was approved by the NRC June 9, 2016. The marked-up pages from VEGP's July 18, 2014 application to adopt TSTF-234 (ML14203A124) correctly stated "per group", consistent with TSTF-234. To clarify the intent of the TSTF-547 modifications to Condition B, this oversight is being corrected.
- RA C.1 from the TSTF-547 markup for TS 3.1.7 (with insert shown underline) states "Verify the position of the rods with inoperable DRPIs ~~position indicators~~ indirectly by using movable incore detectors." with a Completion Time (CT) of [4] hours. FNP's corresponding RA is split into two RAs. FNP's RA C.1.1 states to "Initiate action to verify the position of the rods with inoperable DRPIs indirectly by using movable incore detectors." with a CT of "Immediately", and RA C.1.2 states to "Complete rod position verification started in Required Action C.1.1." with a CT of 8 hours. While FNP has the additional requirement to begin this step "Immediately", the net RA is the same between the TSTF-547 markups and FNP.

These differences are administrative and do not affect the applicability of TSTF-547 to the FNP or VEGP TS.

3.0 REGULATORY ANALYSIS

3.1 No Significant Hazards Consideration Analysis

Southern Nuclear Operating Company (SNC) requests adoption of TSTF-547, "Clarification of Rod Position Requirements," which is an approved change to the Standard Technical Specifications, for the Joseph M. Farley Nuclear Plant (FNP) Units 1 and 2, and for Vogtle Electric Generating Plant (VEGP) Units 1 and 2 Technical Specifications (TS). The proposed change revises the requirements on control and shutdown rods, and rod and bank position indication to provide time to repair rod movement failures that do not affect rod Operability, to provide an alternative to frequent use of the movable incore detector system when position indication for a rod is inoperable, to provide time for analog position indication instruments to read accurately after rod movement, to correct conflicts between the TS, to eliminate an unnecessary action, and to increase consistency and to improve the presentation.

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

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

Response: No

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

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Description and Assessment

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

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

Revising the TS Actions to provide an alternative to frequent use of the moveable incore detector system to verify the position of rods with inoperable rod position indicator does not change the requirement for the rods to be aligned and within the insertion limits.

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

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

The proposed change to eliminate an unnecessary action has no effect on the consequences of accidents previously evaluated as the analysis of those accidents did not consider the use of the action.

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

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

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

Response: No

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

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

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Description and Assessment

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

Response: No

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

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

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

3.2 Conclusions

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

4.0 ENVIRONMENTAL EVALUATION

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

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Attachment 2

Proposed FNP Technical Specification Changes (Mark-Up)

3.1 REACTIVITY CONTROL SYSTEMS

3.1.4 Rod Group Alignment Limits

LCO 3.1.4 All shutdown and control rods shall be OPERABLE, with all individual indicated rod positions within 12 steps of their group step counter demand position.

APPLICABILITY: MODES 1 and 2.

ACTIONS

CONDITION	REQUIRED ACTION	COMPLETION TIME
A. One or more rod(s) untrippable.	A.1.1 Verify SDM to be within the limits provided in the COLR.	1 hour
	<u>OR</u>	
	A.1.2 Initiate boration to restore SDM to within limit.	1 hour
	<u>AND</u>	
	A.2 Be in MODE 3.	6 hours
B. One rod not within alignment limits.	B.1 Restore rod to within alignment limits.	1 hour
	<u>OR</u>	
	B.2-1.1 Verify SDM to be within the limits provided in the COLR.	1 hour
	OR	
		(continued)

ACTIONS

CONDITION	REQUIRED ACTION	COMPLETION TIME
B. (continued)	B.2.1.2 Initiate boration to restore SDM to within limit.	1 hour
	— <u>AND</u>	
	B.2.2 Reduce THERMAL POWER to ≤ 75% RTP.	2 hours
	— <u>AND</u>	
	B.2.3 Verify SDM to be within the limits provided in the COLR.	Once per 12 hours
	— <u>AND</u>	
C. Required Action and associated Completion Time of Condition B not met.	B.2.4 Perform SR 3.2.1.1 and , SR 3.2.1.2, <u>and SR 3.2.2.1.</u>	72 hours
	— <u>AND</u>	
	B.2.5 — Perform SR 3.2.2.1.	72 hours
	— <u>AND</u>	
	B.5.2.6 Re-evaluate safety analyses and confirm results remain valid for duration of operation under these conditions.	5 days

ACTIONS

CONDITION	REQUIRED ACTION	COMPLETION TIME
D. More than one rod not within alignment limit.	D.1.1 Verify SDM to be within the limits provided in the COLR.	1 hour
	<u>OR</u>	
	D.1.2 Initiate boration to restore required SDM to within limit.	1 hour
	<u>AND</u>	
	D.2 Be in MODE 3.	6 hours

SURVEILLANCE REQUIREMENTS

SURVEILLANCE	FREQUENCY
SR 3.1.4.1 <u>----- NOTE-----</u> <u>Not required to be performed for rods associated with inoperable rod position indicator or demand position indicator</u> Verify <u>position of individual rods</u> positions within alignment limit.	In accordance with the Surveillance Frequency Control Program
SR 3.1.4.2 Verify rod freedom of movement (trippability) by moving each rod not fully inserted in the core ≥ 10 steps in either direction.	In accordance with the Surveillance Frequency Control Program
SR 3.1.4.3 Verify rod drop time of each rod, from the fully withdrawn position, is ≤ 2.7 seconds from the beginning of decay of stationary gripper coil voltage to dashpot entry, with: a. $T_{avg} \geq 541^{\circ}\text{F}$; and	Prior to reactor criticality after each removal of the reactor head

3.1 REACTIVITY CONTROL SYSTEMS

3.1.5 Shutdown Bank Insertion Limits

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

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

APPLICABILITY: MODE 1,
 MODE 2 with any control bank not fully inserted.

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

ACTIONS

CONDITION	REQUIRED ACTION	COMPLETION TIME
<u>A.</u> One shutdown bank inserted \leq 16 steps beyond the insertion limits specified in the COLR.	<u>A.1</u> Verify all control banks are within the insertion limits specified in the COLR.	<u>1 hour</u>
	<u>AND</u>	
	<u>A.2.1</u> Verify SDM is within the limits specified in the COLR.	<u>1 hour</u>
	<u>OR</u>	
	<u>A.2.2</u> Initiate boration to restore SDM to within limit.	<u>1 hour</u>
	<u>AND</u>	
	<u>A.3</u> Restore the shutdown banks to within the insertion limits specified in the COLR	<u>24 hours</u>
<u>AB.</u> One or more shutdown banks not within limits for	<u>BA.1.1</u> Verify SDM to be within the limits provided in the	<u>1 hour</u>

CONDITION	REQUIRED ACTION	COMPLETION TIME
<u>reasons other than Condition A.</u>	<p>COLR.</p> <p><u>OR</u></p> <p><u>BA.1.2</u> Initiate boration to restore SDM to within limit.</p> <p><u>AND</u></p> <p><u>BA.2</u> Restore shutdown banks to within limits.</p>	<p>1 hour</p> <p>2 hours</p>
<u>CB.</u> Required Action and associated Completion Time not met.	<u>CB.1</u> Be in MODE 3.	6 hours

3.1 REACTIVITY CONTROL SYSTEMS

3.1.6 Control Bank Insertion Limits

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

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

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

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

ACTIONS

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

Control Bank Insertion Limits
3.1.6

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

ACTIONS

CONDITION	REQUIRED ACTION	COMPLETION TIME
<u>CB.</u> Control bank sequence or overlap limits not met <u>for reasons other than Condition A.</u>	<u>CB.1.1</u> Verify SDM to be within the limits provided in the COLR.	1 hour
	<u>OR</u>	
	<u>CB.1.2</u> Initiate boration to restore SDM to within limit.	1 hour
	<u>AND</u>	
	<u>CB.2</u> Restore control bank sequence and overlap to within limits.	2 hours
<u>DC.</u> Required Action and associated Completion Time not met.	<u>DC.1</u> Be in MODE 3.	6 hours

SURVEILLANCE REQUIREMENTS

SURVEILLANCE		FREQUENCY
SR 3.1.6.1	Verify estimated critical control bank position is within the limits specified in the COLR.	Within 4 hours prior to achieving criticality

3.1 REACTIVITY CONTROL SYSTEMS

3.1.7 Rod Position Indication

LCO 3.1.7 The Digital Rod Position Indication (DRPI) System and the Demand Position Indication System shall be OPERABLE.

APPLICABILITY: MODES 1 and 2.

ACTIONS

-----NOTE-----

Separate Condition entry is allowed for each inoperable ~~DRPI digital rod position indicator~~ and each demand position indicator.

CONDITION	REQUIRED ACTION	COMPLETION TIME
<p>A. One DRPI per group inoperable for <u>in</u> one or more groups.</p>	<p>A.1 Verify the position of the rods with inoperable DRPIs indirectly by using movable incore detectors.</p>	<p>Once per 8 hours</p>
	<p><u>OR</u></p> <p><u>A.2.1</u> <u>Verify the position of the rod with inoperable DRPI indirectly by using movable incore detectors.</u></p> <p><u>AND.</u></p>	<p><u>8 hours</u></p> <p><u>AND</u></p> <p><u>Once per 31 EFPD thereafter</u></p> <p><u>AND</u></p> <p><u>8 hours after discovery of each unintended rod movement</u></p> <p><u>AND</u></p>

CONDITION	REQUIRED ACTION	COMPLETION TIME
	<p>A.2.2 <u>Restore inoperable DRPI to OPERABLE status.</u></p> <p>OR</p> <p>A.2.3 Reduce THERMAL POWER to \leq 50% RTP</p>	<p><u>8 hours after each movement of rod with inoperable DRPI > 12 steps</u></p> <p><u>AND</u></p> <p><u>Prior to THERMAL POWER exceeding 50% RTP</u></p> <p><u>AND</u></p> <p><u>8 hours after reaching RTP</u></p> <p><u>Prior to entering MODE 2 from MODE 3</u></p> <p>8 hours</p>
<p>B. More than one DRPI per group inoperable <u>in one or more groups.</u></p>	<p>B.1 Place the control rods under manual control.</p> <p><u>AND</u></p> <p>B.2 Monitor and Record RCS T_{avg}</p> <p><u>AND</u></p>	<p>Immediately</p> <p>Once per 1 hour</p> <p>(continued)</p>

ACTIONS

CONDITION	REQUIRED ACTION	COMPLETION TIME
<p>B. (continued)</p>	<p>B.3 — Verify the position of the rods with inoperable position indicators indirectly using the movable incore detectors.</p> <p><u>AND</u></p> <p>B.42 Restore the inoperable position indicators <u>DRPIs</u> to OPERABLE status such that a maximum of one DRPI per group is inoperable.</p>	<p>Once per 8 hours</p> <p>24 hours</p>
<p>C. <u>One or more DRPI inoperable in one or more groups and associated rod has</u> One or more rods with inoperable DRPIs have been moved in excess of <u>≥</u> 24 steps in one direction since the last determination of the rod's position.</p>	<p>C.1.1 Initiate action to verify the position of the rods with inoperable DRPIs indirectly by using movable incore detectors.</p> <p><u>AND</u></p>	<p>Immediately</p> <p>(continued)</p>

SURVEILLANCE REQUIREMENTS

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

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"Clarification of Rod Position Requirements"**

Attachment 3

Revised FNP Technical Specification Pages

3.1 REACTIVITY CONTROL SYSTEMS

3.1.4 Rod Group Alignment Limits

LCO 3.1.4 All shutdown and control rods shall be OPERABLE, with all individual indicated rod positions within 12 steps of their group step counter demand position.

APPLICABILITY: MODES 1 and 2.

ACTIONS

CONDITION	REQUIRED ACTION	COMPLETION TIME
A. One or more rod(s) untrippable.	A.1.1 Verify SDM to be within the limits provided in the COLR.	1 hour
	<u>OR</u>	
	A.1.2 Initiate boration to restore SDM to within limit.	1 hour
	<u>AND</u>	
	A.2 Be in MODE 3.	6 hours
B. One rod not within alignment limits.	B.1.1 Verify SDM to be within the limits provided in the COLR.	1 hour
	<u>OR</u>	
	B.1.2 Initiate boration to restore SDM to within limit.	1 hour
	<u>AND</u>	
		(continued)

ACTIONS

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

ACTIONS

CONDITION	REQUIRED ACTION	COMPLETION TIME
D. More than one rod not within alignment limit.	D.1.1 Verify SDM to be within the limits provided in the COLR.	1 hour
	<u>OR</u>	
	D.1.2 Initiate boration to restore required SDM to within limit.	1 hour
	<u>AND</u>	
	D.2 Be in MODE 3.	6 hours

SURVEILLANCE REQUIREMENTS

SURVEILLANCE	FREQUENCY
SR 3.1.4.1 -----NOTE----- Not required to be performed for rods associated with inoperable rod position indicator or demand position indicator ----- Verify position of individual rods within alignment limit.	In accordance with the Surveillance Frequency Control Program
SR 3.1.4.2 Verify rod freedom of movement (trippability) by moving each rod not fully inserted in the core ≥ 10 steps in either direction.	In accordance with the Surveillance Frequency Control Program
SR 3.1.4.3 Verify rod drop time of each rod, from the fully withdrawn position, is ≤ 2.7 seconds from the beginning of decay of stationary gripper coil voltage to dashpot entry, with: a. $T_{avg} \geq 541^{\circ}F$; and b. All reactor coolant pumps operating.	Prior to reactor criticality after each removal of the reactor head

3.1 REACTIVITY CONTROL SYSTEMS

3.1.5 Shutdown Bank Insertion Limits

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

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

APPLICABILITY: MODE 1,
MODE 2 with any control bank not fully inserted.

ACTIONS

CONDITION	REQUIRED ACTION	COMPLETION TIME
A. One shutdown bank inserted \leq 16 steps beyond the insertion limits specified in the COLR.	A.1 Verify all control banks are within the insertion limits specified in the COLR.	1 hour
	<u>AND</u>	
	A.2.1 Verify SDM is within the limits specified in the COLR	1 hour
	<u>OR</u>	
	A.2.2 Initiate boration to restore SDM to within limit.	1 hour
	<u>AND</u>	
	A.3 Restore the shutdown banks to within the insertion limits specified in the COLR.	24 hours

Shutdown Bank Insertion Limits
3.1.5

ACTIONS

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

SURVEILLANCE REQUIREMENTS

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

3.1 REACTIVITY CONTROL SYSTEMS

3.1.6 Control Bank Insertion Limits

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

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

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

ACTIONS

CONDITION	REQUIRED ACTION	COMPLETION TIME
A. Control bank A, B, or C inserted ≤ 16 steps beyond the insertion, sequence, or overlap limits specified in the COLR.	A.1.1 Verify all shutdown banks are within the insertion limits specified in the COLR.	1 hour
	<u>AND</u>	
	A.2.1 Verify SDM is within the limits specified in the COLR.	1 hour
	<u>OR</u>	
	A.2.2 Initiate boration to restore SDM to within limit.	1 hour
	<u>AND</u>	
	A.3 Restore the control bank to within the insertion, sequence, and limits specified in the COLR.	24 hours

SURVEILLANCE REQUIREMENTS

SURVEILLANCE		FREQUENCY
SR 3.1.6.1	Verify estimated critical control bank position is within the limits specified in the COLR.	Within 4 hours prior to achieving criticality
SR 3.1.6.2	Verify each control bank insertion is within the limits specified in the COLR.	In accordance with the Surveillance Frequency Control Program
SR 3.1.6.3	Verify sequence and overlap limits specified in the COLR are met for control banks not fully withdrawn from the core.	In accordance with the Surveillance Frequency Control Program

3.1 REACTIVITY CONTROL SYSTEMS

3.1.7 Rod Position Indication

LCO 3.1.7 The Digital Rod Position Indication (DRPI) System and the Demand Position Indication System shall be OPERABLE.

APPLICABILITY: MODES 1 and 2.

ACTIONS

-----NOTE-----

Separate Condition entry is allowed for each inoperable DRPI and each demand position indicator.

CONDITION	REQUIRED ACTION	COMPLETION TIME
<p>A. One DRPI per group inoperable in one or more groups.</p>	<p>A.1 Verify the position of the rod with inoperable DRPI indirectly by using movable incore detectors.</p> <p><u>OR</u></p> <p>A.2.1 Verify the position of the rod with inoperable DRPI indirectly by using movable incore detectors.</p> <p><u>AND</u></p>	<p>Once per 8 hours</p> <p><u>AND</u></p> <p>8 hours</p> <p><u>AND</u></p> <p>Once per 31 EFPD thereafter</p> <p><u>AND</u></p> <p>8 hours after discovery of each unintended rod movement</p> <p><u>AND</u></p> <p>(continued)</p>

ACTIONS

CONDITION	REQUIRED ACTION	COMPLETION TIME
<p>A. (continued)</p>	<p>A.2.2 Restore inoperable DRPI to OPERABLE status.</p> <p><u>OR</u></p> <p>A.3 Reduce THERMAL POWER to ≤ 50% RTP</p>	<p>8 hours after each movement of rod with inoperable DRPI > 12 steps</p> <p><u>AND</u></p> <p>Prior to THERMAL POWER exceeding 50% RTP</p> <p><u>AND</u></p> <p>8 hours after reaching RTP</p> <p>Prior to entering MODE 2 from MODE 3</p> <p>8 hours</p>
<p>B. More than one DRPI group inoperable in one or more groups.</p>	<p>B.1 Place the control rods under manual control.</p> <p><u>AND</u></p> <p>B.2 Restore the inoperable DRPIs to OPERBLE status such that a maximum of one DRPI per group is inoperable.</p>	<p>Immediately</p> <p>24 hours</p>

SURVEILLANCE REQUIREMENTS

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

**Joseph M. Farley Nuclear Plant – Units 1 & 2
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Application To Revise Technical Specifications To Adopt TSTF-547,
"Clarification of Rod Position Requirements"**

Attachment 4

Proposed FNP Technical Specification Bases Changes (Mark-Up)

BASES

ACTIONS

A.2 (continued)

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

B.1.1 and B.1.2

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

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

B.2.1.1 and B.2.1.2

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

In many cases, realigning the remainder of the group to the misaligned rod may not be desirable. For example, realigning control bank B to a rod that is misaligned 15 steps from the top of the core would require a significant power reduction, since control bank D must be moved fully in and control bank C must be moved in to below 90 steps.

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

(continued)

BASES

ACTIONS
(continued)B.2.2, B.2.3, B.2.4, B.2.5, and B.52-6

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

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

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

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

Once current conditions have been verified acceptable, time is available to perform evaluations of accident analysis to determine that core limits will not be exceeded during a Design Basis Event for the duration of operation under these conditions. A Completion Time of 5 days is sufficient time to obtain the required input data and to perform the analysis.

The following accident analyses are required to be reevaluated:

1. Rod Cluster Control Assembly Insertion Characteristics;
2. Rod Cluster Control Assembly Misalignment;
3. Loss Of Reactor Coolant From Small Ruptured Pipes or From Cracks In Large Pipes Which Actuates The Emergency Core Cooling System;

(continued)

BASES

ACTIONS

B.2.2, B.2.3, B.2.4, B.2.5, and B.52.6 (continued)

4. Single Rod Cluster Control Assembly Withdrawal At Full Power;
5. Major Reactor Coolant System Pipe Ruptures (Loss Of Coolant Accident);
6. Major Secondary System Pipe Rupture; and
7. Rupture Of A Control Rod Drive Mechanism Housing (Rod Cluster Control Assembly Ejection).

C.1

When Required Actions cannot be completed within their Completion Time, the unit must be brought to a MODE or Condition in which the LCO requirements are not applicable. To achieve this status, the unit must be brought to at least MODE 3 within 6 hours, which obviates concerns about the development of undesirable xenon or power distributions. The allowed Completion Time of 6 hours is reasonable, based on operating experience, for reaching MODE 3 from full power conditions in an orderly manner and without challenging the plant systems.

D.1.1 and D.1.2

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

D.2

If more than one rod is found to be misaligned or becomes misaligned because of bank movement, the unit conditions fall outside of the

(continued)

BASES

ACTIONSD.2 (continued)

accident analysis assumptions. Since automatic bank sequencing would continue to cause misalignment, the unit must be brought to a MODE or Condition in which the LCO requirements are not applicable. To achieve this status, the unit must be brought to at least MODE 3 within 6 hours.

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

**SURVEILLANCE
REQUIREMENTS**SR 3.1.4.1

The Surveillance Frequency is controlled under 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. LCO 3.1.7, "Rod Position Indication," provides Actions to verify the rods are in alignment when one or more rod position indicators are inoperable.

SR 3.1.4.2

Verifying each control rod is OPERABLE would require that each rod be tripped. However, in MODES 1 and 2, tripping each control rod would result in radial or axial power tilts, or oscillations. Exercising each individual control rod provides increased confidence that all rods continue to be OPERABLE without exceeding the alignment limit, even if they are not regularly tripped. Moving each control rod by 10 steps will not cause radial or axial power tilts, or oscillations, to occur. The Surveillance Frequency is controlled under the Surveillance Frequency Control Program. Between required performances of SR 3.1.4.2 (determination of control rod OPERABILITY by movement), if a control rod(s) is discovered to be immovable, but remains trippable and aligned, 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.

(continued)

BASES

APPLICABLE
SAFETY ANALYSES
(continued)

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

- a. There be no violations of:
 1. specified acceptable fuel design limits, or
 2. RCS pressure boundary integrity; and
- b. The core remains subcritical after accident transients that result in a reactor trip, except for the MSLB.

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

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

LCO

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

The shutdown bank insertion limits are defined in the COLR.

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

APPLICABILITY

The shutdown banks must be within their insertion limits, with the reactor in MODES 1 and 2. The applicability in MODE 2 begins at initial control bank withdrawal, during an approach to criticality, and continues throughout MODE 2, until all control bank rods are again fully inserted by reactor trip or by shutdown. This ensures that a sufficient amount of negative reactivity is available to shut down the reactor and maintain the required SDM following a reactor trip. The shutdown banks do not have to be within their insertion limits in

(continued)

MODE 3, unless an approach to criticality is being made. In MODE 3, 4, 5, or 6, the shutdown banks are fully inserted in the core and contribute to the SDM. Refer to LCO 3.1.1 for SDM requirements in MODES 3, 4, and 5. LCO 3.9.1, "Boron Concentration," ensures adequate SDM in MODE 6.

(continued)

BASES

APPLICABILITY
(continued)

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

ACTIONS

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

If one shutdown bank is inserted less than or equal to 16 steps below the insertion limit, 24 hours is allowed to restore the shutdown bank to within the limit. This is necessary because the available SDM may be reduced with a shutdown bank not within its insertion limit. Also, verification of SDM or initiation of boration within 1 hour is required, since the SDM in MODES 1 and 2 is ensured by adhering to the control and shutdown bank insertion limits (see LCO 3.1.1). If a shutdown bank is not within its insertion limit, SDM will be verified by performing a reactivity balance calculation, considering the effects listed in the BASES for SR 3.1.1.1.

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

BA.1.1, BA.1.2 and BA.2

When one or more shutdown banks is not within insertion limits (i.e., the entire bank is below the insertion limits) for reasons other than Condition A, 2 hours is allowed to restore the shutdown banks to within the insertion limits. This is necessary because the available SDM may be significantly reduced, with one or more of the shutdown banks not within their insertion limits. Also, verification of SDM or initiation of boration within 1 hour is required, since the SDM in MODES 1 and 2 is ensured by adhering to the control and shutdown bank insertion limits (see LCO 3.1.1). If shutdown banks are not within their insertion limits, then SDM will be verified by performing a reactivity balance calculation, considering the effects listed in the BASES for SR 3.1.1.1. If one or more individual shutdown rods (but not an entire bank) is not within alignment limits (even if below the insertion limits), then LCO 3.1.4 should be entered and this Condition is not applicable.

The allowed Completion Time of 2 hours provides an acceptable time for evaluating and repairing minor problems without allowing the plant
(continued)

to remain in an unacceptable condition for an extended period of time.

CB.1

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

SURVEILLANCE
REQUIREMENTS

SR 3.1.5.1

Verification that the shutdown banks are within their insertion limits prior to an approach to criticality ensures that when the reactor is critical, or being taken critical, the shutdown banks will be available to

(continued)

BASES

APPLICABLE
SAFETY ANALYSES
(continued)

- a. There be no violations of:
 - 1. specified acceptable fuel design limits, or
 - 2. Reactor Coolant System pressure boundary integrity; and
- b. The core remains subcritical after accident transients that result in a reactor trip, except for the MSLB.

As such, the shutdown and control bank insertion limits affect safety analysis involving core reactivity and power distributions (Ref. 3).

The SDM requirement is ensured by limiting the control and shutdown bank insertion limits so that allowable inserted worth of the RCCAs is such that sufficient reactivity is available in the rods to shut down the reactor to hot zero power with a reactivity margin that assumes the maximum worth RCCA remains fully withdrawn upon trip (Ref. 4).

Operation at the insertion limits or AFD limits may approach the maximum allowable linear heat generation rate or peaking factor with the allowed QPTR present. Operation at the insertion limit may also indicate the maximum ejected RCCA worth could be equal to the limiting value in fuel cycles that have sufficiently high ejected RCCA worths.

The control and shutdown bank insertion limits ensure that safety analyses assumptions for SDM, ejected rod worth, and power distribution peaking factors are preserved (Ref. 5).

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

LCO

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

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

BASES

APPLICABILITY

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

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

ACTIONS

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

If Control Bank A, B, or C is inserted less than or equal to 16 steps below the insertion, sequence, or overlap limits, 24 hours is allowed to restore the control bank to within the limits. Verification of SDM or initiation of boration within 1 hour is required, since the SDM in MODES 1 and 2 is ensured by adhering to the control and shutdown bank insertion limits (see LCO 3.1.1). If a control bank is not within its insertion limit, SDM will be verified by performing a reactivity balance calculation, considering the effects listed in the BASES for SR 3.1.1.1.

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

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

BA.1.1, BA.1.2, AB.2, CB.1.1, CB.1.2, and CB.2

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

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

Also, verification of SDM or initiation of boration to regain SDM is

required within 1 hour, since the SDM in MODES 1 and 2 normally ensured by adhering to the control and shutdown bank insertion limits (see LCO 3.1.1, "SHUTDOWN MARGIN (SDM)") has been upset. If control banks are not within their insertion limits, then SDM will be verified by performing a reactivity balance calculation, considering the effects listed in the BASES for SR 3.1.1.1.

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

Operation beyond the LCO limits is allowed for a short time period in order to take conservative action because the simultaneous occurrence of either a LOCA, loss of flow accident, ejected rod accident, or other accident during this short time period, together with an inadequate power distribution or reactivity capability, has an acceptably low probability.

(continued)

BASES

ACTIONS

BA.1.1, BA.1.2, BA.2, CB.1.1, CB.1.2, and CB.2 (continued)

The allowed Completion Time of 2 hours for restoring the banks to within the insertion, sequence, and overlaps limits provides an acceptable time or evaluating and repairing minor problems without allowing the plant to remain in an unacceptable condition for an extended period of time.

DG.1

If the Required Actions A.1 and A.2, or B.1 and B.2 cannot be completed within the associated Completion Times, the plant must be brought to MODE 3, where the LCO is not applicable. The allowed Completion Time of 6 hours is reasonable, based on operating experience, for reaching the required MODE from full power conditions in an orderly manner and without challenging plant systems.

**SURVEILLANCE
REQUIREMENTS**

SR 3.1.6.1

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

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

SR 3.1.6.2

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

(continued)

BASES

LCO
(continued)

OPERABILITY of the position indicator channels ensures that inoperable, misaligned, or mispositioned control rods can be detected. Therefore, power peaking, ejected rod worth, and SDM can be controlled within acceptable limits.

APPLICABILITY

The requirements on the DRPI and step counters are only applicable in MODES 1 and 2 (consistent with LCO 3.1.4, LCO 3.1.5, and LCO 3.1.6), because these are the only MODES in which power is generated, and the OPERABILITY and alignment of rods have the potential to affect the safety of the plant. In the shutdown MODES, the OPERABILITY of the shutdown and control banks has the potential to affect the required SDM, but this effect can be compensated for by an increase in the boron concentration of the Reactor Coolant System.

ACTIONS

The ACTIONS table is modified by a Note indicating that a separate Condition entry is allowed for each inoperable rod position indicator and each demand position indicator. This is acceptable because the Required Actions for each Condition provide appropriate compensatory actions for each inoperable position indicator.

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

When one DRPI system (both A and B) per group fails ~~for~~ one or more groups, the position of the affected rod(s) may still be determined indirectly by use of the movable incore detectors. The Required Action may also be satisfied by ensuring at least once per 8 hours that F_Q satisfies LCO 3.2.1, $F_{\Delta H}$ satisfies LCO 3.2.2, and SHUTDOWN MARGIN is within the limits provided in the COLR, provided the non-indicating rods have not been moved. Based on experience, normal power operation does not require excessive movement of banks. If a bank has been significantly moved, the Required Action of C.1 or C.2 below is required. Therefore, verification of RCCA position within the Completion Time of 8 hours is adequate for allowing continued full power operation, since the probability of simultaneously having a rod significantly out of position and an event sensitive to that rod position is small.

Required Action A.1 requires verification of the position of a rod with an inoperable DRPI once per 8 hours which may put excessive wear and tear on the moveable incore detector system. Required Action A.2.1 provides an alternative. Required Action A.2.1 requires verification of rod position using the moveable incore detectors every 31 EFPD, which coincides with the normal use of the system to verify core power distribution.

Required Action A.2.1 includes six distinct requirements for verification of the position of rods associated with an inoperable DRPI

using the movable incore detectors:

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

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

Required Action A.2.2 states that the inoperable DRPI must be restored to OPERABLE status prior to entering MODE 2 from MODE 3. The repair of the inoperable RPI must be performed prior to returning to power operation following a shutdown.

(continued)

BASES

ACTIONS
(continued)

A.32

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

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

B.1, B.2, B.3, and B.24

When more than one DRPI channel per group in one or more groups fails (Data A and Data B), additional actions are necessary to ensure that acceptable power distribution limits are maintained, minimum SDM is maintained, and the potential effects of rod misalignment on associated accident analyses are limited. Placing the Rod Control System in manual assures unplanned rod motion will not occur. Together with the indirect position determination available via movable incore detectors, this action will minimize the potential for rod misalignment. The immediate Completion Time for placing the Rod Control System in manual reflects the urgency with which unplanned rod motion must be prevented while in this Condition.

~~Monitoring and recording reactor coolant T_{avg} helps assure that significant changes in power distribution and SDM are avoided. The once per hour Completion Time is acceptable because only minor fluctuations in RCS temperature are expected at steady state plant operating conditions.~~

~~The position of the rods may be determined indirectly by use of the movable incore detectors. The Required Action may also be satisfied by ensuring at least once per 8 hours that F_Q satisfies LCO 3.2.1, F_{AH}~~

~~satisfies LCO 3.2.2, and SHUTDOWN MARGIN is within the limits provided in the COLR, provided the non-indicating rods have not been moved. Verification of control rod position once per 8 hours is adequate for allowing continued full power operation for a limited, 24 hour period, since the probability of simultaneously having a rod significantly out of position and an event sensitive to that rod position is small. The inoperable DRPIs must be restored, such that a maximum of one DRPI per group is inoperable, within 24 hours. The 24 hour Completion Time provides sufficient time to troubleshoot and restore the DRPI system to operation while avoiding the plant challenges associated with a shutdown without full rod position indication.~~

(continued)

BASES

ACTIONS

B.1, B.2, B.3, and B.24 (continued)

Based on operating experience, normal plant operation does not require excessive rod movement. If one or more rods has been significantly moved, the Required Action of C.1 or C.2 below is required.

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

With one DRPI inoperable in one or more groups and the affected groups have moved greater than 24 steps in one direction since the last determination of rod position, additional actions are needed to verify the position of rods within inoperable DRPI. Within 8 hours, the position of the rods with inoperable position indication must be determined using the moveable incore detectors to verify ~~These Required Actions clarify that when one or more rods with inoperable position indicators have been moved in excess of 24 steps in one direction, since the position was last determined, the Required Actions of A.1 and A.2, or B.1, as applicable, are still appropriate but must be initiated immediately under Required Action C.1.1 to begin verifying that these rods are still properly positioned, relative to their group positions.~~

If, within 8 hours, the rod positions have not been determined, THERMAL POWER must be reduced to $\leq 50\%$ RTP to avoid undesirable power distributions that could result from continued operation at $> 50\%$ RTP, if one or more rods are misaligned by more than 24 steps. The allowed Completion Time of 8 hours provides an acceptable period of time to verify the rod positions using the movable incore detectors or reduce power to $\leq 50\%$ RTP.

D.1.1 and D.1.2

With one or more demand position indicators per bank inoperable in one or more banks, the rod positions can be determined by the 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 within the allowed Completion Time of once every 8 hours is adequate.

D.2

Reduction of THERMAL POWER to $\leq 50\%$ RTP puts the core into a condition where rod position is not significantly affecting core peaking factor limits specified in the COLR. The allowed Completion Time of 8 hours provides an acceptable period of time to verify the rod positions per Required Actions D.1.1 and D.1.2 or reduce power to $\leq 50\%$ RTP.

(continued)

BASES

ACTIONS
(continued)

E.1

If the Required Actions cannot be completed within the associated Completion Time, the plant must be brought to a MODE in which the requirement does not apply. To achieve this status, the plant must be brought to at least MODE 3 within 6 hours. The allowed Completion Time is reasonable, based on operating experience, for reaching the required MODE from full power conditions in an orderly manner and without challenging plant systems.

SURVEILLANCE
REQUIREMENTS

SR 3.1.7.1

Verification that the DRPI agrees with the demand position within 12 steps over the full indicated range ensures that the DRPI is operating correctly.

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

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

REFERENCES

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

**Joseph M. Farley Nuclear Plant – Units 1 & 2
Vogtle Electric Generating Plant – Units 1 & 2
Application To Revise Technical Specifications To Adopt TSTF-547,
"Clarification of Rod Position Requirements"**

Attachment 5

Proposed VEGP Technical Specification Changes (Mark-Up)

ACTIONS

CONDITION	REQUIRED ACTION	COMPLETION TIME
B. (continued)	B.1.2 Initiate boration to restore SDM to within limit.	1 hour
	<u>AND</u>	
	B.2 Reduce THERMAL POWER to $\leq 75\%$ RTP.	2 hours
	<u>AND</u>	
	B.3 Verify SDM is \geq the limit specified in the COLR.	Once per 12 hours
	<u>AND</u>	
	B.4 Perform SR 3.2.1.1, and SR 3.2.1.2, and SR 3.2.2.1.	72 hours
	<u>AND</u>	
B.5 Perform SR 3.2.2.1.	72 hours	
<u>AND</u>		
B.65 Reevaluate safety analyses and confirm results remain valid for duration of operation under these conditions.	5 days	

(continued)

ACTIONS (continued)

CONDITION	REQUIRED ACTION	COMPLETION TIME
C. Required Action and associated Completion Time of Condition B not met.	C.1 Be in MODE 3	6 hours
D. More than one rod not within alignment limit.	D.1.1 Verify SDM is \geq the limit specified in the COLR.	1 hour
	<u>OR</u>	
	D.1.2 Initiate boration to restore required SDM to within limit.	1 hour
	<u>AND</u>	
	D.2 Be in MODE 3.	6 hours

SURVEILLANCE REQUIREMENTS

SURVEILLANCE	FREQUENCY
SR 3.1.4.1 <hr style="border-top: 1px dashed red;"/> <p style="text-align: center;">NOTE</p> <p style="text-align: center;"><u>Not required to be performed for rods associated with inoperable rod position indicator or demand position indicator</u></p> <hr style="border-top: 1px dashed red;"/> <p>Verify <u>position of individual rods</u> positions within alignment limit.</p>	In accordance with the Surveillance Frequency Control Program

(continued)

3.1 REACTIVITY CONTROL SYSTEMS

3.1.5 Shutdown Bank Insertion Limits

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

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

APPLICABILITY: MODES 1 and 2

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

ACTIONS

CONDITION	REQUIRED ACTION	COMPLETION TIME
<u>A. One shutdown bank inserted \leq 16 steps beyond the insertion limits specified in the COLR.</u>	<u>A.1 Verify all control banks are within the insertion limits specified in the COLR.</u>	<u>1 hour</u>
	<u>AND</u>	
	<u>A.2.1 Verify SDM is within the limits specified in the COLR.</u>	<u>1 hour</u>
	<u>OR</u>	
	<u>A.2.2 Initiate boration to restore SDM to within limit.</u>	<u>1 hour</u>
	<u>AND</u>	
	<u>A.3 Restore the shutdown banks to within the insertion limits specified in the COLR</u>	<u>24 hours</u>
<u>AB. One or more shutdown banks not within limits</u>	<u>AB.1.1 Verify SDM is \geq the limit specified in the COLR.</u>	<u>1 hour</u>

3.1 REACTIVITY CONTROL SYSTEMS

3.1.6 Control Bank Insertion Limits

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

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

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

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

ACTIONS

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

CONDITION	REQUIRED ACTION	COMPLETION TIME
<p>AB. Control bank insertion limits not met <u>for reasons other than Condition A.</u></p>	<p>AB.1.1 Verify SDM is \geq the limit specified in the COLR.</p>	<p>1 hour</p>
	<p><u>OR</u></p>	
	<p>AB.1.2 Initiate boration to restore SDM to within limit.</p>	<p>1 hour</p>
	<p><u>AND</u></p>	
	<p>AB.2 Restore control bank(s) to within limits.</p>	<p>2 hours</p>

(continued)

3.1 REACTIVITY CONTROL SYSTEMS

3.1.7 Rod Position Indication

LCO 3.1.7 The Digital Rod Position Indication (DRPI) System and the Demand Position Indication System shall be OPERABLE.

APPLICABILITY: MODES 1 and 2.

ACTIONS

NOTE

Separate Condition entry is allowed for each inoperable ~~rod position indicator~~ DRPI and each inoperable demand position indicator.

CONDITION	REQUIRED ACTION	COMPLETION TIME
<p>A. One DRPI per group inoperable for <u>in</u> one or more groups.</p>	<p>A.1 Verify the position of the rods with inoperable DRPI position indicators DRPI indirectly by using movable incore detectors.</p> <p><u>OR</u></p> <p><u>A.2.1</u> <u>Verify the position of the rod with inoperable DRPI indirectly by using movable incore detectors.</u></p> <p><u>AND</u></p>	<p>Once per 8 hours</p> <p><u>8 hours</u></p> <p><u>AND</u></p> <p><u>Once per 31 EFPD thereafter</u></p> <p><u>AND</u></p> <p><u>8 hours after discovery of each unintended rod movement</u></p> <p><u>AND</u></p> <p><u>8 hours after each</u></p>

CONDITION	REQUIRED ACTION	COMPLETION TIME
	<p><u>A.2.2</u> Restore inoperable DRPI to OPERABLE status.</p> <p><u>OR</u></p> <p><u>A.2.3</u> Reduce THERMAL POWER to ≤ 50% RTP.</p>	<p><u>movement of rod with inoperable DRPI > 12 steps</u></p> <p><u>AND</u></p> <p><u>Prior to THERMAL POWER exceeding 50% RTP</u></p> <p><u>AND</u></p> <p><u>8 hours after reaching RTP</u></p> <p><u>Prior to entering MODE 2 from MODE 3</u></p> <p><u>8 hours</u></p>

(continued)

ACTIONS (continued)

CONDITION	REQUIRED ACTION	COMPLETION TIME
<p>B. <u>More than one DRPI per group inoperable in one or more groups.</u></p>	<p>B.1 Place the control rods under manual control.</p> <p><u>AND</u></p> <p>B.2 Monitor and Record RCS T_{avg}</p> <p><u>AND</u></p> <p>B.3 Verify the position of the rods with inoperable position indicators indirectly by using the movable incore detectors.</p> <p><u>AND</u></p> <p>B.42 Restore inoperable position indicators DRPIs to OPERABLE status such that a maximum of one DRPI per group is inoperable.</p>	<p>Immediately</p> <p>Once per 1 hour</p> <p>Once per 8 hours</p> <p>24 hours</p>
<p>C. <u>One or more DRPI inoperable in one or more groups and associated rod has</u> One or more rods with inoperable DRPIs have been moved in excess of <u>≥ 24 steps in one direction since the last determination of the rod's position.</u></p>	<p>C.1 Verify the position of the rods with inoperable DRPIs by using movable incore detectors.</p> <p><u>OR</u></p> <p>C.2 Reduce THERMAL POWER to ≤ 50% RTP.</p>	<p>8 hours</p> <p>8 hours</p>

(continued)

ACTIONS (continued)		
CONDITION	REQUIRED ACTION	COMPLETION TIME
D. One or more demand position indicators per bank inoperable for in one or more banks.	D.1.1 Verify by administrative means all DRPIs for the affected banks are OPERABLE.	Once per 8 hours
	<u>AND</u>	
	D.1.2 Verify the most withdrawn rod and the least withdrawn rod of the affected banks are ≤ 12 steps apart.	Once per 8 hours
	<u>OR</u>	
	D.2 Reduce THERMAL POWER to $\leq 50\%$ RTP.	8 hours
E. Required Action and associated Completion Time not met.	E.1 Be in MODE 3.	6 hours

SURVEILLANCE REQUIREMENTS

SURVEILLANCE	FREQUENCY
<p>SR 3.1.7.1</p> <p>----- NOTE----- <u>Not required to be met for DRPIs associated with rods that do not meet LCO 3.1.4.</u></p> <p>Verify each DRPI agrees within 12 steps of the group demand position for the full indicated range of rod travel.</p>	<p>In accordance with the Surveillance Frequency Control Program</p>

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Vogtle Electric Generating Plant – Units 1 & 2
Application To Revise Technical Specifications To Adopt TSTF-547,
"Clarification of Rod Position Requirements"**

Attachment 6

Revised VEGP Technical Specification Pages

ACTIONS

CONDITION	REQUIRED ACTION	COMPLETION TIME
B. (continued)	B.1.2 Initiate boration to restore SDM to within limit.	1 hour
	<u>AND</u>	
	B.2 Reduce THERMAL POWER to $\leq 75\%$ RTP.	2 hours
	<u>AND</u>	
	B.3 Verify SDM is \geq the limit specified in the COLR.	Once per 12 hours
	<u>AND</u>	
	B.4 Perform SR 3.2.1.1, SR 3.2.1.2, and SR 3.2.2.1.	72 hours
	<u>AND</u>	
	B.5 Reevaluate safety analyses and confirm results remain valid for duration of operation under these conditions.	5 days

(continued)

ACTIONS (continued)

CONDITION	REQUIRED ACTION	COMPLETION TIME
C. Required Action and associated Completion Time of Condition B not met.	C.1 Be in MODE 3	6 hours
D. More than one rod not within alignment limit.	D.1.1 Verify SDM is \geq the limit specified in the COLR.	1 hour
	<u>OR</u>	
	D.1.2 Initiate boration to restore required SDM to within limit.	1 hour
	<u>AND</u>	
	D.2 Be in MODE 3.	6 hours

SURVEILLANCE REQUIREMENTS

SURVEILLANCE	FREQUENCY
SR 3.1.4.1 <p style="text-align: center;">-----NOTE----- Not required to be performed for rods associated with inoperable rod position indicator or demand position indicator. -----</p> Verify position of individual rods within alignment limit.	In accordance with the Surveillance Frequency Control Program

(continued)

3.1 REACTIVITY CONTROL SYSTEMS

3.1.5 Shutdown Bank Insertion Limits

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

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

APPLICABILITY: MODES 1 and 2

ACTIONS

CONDITION	REQUIRED ACTION	COMPLETION TIME
A. One shutdown bank inserted \leq 16 steps beyond the insertion limits specified in the COLR.	A.1 Verify all control banks are within the insertion limits specified in the COLR.	1 hour
	<u>AND</u>	
	A.2.1 Verify SDM is within the limits specified in the COLR.	1 hour
	<u>OR</u>	
	A.2.2 Initiate boration to restore SDM to within limit.	1 hour
	<u>AND</u>	
	A.3 Restore the shutdown banks to within the insertion limits specified in the COLR.	24 hours

(continued)

Shutdown Bank Insertion Limits
3.1.5

ACTIONS (continued)

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

SURVEILLANCE REQUIREMENTS

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

3.1 REACTIVITY CONTROL SYSTEMS

3.1.6 Control Bank Insertion Limits

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

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

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

ACTIONS

CONDITION	REQUIRED ACTION	COMPLETION TIME
A. Control bank A, B, or C inserted ≤ 16 steps beyond the insertion, sequence, or overlap limits specified in the COLR.	A.1.1 Verify all shutdown banks are within the insertion limits specified in the COLR.	1 hour
	<u>AND</u>	
	A.2.1 Verify SDM is within the limits specified in the COLR.	1 hour
	<u>OR</u>	
	A.2.2 Initiate boration to restore SDM to within limit.	1 hour
	<u>AND</u>	
	A.3 Restore the control bank to within the insertion, sequence, and limits specified in the COLR.	24 hours

(continued)

SURVEILLANCE REQUIREMENTS

SURVEILLANCE		FREQUENCY
SR 3.1.6.1	Verify estimated critical control bank position is within the limits specified in the COLR.	Within 4 hours prior to achieving criticality
SR 3.1.6.2	Verify each control bank insertion is within the limits specified in the COLR.	In accordance with the Surveillance Frequency Control Program
SR 3.1.6.3	Verify sequence and overlap limits specified in the COLR are met for control banks not fully withdrawn from the core.	In accordance with the Surveillance Frequency Control Program

3.1 REACTIVITY CONTROL SYSTEMS

3.1.7 Rod Position Indication

LCO 3.1.7 The Digital Rod Position Indication (DRPI) System and the Demand Position Indication System shall be OPERABLE.

APPLICABILITY: MODES 1 and 2.

ACTIONS

-----NOTE-----

Separate Condition entry is allowed for each inoperable DRPI and each inoperable demand position indicator.

CONDITION	REQUIRED ACTION	COMPLETION TIME
<p>A. One DRPI per group inoperable in one or more groups.</p>	<p>A.1 Verify the position of the rod with inoperable DRPI indirectly by using movable incore detectors.</p>	<p>Once per 8 hours</p>
	<p><u>OR</u></p> <p>A.2.1 Verify the position of the rod with inoperable DRPI indirectly by using movable incore detectors.</p> <p><u>AND</u></p>	<p>8 hours</p> <p><u>AND</u></p> <p>Once per 31 EFPD thereafter</p> <p><u>AND</u></p> <p>8 hours after discovery of each unintended rod movement</p> <p><u>AND</u></p> <p>(continued)</p>

ACTIONS

CONDITION	REQUIRED ACTION	COMPLETION TIME
<p>A. (continued)</p>	<p>A.2.2 Restore inoperable DRPI to OPERABLE status.</p> <p><u>OR</u></p> <p>A.3 Reduce THERMAL POWER to ≤ 50% RTP.</p>	<p>8 hours after each movement of rod with inoperable DRPI > 12 steps</p> <p><u>AND</u></p> <p>Prior to THERMAL POWER exceeding 50% RTP</p> <p><u>AND</u></p> <p>8 hours after reaching RTP</p> <p>Prior to entering MODE 2 from MODE 3</p> <p>8 hours</p>
<p>B. More than one DRPI per group inoperable in one or more groups.</p>	<p>B.1 Place the control rods under manual control.</p> <p><u>AND</u></p> <p>B.2 Restore inoperable DRPIs to OPERABLE status such that a maximum of one DRPI per group is inoperable.</p>	<p>Immediately</p> <p>24 hours</p>

(continued)

ACTIONS (continued)

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

SURVEILLANCE REQUIREMENTS

SURVEILLANCE	FREQUENCY
<p>SR 3.1.7.1</p> <p>-----NOTE----- Not required to be met for DRPIs associated with rods that do not meet LCO 3.1.4.</p> <p>-----</p> <p>Verify each DRPI agrees within 12 steps of the group demand position for the full indicated range of rod travel.</p>	<p>In accordance with the Surveillance Frequency Control Program</p>

**Joseph M. Farley Nuclear Plant – Units 1 & 2
Vogtle Electric Generating Plant – Units 1 & 2
Application To Revise Technical Specifications To Adopt TSTF-547,
"Clarification of Rod Position Requirements"**

Attachment 7

Proposed VEGP Technical Specification Bases Changes (Mark-Up)

BASES

ACTIONS

B.1.1 and B.1.2 (continued)

The Completion Time of 1 hour represents the time necessary for determining the actual unit SDM and, if necessary, aligning and starting the necessary systems and components to initiate boration.

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

When a rod becomes misaligned, it can usually be moved and is still trippable. If the rod can be realigned shortly after the misalignment, local xenon redistribution during this short interval will not be significant, and operation in compliance with the LCO may proceed without further restriction.

An alternative to realigning a single misaligned RCCA to the group average position is to align the remainder of the group to the position of the misaligned RCCA. However, this must be done without violating the bank sequence, overlap, and insertion limits specified in LCO 3.1.5, "Shutdown Bank Insertion Limits," and LCO 3.1.6, "Control Bank Insertion Limits." The Completion Time of Required Action B.2 gives the operator sufficient time to adjust the rod positions in an orderly manner or subsequently reduce power if the rod alignment cannot be restored to within the LCO limits shortly after the misalignment.

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

Reduction of power to 75% RTP ensures that local LHR increases due to a misaligned RCCA will not cause the core design criteria to be exceeded (Ref. 3). The Completion Time of 2 hours gives the operator sufficient time to accomplish an orderly power reduction without challenging the Reactor Protection System.

When a rod is known to be misaligned, there is a potential to impact the SDM. Since the core conditions can change with time, periodic verification of SDM is required.

(continued)

BASES

ACTIONS

B.2, B.3, B.4, and B.5, and B.6 (continued)

A Frequency of 12 hours is sufficient to ensure this requirement continues to be met.

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

Once current conditions have been verified acceptable, time is available to perform evaluations of accident analysis to determine that core limits will not be exceeded during a Design Basis Event for the duration of operation under these conditions. A Completion Time of 5 days is sufficient time to obtain the required input data and to perform the analysis.

The following accident analyses require reevaluation for continued operation with a misaligned rod.

RCCA Insertion Characteristics
RCCA Misalignment
Decrease in Reactor Coolant Inventory

- Inadvertent Opening of a Pressurizer Safety or Relief Valve
- Break in Instrument Line or Other Lines From Reactor Coolant Pressure Boundary That Penetrates Containment
- Loss-of-Coolant-Accidents

Increase in Heat Removal by the Secondary System (Steam System Piping Rupture) Spectrum of RCCA Ejection Accidents.

C.1

When Required Actions cannot be completed within their Completion Time, the unit must be brought to a MODE or Condition in which the LCO requirements are not applicable. To achieve this status, the unit must be brought to at least

(continued)

BASES (continued)

SURVEILLANCE
REQUIREMENTS

SR 3.1.4.1

The Surveillance Frequency is controlled under 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. LCO 3.1.7, "Rod Position Indication," provides Actions to verify the rods are in alignment when one or more rod position indicators are inoperable.

SR 3.1.4.2

Exercising each individual control rod provides confidence that all rods continue to be OPERABLE without exceeding the alignment limit, even if they are not regularly tripped. Moving each control rod by 10 steps will not cause radial or axial power tilts, or oscillations, to occur. The Surveillance Frequency is controlled under the Surveillance Frequency Control Program. Between required performances of SR 3.1.4.2 (determination of control rod OPERABILITY by movement), if a control rod(s) is discovered to be immovable, but remains trippable, the control rod(s) is considered to be OPERABLE. At any time, if a control rod(s) is immovable, a determination of the trippability (OPERABILITY) of the control rod(s) must be made, and appropriate action taken.

SR 3.1.4.3

Verification of rod drop times from the physical fully withdrawn position allows the operator to determine that the maximum rod drop time permitted is consistent with the assumed rod drop time used in the safety analysis. Measuring rod drop times prior to reactor criticality, after reactor vessel head removal, ensures that the reactor internals and rod drive mechanism will not interfere with rod motion or rod drop time, and that no degradation in these systems has occurred that would adversely affect

(continued)

BASES

APPLICABLE
SAFETY ANALYSES
(continued)

- a. There be no violations of:
 - 1. specified acceptable fuel design limits, or
 - 2. RCS pressure boundary integrity; and
- b. The core remains subcritical after accident transients.

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

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

LCO

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

The shutdown bank insertion limits are defined in the COLR.

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

APPLICABILITY

The shutdown banks must be within their insertion limits, with the reactor in MODES 1 and 2. The applicability in MODE 2 begins at initial control bank withdrawal, during an approach to criticality, and continues throughout MODE 2, until all control bank rods are again fully inserted by reactor trip or by shutdown. This ensures that a sufficient amount of negative reactivity is available to shut down the reactor and maintain the required SDM following a reactor trip. The shutdown banks do not have to be within their insertion limits in MODE 3, unless an approach to criticality is being made. In MODE 3, 4, 5, or 6, the shutdown banks are fully inserted in the core and contribute to the SDM. Refer to LCO 3.1.1 for SDM requirements in MODES 3, 4, and 5. LCO 3.9.1, "Boron Concentration," ensures adequate SDM in MODE 6.

(continued)

Shutdown Bank Insertion Limits
B 3.1.5

~~The Applicability requirements have been modified by a Note indicating the LCO requirement is suspended during SR 3.1.4.2. This SR verifies the freedom of the rods to~~

(continued)

BASES

APPLICABILITY
(continued)

~~move, and requires the shutdown bank to move below the LCO limits, which would normally violate the LCO.~~

ACTIONS

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

If one shutdown bank is inserted less than or equal to 16 steps below the insertion limit, 24 hours is allowed to restore the shutdown bank to within the limit. This is necessary because the available SDM may be reduced with a shutdown bank not within its insertion limit. Also, verification of SDM or initiation of boration within 1 hour is required, since the SDM in MODES 1 and 2 is ensured by adhering to the control and shutdown bank insertion limits (see LCO 3.1.1). If a shutdown bank is not within its insertion limit, SDM will be verified by performing a reactivity balance calculation, considering the effects listed in the BASES for SR 3.1.1.1.

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

AB.1.1, AB.1.2 and AB.2

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

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

BC.1

(continued)

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

SURVEILLANCE
REQUIREMENTS

SR 3.1.5.1

Verification that the shutdown banks are within their insertion limits prior to an approach to criticality ensures that the reactivity of the shutdown banks will be available to shut down the reactor, and the required SDM will be maintained following a reactor trip.

(continued)

BASES

APPLICABLE
SAFETY ANALYSES
(continued)

Operation at the insertion limits or AFD limits may approach the maximum allowable linear heat generation rate or peaking factor with the allowed QPTR present. Operation at the insertion limit may also indicate the maximum ejected RCCA worth could be equal to the limiting value in fuel cycles that have sufficiently high ejected RCCA worths.

The control and shutdown bank insertion limits ensure that safety analyses assumptions for SDM, ejected rod worth, and power distribution peaking factors are preserved (Ref. 3).

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

LCO

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

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

APPLICABILITY

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

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

(continued)

BASES (continued)

ACTIONS

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

If Control Bank A, B, or C is inserted less than or equal to 16 steps below the insertion, sequence, or overlap limits, 24 hours is allowed to restore the control bank to within the limits. Verification of SDM or initiation of boration within 1 hour is required, since the SDM in MODES 1 and 2 is ensured by adhering to the control and shutdown bank insertion limits (see LCO 3.1.1). If a control bank is not within its insertion limit, SDM will be verified by performing a reactivity balance calculation, considering the effects listed in the BASES for SR 3.1.1.1.

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

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

AB.1.1, AB.1.2, AB.2, BC.1.1, BC.1.2, and BC.2

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

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

Also, verification of SDM or initiation of boration to regain SDM is required within 1 hour, since the SDM in MODES 1 and 2 normally ensured by adhering to the control and shutdown bank insertion limits (see LCO 3.1.1, "SHUTDOWN MARGIN (SDM)) has been upset. If control banks are not within their insertion limits, then SDM will be verified by performing a reactivity balance calculation, considering the effects listed in the Bases for SR 3.1.1.1.

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

(continued)

Operation beyond the LCO limits is allowed for a short time period in order to take conservative action because the simultaneous occurrence of either a LOCA, loss of flow accident, ejected rod accident, or other accident during this short time period, together with an inadequate power distribution or reactivity capability, has an acceptably low probability.

The allowed Completion Time of 2 hours for restoring the banks to within the insertion, sequence, and overlap limits provides an acceptable time for evaluating and repairing minor problems without allowing the plant to remain in an unacceptable condition for an extended period of time.

GD.1

If ~~the Required Actions A.1 and A.2, or B.1 and B.2~~ cannot be completed within the associated Completion Times, the plant must be brought to MODE 3, where the LCO is not applicable. The allowed Completion Time of 6 hours is reasonable, based on operating experience, for reaching the required MODE from

(continued)

BASES

ACTIONS

GD.1 (continued)

full power conditions in an orderly manner and without challenging plant systems.

**SURVEILLANCE
REQUIREMENTS**

SR 3.1.6.1

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

Among the factors that impact the estimated critical position (ECP) is Xenon concentration, which varies with time, either increasing or decreasing depending on the amount of time since the trip occurred. The 4 hour limit within which the ECP must be verified within the insertion limits ensures that changes in Xenon concentration will be limited and, hence, it ensures that criticality will not occur with control rods outside of the insertion limits due to Xenon decay.

SR 3.1.6.2

The Surveillance Frequency is controlled under the Surveillance Frequency Control Program. If the insertion limit monitor becomes inoperable, verification of the control bank position at the specified Frequency is sufficient to detect control banks that may be approaching the insertion limits.

SR 3.1.6.3

When control banks are maintained within their insertion limits as checked by SR 3.1.6.2 above, it is unlikely that their sequence and overlap will not be in accordance with requirements provided in the COLR. This surveillance is accomplished from the control room by verifying via the

(continued)

BASES

APPLICABILITY
(continued)

in which power is generated, and the OPERABILITY and alignment of rods have the potential to affect the safety of the plant. In the shutdown MODES, the OPERABILITY of the shutdown and control banks has the potential to affect the required SDM, but this effect can be compensated for by an increase in the boron concentration of the Reactor Coolant System.

ACTIONS

The ACTIONS table is modified by a Note indicating that a separate Condition entry is allowed for each inoperable rod position indicator and each inoperable demand position indicator. This is acceptable because the Required Actions for each Condition provide appropriate compensatory actions for each inoperable position indicator.

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

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 movable incore detectors. The Required Action may also be satisfied by ensuring at least once per 8 hours that F_Q satisfies LCO 3.2.1, $F_{\Delta H}$ satisfies LCO 3.2.2, and SHUTDOWN MARGIN is within the limits provided in the COLR, provided the non-indicating rods have not been moved. Based on experience, normal power operation does not require excessive movement of banks. If a bank has been significantly moved, the Required Action of C.1 or C.2 below is required. Therefore, verification of RCCA position within the Completion Time of 8 hours is adequate for allowing continued full power operation, since the probability of simultaneously having a rod significantly out of position and an event sensitive to that rod position is small.

Required Action A.1 requires verification of the position of a rod with an inoperable DRPI once per 8 hours which may put excessive wear and tear on the moveable incore detector system. Required Action A.2.1 provides an alternative. Required Action A.2.1 requires verification of rod position using the moveable incore detectors every 31 EFPD, which coincides with the normal use of the system to verify core power distribution.

Required Action A.2.1 includes six distinct requirements for verification of the position of rods associated with an inoperable DRPI using the movable incore detectors:

- a. Initial verification within 8 hours of the inoperability of the DRPI;

(continued)

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

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

Required Action A.2.2 states that the inoperable DRPI must be restored to OPERABLE status prior to entering MODE 2 from MODE 3. The repair of the inoperable RPI must be performed prior to returning to power operation following a shutdown.

A.23

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

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

(continued)

BASES

ACTIONS
(continued)

B.1, B.2, B.3, and B.42

When more than one DRPI per group in one or more groups fail, additional actions are necessary ~~to ensure that acceptable power distribution limits are maintained, minimum SDM is maintained, and the potential effects of rod misalignment on associated accident analyses are limited.~~ Placing the Rod Control System in manual assures unplanned rod motion will not occur. ~~Together with the indirect position determination available via movable incore detectors will minimize the potential for rod misalignment.~~

The immediate Completion Time for placing the Rod Control System in manual reflects the urgency with which unplanned rod motion must be prevented while in this Condition. ~~Monitoring and recording reactor coolant T_{avg} help assure that significant changes in power distribution and SDM are avoided. The once per hour Completion Time is acceptable because only minor fluctuations in RCS temperature are expected at steady state plant operating conditions.~~

~~The position of the rods may be determined indirectly by use of the movable incore detectors. The Required Action may also be satisfied by ensuring at least once per 8 hours that $F_Q(Z)$ satisfies LCO 3.2.1, $F_{\Delta H}$ satisfies LCO 3.2.2, and SHUTDOWN MARGIN is within the limits provided in the COLR, provided the non-indicating rods have not been moved. Verification of RCCA position once per 8 hours is adequate for allowing continued full power operation for a limited, 24 hour period, since the probability of simultaneously having a rod significantly out of position and an event sensitive to that rod position is small.~~ The inoperable DRPIs must be restored, such that a maximum of one DRPI per group is inoperable, within 24 hours. The 24 hour Completion Time provides sufficient time to troubleshoot and restore the DRPI system to operation while avoiding the plant challenges associated with a shutdown without full rod position indication (Ref. 4).

Based on operating experience, normal power operation does not require excessive rod movement. If one or more rods has been significantly moved, the Required Action of C.1 or C.2 below is required.

C.1 and C.2

With one DRPI inoperable in one or more groups and the affected groups have moved greater than 24 steps in one direction since the last determination of rod position, additional actions are needed to verify the position of rods within inoperable DRPI. Within 8 hours, the

(continued)

position of the rods with inoperable position indication must be determined using the moveable incore detectors to verify~~These Required Actions ensure that when one or more rods with inoperable digital rod position indicators have been moved in excess of 24 steps in one direction, since the position was last determined, prompt action is taken to begin verifying~~ that these rods are still properly positioned, relative to their group positions.

(continued)

BASES

ACTIONS
(continued)

C.1 and C.2 (continued)

Either the rod positions must be determined within 8 hours, or THERMAL POWER must be reduced to $\leq 50\%$ RTP within 8 hours to avoid undesirable power distributions that could result from continued operation at $> 50\%$ RTP, if one or more rods are misaligned by more than 24 steps. The allowed Completion Time of 8 hours provides an acceptable period of time to verify the rod positions using the moveable incore detectors.

D.1.1 and D.1.2

With one or more demand position indicators per bank inoperable in one or more banks, the rod positions can be determined by the 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 within the allowed Completion Time of once every 8 hours is adequate. This verification can be an examination of logs, administrative controls, or other information that all DRPIs in the affected bank are OPERABLE.

D.2

Reduction of THERMAL POWER to $\leq 50\%$ RTP puts the core into a condition where rod position will not cause core peaking to approach core peaking factor limits. The allowed Completion Time of 8 hours provides an acceptable period of time to verify the rod positions per Required Actions D.1.1 and D.1.2 or reduce power to $\leq 50\%$ RTP.

E.1

If the Required Actions cannot be completed within the associated Completion Time, the plant must be brought to a MODE in which the requirement does not apply. To achieve this status, the plant must be brought to at least MODE 3 within 6 hours. The allowed Completion Time is reasonable, based on operating experience, for reaching the required MODE from full power conditions in an orderly manner and without challenging plant systems.

(continued)

BASES

SURVEILLANCE
REQUIREMENTS

SR 3.1.7.1

Verification that the DRPI agrees with the demand position within 12 steps ensures that the DRPI is operating correctly.

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

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

REFERENCES

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