



UNITED STATES  
NUCLEAR REGULATORY COMMISSION  
WASHINGTON, D.C. 20555-0001

November 18, 2020

Mr. Christopher P. Domingos  
Site Vice President  
Prairie Island Nuclear Generating Plant  
Northern States Power Company - Minnesota  
1717 Wakonade Drive East  
Welch, MN 55089

SUBJECT: PRAIRIE ISLAND NUCLEAR GENERATING PLANT, UNITS 1  
AND 2 - ISSUANCE OF AMENDMENT NOS. 233 AND 221 RE: ADOPTION OF  
TECHNICAL SPECIFICATIONS TASK FORCE (TSTF) TRAVELER TSTF-547,  
"CLARIFICATION OF ROD POSITION REQUIREMENTS"  
(EPID L-2019-LLA-0295)

Dear Mr. Domingos:

The U.S. Nuclear Regulatory Commission (Commission) has issued the enclosed Amendment No. 233 to Renewed Facility Operating License No. DPR-42 and Amendment No. 221 to Renewed Facility Operating License No. DPR-60 for the Prairie Island Nuclear Generating Plant, Units 1 and 2 (Prairie Island), respectively. The amendments consist of changes to the technical specifications (TSs) in response to your application dated December 23, 2019, as supplemented by letter dated September 28, 2020.

The amendments revise the Prairie Island TSs to adopt Technical Specifications Task Force (TSTF) Traveler TSTF-547, "Clarification of Rod Position Requirements," with site-specific variations.

A copy of our related safety evaluation is also enclosed. The Notice of Issuance will be included in the Commission's monthly *Federal Register* notice.

Sincerely,

***/RA/***

Robert F. Kuntz, Senior Project Manager  
Plant Licensing Branch III  
Division of Operating Reactor Licensing  
Office of Nuclear Reactor Regulation

Docket Nos. 50-282 and 50-306

Enclosures:

1. Amendment No. 233 to DPR-42
2. Amendment No. 221 to DPR-60
3. Safety Evaluation

cc: Listserv



UNITED STATES  
NUCLEAR REGULATORY COMMISSION  
WASHINGTON, D.C. 20555-0001

NORTHERN STATES POWER COMPANY - MINNESOTA

DOCKET NO. 50-282

PRAIRIE ISLAND NUCLEAR GENERATING PLANT, UNIT 1

AMENDMENT TO RENEWED FACILITY OPERATING LICENSE

Amendment No. 233  
Renewed License No. DPR-42

1. The U.S. Nuclear Regulatory Commission (the Commission) has found that:
  - A. The application for amendment by Northern States Power Company, a Minnesota Corporation (NSPM, the licensee), dated December 23, 2019, as supplemented by letter dated September 28, 2020, complies with the standards and requirements of the Atomic Energy Act of 1954, as amended (the Act), and the Commission's rules and regulations set forth in 10 CFR Chapter I;
  - B. The facility will operate in conformity with the application, the provisions of the Act, and the rules and regulations of the Commission;
  - C. There is reasonable assurance (i) that the activities authorized by this amendment can be conducted without endangering the health and safety of the public, and (ii) that such activities will be conducted in compliance with the Commission's regulations;
  - D. The issuance of this amendment will not be inimical to the common defense and security or to the health and safety of the public; and
  - E. The issuance of this amendment is in accordance with 10 CFR Part 51 of the Commission's regulations and all applicable requirements have been satisfied.

2. Accordingly, the license is amended by changes to the Technical Specifications as indicated in the attachment to this license amendment, and paragraph 2.C.(2) of Renewed Facility Operating License No. DPR-42 is hereby amended to read as follows:

(2) Technical Specifications

The Technical Specifications contained in Appendix A, as revised through Amendment No. 233, are hereby incorporated in the renewed operating license. NSPM shall operate the facility in accordance with the Technical Specifications.

3. This license amendment is effective as of the date of its issuance and shall be implemented within 90 days.

FOR THE NUCLEAR REGULATORY COMMISSION

Nancy L. Salgado, Chief  
Plant Licensing Branch III  
Division of Operating Reactor Licensing  
Office of Nuclear Reactor Regulation

Attachment:  
Changes to the Renewed Facility  
Operating License and Technical  
Specifications

Date of Issuance: November 18, 2020



UNITED STATES  
NUCLEAR REGULATORY COMMISSION  
WASHINGTON, D.C. 20555-0001

NORTHERN STATES POWER COMPANY - MINNESOTA

DOCKET NO. 50-306

PRAIRIE ISLAND NUCLEAR GENERATING PLANT, UNIT 2

AMENDMENT TO RENEWED FACILITY OPERATING LICENSE

Amendment No. 221  
Renewed License No. DPR-60

1. The U.S. Nuclear Regulatory Commission (the Commission) has found that:
  - A. The application for amendment by Northern States Power Company, a Minnesota Corporation (NSPM, the licensee), dated December 23, 2019, as supplemented by letter dated September 28, 2020, complies with the standards and requirements of the Atomic Energy Act of 1954, as amended (the Act), and the Commission's rules and regulations set forth in 10 CFR Chapter I;
  - B. The facility will operate in conformity with the application, the provisions of the Act, and the rules and regulations of the Commission;
  - C. There is reasonable assurance (i) that the activities authorized by this amendment can be conducted without endangering the health and safety of the public, and (ii) that such activities will be conducted in compliance with the Commission's regulations;
  - D. The issuance of this amendment will not be inimical to the common defense and security or to the health and safety of the public; and
  - E. The issuance of this amendment is in accordance with 10 CFR Part 51 of the Commission's regulations and all applicable requirements have been satisfied.

2. Accordingly, the license is amended by changes to the Technical Specifications as indicated in the attachment to this license amendment, and paragraph 2.C.(2) of Renewed Facility Operating License No. DPR-60 is hereby amended to read as follows:

(2) Technical Specifications

The Technical Specifications contained in Appendix A, as revised through Amendment No. 221, are hereby incorporated in the renewed operating license. NSPM shall operate the facility in accordance with the Technical Specifications.

3. This license amendment is effective as of the date of its issuance and shall be implemented within 90 days.

FOR THE NUCLEAR REGULATORY COMMISSION

Nancy L. Salgado, Chief  
Plant Licensing Branch III  
Division of Operating Reactor Licensing  
Office of Nuclear Reactor Regulation

Attachment:  
Changes to the Renewed Facility  
Operating License and Technical  
Specifications

Date of Issuance: November 18, 2020

ATTACHMENT TO LICENSE AMENDMENT NOS. 233 AND 221

RENEWED FACILITY OPERATING LICENSE NOS. DPR-42 AND DPR-60

DOCKET NOS. 50-282 AND 50-306

Replace the following pages of the Renewed Facility Operating License Nos. DPR-42 and DPR-60 with the attached revised pages. The changed areas are identified by a marginal line.

REMOVE

Page 3  
Page 3

INSERT

Page 3  
Page 3

Technical Specifications

Replace the following pages of the Appendix A Technical Specifications with the attached revised pages. The revised pages are identified by amendment number and contain marginal lines indicating the areas of change.

REMOVE

3.1.4-1  
3.1.4-2  
3.1.4-3  
3.1.4-4  
3.1.5-1  
3.1.5-2  
-----  
3.1.6-1  
3.1.6-2  
3.1.6-3  
-----  
3.1.7-1  
3.1.7-2  
3.1.7-3  
3.1.7-4  
-----

INSERT

3.1.4-1  
3.1.4-2  
3.1.4-3  
3.1.4-4  
3.1.5-1  
3.1.5-2  
3.1.5-3  
3.1.6-1  
3.1.6-2  
3.1.6-3  
3.1.6-4  
3.1.7-1  
3.1.7-2  
3.1.7-3  
3.1.7-4  
3.1.7-5

- (3) Pursuant to the Act and 10 CFR Parts 30, 40 and 70, NSPM to receive, possess, and use at any time any byproduct, source and special nuclear material as sealed neutron sources for reactor startup, sealed sources for reactor instrumentation and radiation monitoring equipment calibration, and as fission detectors in amounts as required;
  - (4) Pursuant to the Act and 10 CFR Parts 30, 40, and 70, NSPM to receive, possess and use in amounts as required any byproduct, source or special nuclear material without restriction to chemical or physical form, for sample analysis or instrument and equipment calibration or associated with radioactive apparatus or components;
  - (5) Pursuant to the Act and 10 CFR Parts 30 and 70, NSPM to possess but not separate, such byproduct and special nuclear materials as may be produced by the operation of the facility;
  - (6) Pursuant to the Act and 10 CFR Parts 30 and 70, NSPM to transfer byproduct materials from other job sites owned by NSPM for the purpose of volume reduction and decontamination.
- C. This renewed operating license shall be deemed to contain and is subject to the conditions specified in the following Commission regulations in 10 CFR Chapter I: Part 20, Section 30.34 of Part 30, Sections 50.54 and 50.59 of Part 50, and Section 70.32 of Part 70; is subject to all applicable provisions of the Act and to the rules, regulations, and orders of the Commission now or hereafter in effect; and is subject to the additional conditions specified or incorporated below:
- (1) Maximum Power Level  
  
NSPM is authorized to operate the facility at steady state reactor core power levels not in excess of 1677 megawatts thermal.
  - (2) Technical Specifications  
  
The Technical Specifications contained in Appendix A, as revised through Amendment No. 233, are hereby incorporated in the renewed operating license. NSPM shall operate the facility in accordance with the Technical Specifications.
  - (3) Physical Protection  
  
NSPM shall fully implement and maintain in effect all provisions of the Commission-approved physical security, guard training and qualification, and safeguards contingency plans including amendments made pursuant to provisions of the Miscellaneous Amendments and Search Requirements revisions to 10 CFR 73.55 (51 FR 27817 and 27822) and to the authority of 10 CFR 50.90 and 10 CFR 50.54(p). The combined set of plans, which contains



- (3) Pursuant to the Act and 10 CFR Parts 30, 40 and 70, NSPM to receive, possess, and use at any time any byproduct, source and special nuclear material as sealed neutron sources for reactor startup, sealed sources for reactor instrumentation and radiation monitoring equipment calibration, and as fission detectors in amounts as required;
  - (4) Pursuant to the Act and 10 CFR Parts 30, 40, and 70, NSPM to receive, possess and use in amounts as required any byproduct, source or special nuclear material without restriction to chemical or physical form, for sample analysis or instrument and equipment calibration or associated with radioactive apparatus or components;
  - (5) Pursuant to the Act and 10 CFR Parts 30 and 70, NSPM to possess but not separate, such byproduct and special nuclear materials as may be produced by the operation of the facility;
  - (6) Pursuant to the Act and 10 CFR Parts 30 and 70, NSPM to transfer byproduct materials from other job sites owned by NSPM for the purposes of volume reduction and decontamination.
- C. This renewed operating license shall be deemed to contain and is subject to the conditions specified in the following Commission regulations in 10 CFR Chapter I: Part 20, Section 30.34 of Part 30, Sections 50.54 and 50.59 of Part 50, and Section 70.32 of Part 70; is subject to all applicable provisions of the Act and to the rules, regulations, and orders of the Commission now or hereafter in effect; and is subject to the additional conditions specified or incorporated below:
- (1) Maximum Power Level  
  
NSPM is authorized to operate the facility at steady state reactor core power levels not in excess of 1677 megawatts thermal.
  - (2) Technical Specifications  
  
The Technical Specifications contained in Appendix A, as revised through Amendment No. 221, are hereby incorporated in the renewed operating license. NSPM shall operate the facility in accordance with the Technical Specifications.
  - (3) Physical Protection  
  
NSPM shall fully implement and maintain in effect all provisions of the Commission-approved physical security, guard training and qualification, and safeguards contingency plans including amendments made pursuant to provisions of the Miscellaneous Amendments and Search Requirements revisions to 10 CFR 73.55 (51 FR 27817 and 27822) and to the authority of 10 CFR 50.90 and 10 CFR 50.54(p). The combined set of plans, which contains

3.1 REACTIVITY CONTROL SYSTEMS

3.1.4 Rod Group Alignment Limits.

LCO 3.1.4 All shutdown and control rods shall be OPERABLE.

AND

Individual actual rod positions shall be within 24 steps of their group step counter demand position when the demand position is between 30 and 215 steps, or within 36 steps of their group step counter demand position when the demand position  $\leq 30$  steps, or  $\geq 215$  steps.

-----NOTE-----  
Individual RPIs may be outside their limits for 1 hour following movement of the associated rods.  
-----

APPLICABILITY: MODES 1 and 2.

ACTIONS

CONDITION	REQUIRED ACTION	COMPLETION TIME
A. One or more rod(s) inoperable.	A.1.1 Verify SDM is 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

ACTIONS (continued)

CONDITION	REQUIRED ACTION	COMPLETION TIME
<p>B. One rod not within alignment limits.</p>	<p>B.1.1 Verify SDM is within the limits provided in the COLR.</p>	<p>1 hour</p>
	<p><u>OR</u></p>	
	<p>B.1.2 Initiate boration to restore SDM to within limit.</p>	<p>1 hour</p>
	<p><u>AND</u></p>	
	<p>B.2 Reduce THERMAL POWER to <math>\leq</math> 75% RTP.</p>	<p>8 hours</p>
	<p><u>AND</u></p> <p>B.3 Verify SDM is within the limits provided in the COLR.</p>	<p>Once per 12 hours</p>
	<p><u>AND</u></p>	
	<p>B.4 Perform SR 3.2.1.1, SR 3.2.1.2, and SR 3.2.2.1.</p>	<p>72 hours</p>
	<p><u>AND</u></p>	
	<p>B.5 Re-evaluate safety analyses and determine the THERMAL POWER for which the results remain valid for duration of operation under these conditions.</p>	<p>30 days</p>

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 within the limits provided in the COLR.	1 hour
	<u>OR</u>	
	D.1.2 Initiate boration to restore required SDM to within limit.	1 hour
	<u>AND</u>	
	D.2 Be in MODE 3.	6 hours

SURVEILLANCE REQUIREMENTS

SURVEILLANCE	FREQUENCY
<p>SR 3.1.4.1 ----- NOTES-----</p> <ol style="list-style-type: none"> <li>1. Not required to be performed for rods associated with inoperable rod position indicator or demand position indicator.</li> <li>2. Not required to be performed until 1 hour after associated rod motion.</li> </ol> <p>-----</p> <p>Verify position of individual rods within alignment limit.</p>	<p>In accordance with the Surveillance Frequency Control Program</p>
<p>SR 3.1.4.2 Verify rod freedom of movement (trippability) by moving each rod, not fully inserted in the core, <math>\geq 10</math> steps in either direction.</p>	<p>In accordance with the Surveillance Frequency Control Program</p>
<p>SR 3.1.4.3 Verify rod drop time of each rod, from the fully withdrawn position, is <math>\leq 1.8</math> seconds from the beginning of decay of stationary gripper coil voltage to dashpot entry, with:</p> <ol style="list-style-type: none"> <li>a. <math>T_{avg} \geq 500^{\circ}\text{F}</math>; and</li> <li>b. Both reactor coolant pumps operating.</li> </ol>	<p>Prior to reactor criticality after each removal of the reactor head</p>

3.1 REACTIVITY CONTROL SYSTEMS

3.1.5 Shutdown Bank Insertion Limits

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

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

APPLICABILITY: MODES 1 and 2.

ACTIONS

CONDITION	REQUIRED ACTION	COMPLETION TIME
A. One shutdown bank inserted $\leq$ 10 steps beyond the insertion limits specified in the COLR.	A.1 Verify all control banks are within the insertion limits specified in the COLR.  <u>AND</u>	1 hour

**ACTIONS**

CONDITION	REQUIRED ACTION	COMPLETION TIME
A. (continued)	A.2.1 Verify SDM is within the limits specified in the COLR.	1 hour
	<u>OR</u>	
	A.2.2 Initiate boration to restore SDM to within limit.	1 hour
	<u>AND</u>	
	A.3 Restore the shutdown bank to within the insertion limits specified in the COLR.	24 hours
B. One or more shutdown banks not within limits for reasons other than Condition A.	B.1.1 Verify SDM is 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

ACTIONS (continued)

CONDITION	REQUIRED ACTION	COMPLETION TIME
C. Required Action and associated Completion Time not met.	C.1 Be in MODE 3.	6 hours

SURVEILLANCE REQUIREMENTS

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





**ACTIONS**

CONDITION	REQUIRED ACTION	COMPLETION TIME
A. (continued)	A.2.2 Initiate boration to restore SDM to within limit.	1 hour
	<p style="text-align: center;"><u>AND</u></p> A.3 Restore the control bank to within the insertion, sequence, and overlap limits specified in the COLR.	24 hours
B. Control bank insertion limits not met for reasons other than Condition A.	B.1.1 Verify SDM is 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
	<p style="text-align: center;"><u>AND</u></p> B.2 Restore control bank(s) to within limits.	2 hours



**SURVEILLANCE REQUIREMENTS**

SURVEILLANCE	FREQUENCY
<p>SR 3.1.6.1    Verify estimated critical control bank position is within the limits specified in the COLR.</p>	<p>Prior to achieving criticality</p>
<p>SR 3.1.6.2    ----- NOTE -----                      Not required to be performed until 1 hour after associated rod motion.                      -----                        Verify each control bank insertion is within the limits specified in the COLR.</p>	<p>In accordance with the Surveillance Frequency Control Program</p>
<p>SR 3.1.6.3    ----- NOTE -----                      Not required to be performed until 1 hour after associated rod motion.                      -----                        Verify sequence and overlap limits specified in the COLR are met for control banks not fully withdrawn from the core.</p>	<p>In accordance with the Surveillance Frequency Control Program</p>

3.1 REACTIVITY CONTROL SYSTEMS

3.1.7 Rod Position Indication

LCO 3.1.7 The Rod Position Indication (RPI) System and demand position indication shall be OPERABLE.

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

APPLICABILITY: MODES 1 and 2.

ACTIONS

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

CONDITION	REQUIRED ACTION	COMPLETION TIME
A. One RPI per group inoperable in one or more groups.	A.1 Verify the position of the rod with inoperable RPI indirectly by using core power distribution measurement information.  <u>OR</u>	Once per 8 hours

ACTIONS

CONDITION	REQUIRED ACTION	COMPLETION TIME
A. (continued)	<p>A.2 Verify the position of the rods with inoperable RPI indirectly by using core power distribution measurement information.</p> <p><u>OR</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>8 hours after each movement of rod with inoperable RPI &gt; 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>

ACTIONS

CONDITION	REQUIRED ACTION	COMPLETION TIME
A. (continued)	A.3 Reduce THERMAL POWER to $\leq$ 50% RTP.	8 hours
B. More than one RPI per group inoperable in one or more groups.	B.1 Place the control rods under manual control.	Immediately
	<u>AND</u>	
	B.2 Monitor and record demand position indication for rods with inoperable RPIs.	Once per hour
	<u>AND</u>	
	B.3 Verify, using core power distribution measurement information, position of rods with inoperable RPIs which have been moved in excess of 24 steps in one direction since last determination of their position.	Once per 4 hours
	<u>AND</u>	
	B.4 Restore inoperable RPIs to OPERABLE status such that a maximum of one RPI per group is inoperable.	24 hours

ACTIONS (continued)

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



SURVEILLANCE REQUIREMENTS

SURVEILLANCE	FREQUENCY
<p>SR 3.1.7.1 ----- NOTE-----</p> <p>Not required to be met for RPIs associated with rods that do not meet LCO 3.1.4.</p> <p>-----</p> <p>Verify each RPI agrees within 12 steps of the group demand position between 30 and 215 steps, or within 24 steps of the group demand position when the demand position is <math>\geq 215</math> steps or <math>\leq 30</math> steps.</p>	<p>Once prior to criticality after each removal of the reactor head</p>



UNITED STATES  
NUCLEAR REGULATORY COMMISSION  
WASHINGTON, D.C. 20555-0001

SAFETY EVALUATION BY THE OFFICE OF NUCLEAR REACTOR REGULATION

RELATED TO AMENDMENT NO. 233 TO RENEWED FACILITY

OPERATING LICENSE NO. DPR-42

AND AMENDMENT NO. 221 TO RENEWED FACILITY

OPERATING LICENSE NO. DPR-60

NORTHERN STATES POWER COMPANY - MINNESOTA

PRAIRIE ISLAND NUCLEAR GENERATING PLANT, UNITS 1 AND 2

DOCKET NOS. 50-282 AND 50-306

1.0 INTRODUCTION

By license amendment request (LAR) dated December 23, 2019 (Agencywide Documents Access and Management System (ADAMS) Accession No. ML19357A142), as supplemented by letter dated September 28, 2020 (ADAMS Accession No. ML20272A239), Northern States Power Company, a Minnesota Corporation (the licensee), requested changes to the technical specifications (TSs) for Prairie Island Nuclear Generating Plant, Units 1 and 2 (Prairie Island). The supplemental letter dated September 28, 2020, provided additional information that clarified the application, did not expand the scope of the application as originally noticed, and did not change the U.S. Nuclear Regulatory Commission (NRC or the Commission) staff's original proposed no significant hazards consideration determination as published in the *Federal Register* on February 25, 2020 (85 FR 10733).

The proposed changes would revise the Prairie Island TSs to adopt Technical Specifications Task Force (TSTF) Traveler TSTF-547, "Clarification of Rod Position Requirements," with site-specific variations.

By letter dated March 6, 2014 (ADAMS Accession No. ML14065A582), the TSTF submitted Traveler TSTF-547, Revision 0, for NRC review and approval. By letter dated December 31, 2015 (ADAMS Accession No. ML15365A610), the TSTF submitted Revision 1 to Traveler TSTF-547. By letter dated March 4, 2016 (ADAMS Accession No. ML16012A130), the NRC staff approved adoption of TSTF-547. Traveler TSTF-547 proposes changes to Volumes 1 and 2 of NUREG-1431, Revision 4, "Standard Technical Specifications: Westinghouse Plants," dated April 30, 2012 (ADAMS Accession Nos. ML12100A222 and ML12100A228, respectively).

The proposed changes would revise the TSs to provide time to correct rod movement failures that do not affect operability, provide an alternative to frequent verification of rod position using

the movable in-core detectors, and allow time for thermal equilibrium of analog rod position indication. The proposed changes would also align requirements of TS 3.1.4, "Rod Group Alignment Limits," and TS 3.1.7, "Rod Position Indication"; eliminate an unnecessary Required Action (RA) from TS 3.1.7; and make some editorial changes to TSs 3.1.4, "Rod Group Alignment Limits", 3.1.5, "Shutdown Bank Insertion Limits," 3.1.6, "Control Bank Insertion Limits," and 3.1.7, "Rod Position Indication."

## 2.0 REGULATORY EVALUATION

### 2.1 Description of Rod Cluster Control Assemblies

The rod cluster control assemblies (RCCA), or rods, are moved by their control rod drive mechanisms (CRDM). Each CRDM moves its RCCA one step (approximately 5/8 inch) at a time, but at varying rates (steps per minute) depending on the signal output from the rod control system. The RCCAs are divided among control banks and shutdown banks. Each bank may be further subdivided into two groups to provide for precise reactivity control. A group consists of two or more RCCAs that are electrically paralleled to step simultaneously. If a bank of RCCAs consists of two groups, the groups are moved in a staggered fashion, but always within one step of each other. Both units have four control banks and two shutdown banks.

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

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

The axial position of shutdown rods and control rods is indicated by two separate and independent systems, which are the group position indication (Group Demand Counter and commonly called group step counters) and the rod position indication (RPI) system. The group position indication counts the pulses from the rod control system that moves the rods. There is one step counter for each group of rods. Individual rods in a group all receive the same signal to move and should, therefore, all be at the same position indicated by the group step counter for that group. The group position indication is considered relatively precise ( $\pm 1$  step or  $\pm 5/8$  inch). If a rod does not move one step for each demand pulse, the step counter will still count the pulse but incorrectly reflect the position of the rod.

However, the RPI system provides a more accurate indication of actual rod position, but at a lower precision than the step counters. This system is based on inductive analog signals from a series of coils spaced along a hollow tube. To increase the reliability of the system, the

inductive coils are connected alternately to data system A or B. Thus, if one data system fails, the RPI will indicate rod position with half accuracy. The RPI system is capable of monitoring a rod position within at least  $\pm 12$  steps ( $\pm 7.5$  inch) with either full accuracy or half accuracy.

The shutdown margin (SDM) is defined as the instantaneous amount of reactivity by which:

- a. The reactor is subcritical; or
- b. The reactor would be subcritical from its present condition assuming all RCCAs are fully inserted except for the single RCCA of highest reactivity worth, which is assumed to be fully withdrawn. With any RCCA not capable of being fully inserted, the reactivity worth of the RCCA must be accounted for in the determination of SDM. In MODES 1 and 2, the fuel and moderator temperatures are changed to the nominal zero power design temperature.

The core operating limits report (COLR) is the unit-specific document that provides cycle-specific parameter limits for the current reload cycle. These cycle-specific parameter limits shall be determined for each reload cycle in accordance with TS 5.6.5, "Core Operating Limits Report (COLR)." Plant operation within these limits is addressed in individual Specifications.

## 2.2 Description of Changes

This safety evaluation (SE) addresses changes to the TS governing rod group alignment limits (TS 3.1.4), shutdown bank insertion limits (TS 3.1.5), control bank insertion limits (TS 3.1.6), and rod position indication instrumentation (TS 3.1.7). The specific changes are described in the following subsections.

### 2.2.1 Provide Time to Correct Rod Movement Failures that Do Not Affect Operability

Limiting Condition for Operation (LCO) 3.1.5 requires that each shutdown bank be within insertion limits specified in the COLR. Current Condition A for one or more shutdown banks not within the limits, requires:

A.1.1 Verify SDM is within the limits provided in the COLR within 1 hour.

OR

A.1.2 Initiate boration to restore SDM to within limit within 1 hour.

AND

A.2 Restore shutdown banks to within limits within 2 hours.

LCO 3.1.6 requires that each control bank be within the insertion, sequence, and overlap limits specified in the COLR. Current Condition A for control bank insertion limits not met requires:

A.1.1 Verify SDM is within the limits provided in the COLR within 1 hour.

OR

A.1.2 Initiate boration to restore SDM to within limit within 1 hour.

AND

A.2 Restore control bank(s) to within limits within 2 hours.

The proposed change would add a new Condition A to LCO 3.1.5 that would require, with one shutdown bank inserted  $\leq 10$  steps beyond the insertion limits specified in the COLR:

A.1 Verify all control banks are within the insertion limits specified in the COLR within 1 hour.

AND

A.2.1 Verify SDM is within the limits specified in the COLR within 1 hour.

OR

A.2.2 Initiate boration to restore SDM to within limit within 1 hour.

AND

A.3 Restore the shutdown bank to within the insertion limits specified in the COLR within 24 hours.

The existing Condition A would be renumbered as Condition B and would be modified to apply for one or more shutdown banks not within limits for reasons other than Condition A. The existing RAs A.1.1, A.1.2, and A.2 would be renumbered B.1.1, B.1.2, and B.2, respectively. The existing Condition B and RA B.1 would be renumbered Condition C and RA C.1, respectively.

The proposed change would add a new Condition A to LCO 3.1.6 that would require, if control bank A, B, or C inserted  $\leq 10$  steps beyond the insertion, sequence, or overlap limits specified in the COLR, that:

A.1 Verify all shutdown banks are within the insertion limits specified in the COLR within 1 hour.

AND

A.2.1 Verify SDM is within the limits specified in the COLR within 1 hour.

OR

A.2.2 Initiate boration to restore SDM to within limit within 1 hour.

AND

A.3 Restore the control bank to within the insertion, sequence, and overlap limits specified in the COLR within 24 hours.

The existing Condition A would be renumbered as Condition B and would be modified to apply for control bank insertion limits not met for reasons other than Condition A. The existing RAs A.1.1, A.1.2, and A.2, would be renumbered B.1.1, B.1.2, and B.2, respectively

The existing Condition B would apply when control bank sequence or overlap limits are not met. Condition B would be modified to apply when control bank sequence or overlap limits are not met for reasons other than Condition A. Existing Condition B and RAs B.1.1, B.1.2, and B.2 would be renumbered as Condition C and RAs C.1.1, C.1.2, and C.2, respectively. Existing Condition C and RA C.1 would be renumbered as Condition D and RA D.1, respectively.

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 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.

2.2.2 Provide an Alternative to Frequent Verification of Rod Position Using the Core Power Distribution Measurement Information

LCO 3.1.7, "Rod Position Indication," requires that the RPI system and demand position indication be operable during Startup and Power Operation. Condition A applies for one RPI per group of rods inoperable for one or more groups of rods. The associated RAs are:

A.1 Verify the position of the rod(s) with inoperable position indicators by using core power distribution measurement information once per 8 hours.

OR

A.2 Reduce THERMAL POWER to  $\leq 50\%$  RTP [rated thermal power] within 8 hours.

The proposed change would add one new RA to Condition A as an alternative to the once per 8-hour indirect determination of rod position. The revised RAs would be:

A.1 Verify the position of the rod with inoperable RPI indirectly by using core power distribution measurement information once per 8 hours.

OR

- A.2 Verify the position of the rods with inoperable RPI indirectly by using core power distribution measurement information within 8 hours AND once per 31 EFPD thereafter, AND within 8 hours after discovery of each unintended rod movement, AND within 8 hours after each movement of rod with inoperable RPI > 12 steps, AND prior to THERMAL POWER exceeding 50% RTP, AND within 8 hours after reaching RTP.

OR

- A.3 Reduce THERMAL POWER to  $\leq$  50% RTP within 8 hours.

The 12-step agreement limit between the Group Position Indication and the RPI system indicates that the Group Position Indication is adequately calibrated and can be used for indication of the measurement of control rod bank position. When one RPI channel per group fails, the position of the rod may still be determined indirectly by use of the core power distribution measurement information.

Surveillance Requirement (SR) 3.1.4.1 requires verification that the individual rods are within the alignment limit in accordance with the surveillance frequency control program (SFCP). This SR is proposed to be modified by a Note to indicate that the SR is not applicable for rods with an inoperable RPI or demand position indicator. Verification that individual rod positions are within alignment limits in accordance with the SFCP provides a history that allows the operator to detect a rod that is beginning to deviate from its expected position.

### 2.2.3 Allow Time for Thermal Equilibrium of Analog RPI

The accuracy of the analog RPI system is affected by rod temperatures. With this effect, movement of associated rods may make the indications of the analog RPI system inaccurate. The proposed revision would allow a 1-hour period for the drive shaft to reach thermal equilibrium following rod movement to ensure the accuracy of the RPI analog indications, prior to requiring verification of compliance with TS limits. This change affects LCO 3.1.4, SR 3.1.4.1, SR 3.1.5.1, SR 3.1.6.2, SR 3.1.6.3, and LCO 3.1.7.

LCO 3.1.4, "Rod Group Alignment Limits," requires that all shutdown and control rods shall be operable during Startup and Power Operation. LCO 3.1.4 is revised to modify the existing Note that states individual RPIs may be outside their limits for 1 hour following movement of the associated rods.

SR 3.1.4.1 requires verification that individual rods are within the alignment limits in accordance with the SFCP. The proposed change adds a Note to the Surveillance that states, "Not required to be performed until 1 hour after associated rod motion."

SR 3.1.5.1 requires verification that each shutdown bank is within the insertion limits in accordance with the SFCP. The proposed change adds a Note to the Surveillance that states, "Not required to be performed until 1 hour after associated rod motion."

Since the shutdown banks are positioned manually by the control room operator, a verification of shutdown bank position in accordance with the SFCP after the reactor is taken critical, is adequate to ensure that they are within their insertion limits. Also, the SFCP takes into account

other information available in the control room for the purpose of monitoring the status of shutdown rods.

SR 3.1.6.2 requires verification that each control bank is within the insertion limits in accordance with the SFCP. The proposed change adds a Note to the Surveillance that states, "Not required to be performed until 1 hour after associated rod motion."

Verification of the control bank insertion in accordance with the SFCP is sufficient to detect control banks that may be approaching the insertion limits since, normally, very little rod motion occurs in normal operation.

SR 3.1.6.3 requires verification that each control bank that is not fully withdrawn from the core is within the sequence and overlap limits every in accordance with the SFCP. The proposed change adds a Note to the Surveillance that states, "Not required to be performed until 1 hour after associated rod motion."

When control banks are maintained within their insertion limits as verified by SR 3.1.6.2, it is unlikely that their sequence and overlap will not be in accordance with requirements provided in the COLR. An SFCP is consistent with the insertion limit verification in SR 3.1.6.2.

LCO 3.1.7, "Rod Position Indication," requires that the RPI System and demand position indication be operable during Startup and Power Operation. LCO 3.1.7 is revised to add a Note that states individual RPIs may be outside their limits for 1 hour following movement of the associated rods.

#### 2.2.4 Clarify SRs in TS 3.1.4 and TS 3.1.7

SR 3.1.4.1 requires verification of individual rod positions are in accordance with the SFCP. The proposed change is the addition of a Note to SR 3.1.4.1 stating that the SR is not required to be performed for rods associated with an inoperable demand position indicator. This Note is being added because SR 3.1.4.1 cannot be performed for rods with an inoperable demand position indicator.

LCO 3.1.4 specifies that all shutdown and control rods shall be operable and individual indicated rod positions shall be within 24 steps of their group step counter demand position. SR 3.1.7.1 requires verification that each RPI agrees within the required steps of the group demand position between 30 and 215 steps, or within 24 steps of the group demand position when the demand position is  $\geq 215$  steps or  $\leq 30$  steps. The proposed change is the addition of a Note to SR 3.1.7.1 stating that the SR would not be required to be met for rods known not to meet LCO 3.1.4.

#### 2.2.5 Other Proposed Changes

The proposed changes described in this section are editorial and do not change the technical content.

1. LCO 3.1.5 and LCO 3.1.6 contain a note modifying their Applicability that states "This LCO is not applicable while performing SR 3.1.4.2." The proposed change revises the Notes to state, "Not applicable to shutdown banks inserted while performing SR 3.1.4.2," for LCO 3.1.5 and "Not applicable to control banks inserted



while performing SR 3.1.4.2,” for LCO 3.1.6. This change clarifies the note and does not alter its meaning.

2. TS 3.1.7 is revised to consistently use the defined abbreviation “RPI.” This affects the Actions Note, RA A.1, RA B.2, and RA C.1.1.
3. TS 3.1.7, Condition A, is revised from “for one or more groups” to the more standard terminology “in one or more groups,” and TS 3.1.7, Condition B is revised to include the phrase “in one or more groups” to be more consistent with the wording of Condition A.
4. LCO 3.1.7, Condition C is revised from “Indication for one demand position per bank inoperable for one or more banks” to “One or more demand position indicators per bank inoperable in one or more banks.” The proposed change makes the terminology consistent with the Note modifying the RAs.

The current TS 3.1.7 is modified by a Note which states, “Separate Condition entry is allowed for each inoperable RPI and each demand position indicator.” The Bases for the Note states that the Note is acceptable because the RAs for each condition provide appropriate compensatory actions for each inoperable indicator.

### 2.3 Regulatory Review

The categories of items required to be in the TSs are provided in Title 10 of the *Code of Federal Regulations* (10 CFR) Section 50.36(c). As required by 10 CFR 50.36(c)(2)(i), the TSs will include LCOs, which are the lowest functional capability or performance levels of equipment required for safe operation of the facility. Per 10 CFR 50.36(c)(2)(i), when an LCO of a nuclear reactor is not met, the licensee shall shut down the reactor or follow any remedial action permitted by the TSs until the condition can be met. The regulation at 10 CFR 50.36(c)(3) requires TSs to include items in the category of SRs, which are requirements relating to test, calibration, or inspection to assure that the necessary quality of systems and components is maintained, that facility operation will be within safety limits, and that the LCOs will be met.

Additionally, 10 CFR 50.36(a)(1) states that a summary statement of the bases or reasons for such specifications, other than those covering administrative controls, shall also be included in the application, but shall not become part of the TSs.

The NRC staff’s guidance for review of TSs is in Chapter 16.0, “Technical Specifications,” of NUREG-0800, Revision 3, *Standard Review Plan* (March 2010) (ADAMS Accession No. ML100351425). As described therein, as part of the regulatory standardization effort, the NRC staff has prepared standard technical specifications (STS) for each of the light–water reactor nuclear designs. NUREG-1431 contains the STS for Westinghouse-designed plants.

### 3.0 TECHNICAL EVALUATION

The NRC staff reviewed the technical justification for the changes provided in Traveler TSTF-547. The NRC staff reviewed the technical justification for the proposed changes to ensure the reasoning was logical, complete and clearly written as described in Chapter 16.0 of NUREG-0800. The NRC staff reviewed the proposed changes for continued compliance with the requirements of 10 CFR 50.36. Although the TS bases are not part of the TS, the staff also

confirmed that that TS bases described the basis for each revised TS requirement accurately as described in Chapter 16.0 of NUREG-0800.

### 3.1 Provide Time to Correct Rod Movement Failures that Do Not Affect Operability Review

The proposed new Condition A of TSs 3.1.5 and 3.1.6 for shutdown and control bank insertion limits would allow 24 hours to restore a single bank to be within its insertion limit when inserted below the insertion limit. With one shutdown or control bank inserted a maximum of 10 steps below the rod insertion limit, the RAs associated with new Condition A also require verification that all other control and shutdown banks are within the insertion limits; and verification that the reactor can be shut down using control rods or boration. The Completion Time for these RAs is 1 hour.

The new conditions define limits of both duration and insertion if a bank is immovable due to failures external to the CRDM. A maximum of one control or shutdown bank may be inserted beyond the limits for a maximum of 24 hours provided all other banks are within the insertion limits and that the reactor could be shut down using control rods or boration. The new Condition A imposes a limit on the insertion of 10 steps less than the insertion limit. The value of 10 steps corresponds to the minimum number of steps that the rods must be moved to ensure correct performance of SR 3.1.4.2.

The NRC staff reviewed the justification for the proposed addition of Condition A to TS 3.1.5 and TS 3.1.6 provided in the Technical Evaluation section of Traveler TSTF-547, to ensure the reasoning is logical, complete, and clearly written. The justification in Traveler TSTF-547 states:

1. All control and shutdown rod assemblies are required to be Operable. If a rod is untrippable (i.e., inoperable), then a plant shutdown is required in accordance with LCO 3.1.4, Condition A.
2. Only one control bank and shutdown bank may be inserted beyond insertion limits by no more than 10 steps. If one or more control banks or shutdown banks exceed the insertion limit, a brief time period is permitted to correct the condition and then a plant shutdown is required.
3. If one rod is not within the alignment limits, adequate SDM is verified and a power reduction is required by LCO 3.1.4, Condition B. If more than one rod is not within the alignment limit as defined in LCO 3.1.4, adequate SDM is verified and a plant shutdown is required.

The insertion limits are established to ensure a sufficient amount of negative reactivity can be rapidly inserted to shut down the reactor. The NRC staff finds that allowing continued full-power operations for 24 hours with a rod movement failure is acceptable for the following reasons:

1. the SDM continues to be met;
2. all control and shutdown rods are trippable (i.e., capable of being rapidly inserted into the core);
3. only one bank may exceed insertion limits by no more than a specified number of steps;

4. all immovable rod assemblies are aligned; and
5. the rods must be restored to within the insertion limits within 24 hours.

The change to TS 3.1.5 and TS 3.1.6 to provide time to correct rod movement failures that do not affect operability will allow sufficient time for diagnosis and repairs while maintaining the safety function of the control rods since the affected rods are still trippable. The thermal margins may be affected by power distribution changes due to control rod bank insertion, both during the insertion and during the resulting local xenon transient. However, insertions at 10 steps from fully withdrawn, as provided in the proposed changes to TSs 3.1.5 and 3.1.6, would result in a very small negative reactivity impact at the top of active fuel. The resulting effect on the axial power distribution is not expected to be significant. In addition, alignment of all rods with the rod bank position (as per LCO 3.1.4) must be maintained and it will be verified that the reactor can still be shut down. Therefore, the NRC staff has determined that the proposed 24-hour Completion Time for Condition A in LCOs 3.1.5 and 3.1.6 specifying shutdown bank and control bank insertion limits is acceptable.

The NRC staff concludes that TS 3.1.5 and TS 3.1.6, as modified by the addition of Condition A, continue to specify the minimum performance level of equipment needed for safe operation of the facility as an LCO; and continue to specify the appropriate remedial measures if the LCO is not met. SRs are not being changed by the addition of Condition A. The NRC staff finds that the requirements of 10 CFR 50.36(c)(2) continue to be met because the minimum performance level of equipment needed for safe operation of the facility is contained in the LCO and the appropriate remedial measures are specified if the LCO is not met.

### 3.2 Provide an Alternative to Frequent Verification of Rod Position Using the Core Power Distribution Measurement Information Review

LCO 3.1.7 requires that the RPI and the demand position indication system be operable during Power Operation and Startup. When one or more RPI are inoperable, current TS 3.1.7 requires verification of rod position once per 8 hours using the core power distribution measurement information.

In regard to TS 3.1.7, Condition A, Prairie Island TS and TS Bases 3.1.7 will not include TSTF-547 RA A.2.2 and will renumber RA A.2.1 to RA A.2. RA A.2.2 is made irrelevant, as the logical "OR" connector would allow the licensee to transition from RA A.2.1 and RA A.2.2 into either RA A.1 or RA A.3 (which do not have that requirement), and thereby not have to restore the inoperable RPI to OPERABLE status. The licensee provided justification that showed that this RA would never be limiting or implemented because the RAs are joined by a logical "OR," any one of the RAs may be chosen. In addition, when an LCO is not met, LCO 3.0.4.a allows entry into a MODE when the associated actions to be entered permit continued operation in the MODE for an unlimited period of time. Since the LCO permits continued operation with the specified RAs, entering startup from hot standby is allowed.

The LAR also proposed the addition of the Note to SR 3.1.4.1 stating that the SR is not required to be performed for rods associated with an inoperable RPI. The licensee stated that this is appropriate because the RAs of TS 3.1.7 for an inoperable RPI provide the appropriate actions for indirectly determining the position of the affected rods.

The NRC staff concludes that the addition of an alternative monitoring scheme to indirectly determine the position of rods associated with an inoperable RPI is acceptable. TS 3.1.7, as

modified, continues to specify the minimum performance level of equipment needed for safe operation of the facility as an LCO and continues to specify the appropriate remedial measures if the LCO is not met. The revised SR 3.1.4.1, which has been clarified to specify when it is required to be performed, continues to be an appropriate test to ensure that the necessary quality of systems is maintained. The NRC staff finds that the requirements of 10 CFR 50.36(c)(2) continue to be met because the minimum performance level of equipment needed for safe operation of the facility is contained in the LCO and the appropriate remedial measures are specified if the LCO is not met. The NRC staff finds that the requirements of 10 CFR 50.36(c)(3) continue to be met because the revised SR provides the appropriate testing to ensure the necessary quality of components is maintained and that the LCO will be met.

### 3.3 Allow Time for Thermal Equilibrium of Analog RPI Review

Several changes are proposed to allow a 1-hour period for the drive shaft to reach thermal equilibrium following rod movement to ensure accuracy of the RPI analog indications to verify TS limits. LCOs 3.1.4 and 3.1.7 would be revised with a Note that individual RPIs are not required to be operable for 1 hour following rod motion. SRs 3.1.4.1, 3.1.5.1, 3.1.6.2, and 3.1.6.3 would be revised to not be required to be performed until 1 hour after the associated rod motion.

The 1-hour period is based on the necessary time to allow the rod drive shaft to reach thermal equilibrium following rod motion. There are thermal effects which cause the analog position indicators to drift following rod motion. During this period prior to establishment of thermal equilibrium, the indicators could be unstable and could indicate an inaccurate rod position. The provision to allow a 1-hour period to reach thermal equilibrium ensures that actions are not taken based on an inaccurate indication of rod position, which could lead to unnecessary transients. During this 1-hour period, the demand position indication would be available to indicate the demand position of the rods.

The NRC staff reviewed the technical justification provided in the Traveler TSTF-547 to ensure the reasoning is logical, complete, and clearly written as described in Chapter 16.0 of NUREG-0800.

The NRC staff concludes that TSs 3.1.4 and 3.1.7, as modified by the revision of the existing Note in 3.1.4 and the addition of a Note to 3.1.7, continue to specify the minimum performance level of equipment needed for safe operation of the facility, and continues to specify the appropriate remedial measures if the LCO is not met. The changes to the SRs ensure the SRs are performed when the position indication system has achieved thermal stability following rod motion. The SRs would continue to ensure the necessary quality of systems and components is maintained, that facility operation will be within safety limits, and the LCOs will be met. The NRC staff finds that the requirements of 10 CFR 50.36(c)(2) continue to be met.

### 3.4 Clarify SRs in TS 3.1.4 and TS 3.1.7 Review

#### 3.4.1 Clarification of SR 3.1.4.1

LCO 3.1.4 requires that all shutdown and control rods shall be operable and individual indicated rod positions shall be within 24 steps of their group step counter demand position. SR 3.1.4.1 requires verification of the individual rod positions within the alignment limit periodically. SR 3.1.4.1 cannot be performed for rods with an inoperable bank demand position indicator. Failure to meet an SR is considered a failure to meet an LCO requirement. Therefore, if

SR 3.1.4.1 cannot be performed, entry into LCO 3.1.4 Condition D is required. LCO 3.1.4 Condition D applies when more than one rod is not within the alignment limit. The RA associated with Condition D requires, in part, that the reactor be in Hot Standby within 6 hours.

LCO 3.1.7 requires the RPI and bank demand position indication to be operable. LCO 3.1.7 Condition C applies if one demand position indicator per bank is inoperable for one or more banks. The Condition C RAs require verification that all RPIs for the affected banks are operable and require verification that the most withdrawn rod and least withdrawn rod of the affected banks are less than or equal to 12 steps apart once per 8 hours. Alternatively, thermal power must be reduced to less than or equal to 50 percent RTP.

A Note is being added to SR 3.1.4.1 stating that this SR is not required to be performed for rods associated with an inoperable demand position indicator. The alignment limit is based on the demand position indicator. If the bank demand position indicator is inoperable, the SR cannot be performed.

Following modification of SR 3.1.4.1, Condition C of LCO 3.1.7 would be the applicable condition to be entered in the event of inoperable demand position indicators. The RAs associated with Condition C of LCO 3.1.7 provide the appropriate actions in this situation by requiring that the RPIs are operable and that the individual rods in the bank are not misaligned by more than 12 steps.

#### 3.4.2 Clarification of SR 3.1.4.1 and SR 3.1.7.1

LCO 3.1.4 requires that all shutdown and control rods shall be operable and individual indicated rod positions shall be within 24 steps of their group step counter demand position.

LCO 3.1.7 requires the RPI system and bank demand position indication to be operable.

SR 3.1.7.1 requires verification that each RPI agrees within 12 steps of the group demand position between 30 and 215 steps. This SR is performed once prior to criticality after each removal of the reactor head. Failure to meet an SR is considered a failure to meet the LCO per SR 3.0.1. The requirements of SRs must be satisfied in between performances of the surveillance test itself. If a control or shutdown rod is not within 24 steps of its bank demand position indication, then the requirements of both LCO 3.1.4 and LCO 3.1.7 are not met.

A Note is being added to SR 3.1.7.1 stating that this SR is not required to be performed for rods that are known not to meet LCO 3.1.4. If a rod is known not to be within 24 steps of the group demand position, LCO 3.1.4 provides the appropriate RAs. With one rod not within the alignment limit, Condition B requires either (1) verification of shutdown margin or boration until SDM is met; and a reduction in RTP; or (2) verification of shutdown margin or boration until SDM is met, and that hot channel factors must be verified within limits, and safety analyses must be re-evaluated to confirm continued operation is permissible. If more than one rod is misaligned, the SDM must be determined by verifying that the shutdown margin is within limits or by initiating boration to restore required SDM and shut down the plant.

The NRC staff reviewed the technical justification for the proposed changes provided in the Traveler TSTF-547 for logical reasoning, completeness and clarity. The purpose of the changes is to prescribe the appropriate Actions to be followed when equipment is inoperable.

TS 3.1.4 provides limits on rod alignment to ensure acceptable power peaking factors and local linear heat rates and an acceptable shutdown margin, all of which are initial conditions in the applicable safety analyses. It is appropriate to consolidate requirements associated with rod misalignments in this TS. TS 3.1.7 provides requirements for instrumentation to monitor rod position. The instrumentation is used to verify that the rod alignment limits in TS 3.1.4 are satisfied. Similarly, it is appropriate to consolidate requirements associated with instrumentation operability in this TS.

The NRC staff concludes that the clarifications to SRs 3.1.4.1 and 3.1.7.1 to specify configurations in which performance of the SRs is not required are appropriate. The TSs, as modified, continue to specify the minimum performance level of equipment needed for safe operation of the facility as an LCO, and continue to specify the appropriate remedial measures if the LCO is not met. The revised SRs 3.1.4.1 and 3.1.7.1 continue to be appropriate, because they ensure the necessary quality of systems is maintained. The NRC staff finds that the requirements of 10 CFR 50.36(c)(2) and 10 CFR 50.36(c)(3) continue to be met.

### 3.5 Eliminate an Unnecessary RA from LCO 3.1.7 Review

The NRC staff reviewed the justification for deletion of LCO 3.1.7, RA B.2, which requires monitoring and recording of reactor coolant average temperature (Tavg). RA B.2 is one of the RAs associated with LCO 3.1.7 Condition B. Condition B applies when more than one RPI per group is inoperable in one or more groups. RA B.1 requires that the control rods be placed in manual control immediately and existing RA B.4 requires restoring the inoperable position indicators to operable status such that a maximum of one RPI per group is inoperable within 24 hours.

The NRC staff has determined that RA B.2 provides no safety benefit for identifying trends in reactor coolant Tavg. This RA was intended to help assure that significant changes in power distribution and the ability to shut down the reactor are avoided. During normal steady state power operation, there is very little rod motion. LCO 3.1.7 RA B.1 and RA B.4 continue to apply when more than one RPI per group is inoperable. LCO 3.1.4 and LCO 3.1.7 provide the appropriate requirements for monitoring rod position and alignment and provide the appropriate actions, if a rod is misaligned. This provides the necessary verification that SDM is maintained. The nuclear instrumentation monitors neutron flux in the core providing indication of changes in power distribution. Therefore, the NRC staff concludes that RA B.2 of LCO 3.1.7 is unnecessary and can be deleted.

The NRC staff concludes that the proposed changes to LCO 3.1.7 are acceptable because the LCO continues to specify the minimum performance level of equipment needed for safe operation of the facility. As described in the preceding paragraph the appropriate remedial measures are prescribed when the LCO is not met. SRs are not being changed by the deletion of RA B.2. The NRC staff finds that the requirements of 10 CFR 50.36(c)(2) continue to be met.

### 3.6 Other Proposed Changes

The NRC staff found that the following changes are editorial in nature and do not change the TS requirements, and are therefore acceptable.

1. LCO 3.1.5 and LCO 3.1.6 contain a note modifying their Applicability that states "This LCO is not applicable while performing SR 3.1.4.2." The proposed change revises the Notes to state, "Not applicable to shutdown banks inserted while performing

SR 3.1.4.2” for LCO 3.1.5 and “Not applicable to control banks inserted while performing SR 3.1.4.2” for LCO 3.1.6. This change clarifies the note and does not alter its meaning.

2. TS 3.1.7 is revised to consistently use the defined abbreviation “RPI.” This affects the Actions Note, RA A.1, RA B.2, and RA C.1.
3. TS 3.1.7, Condition A, is revised from “for one or more groups” to the more standard terminology “in one or more groups,” and TS 3.1.7, Condition B is revised to include the phrase “in one or more groups” to be more consistent with the wording of Condition A.
4. TS 3.1.7, RA B.3 is redundant to RA A.1. RA B.3 is proposed to be deleted. Condition A applies when one RPI per group is inoperable and Condition B applies when more than one RPI per group is inoperable. Each entry into Condition B also requires entry into Condition A. Restating the RA is not necessary.
5. LCO 3.1.7, Condition C, is revised from “Indication for one demand position per bank inoperable for one or more banks” to “One or more demand position indicators per bank inoperable in one or more banks.” The proposed change makes the terminology consistent with the Note modifying the RAs.

The current TS 3.1.7 is modified by a Note which states, “Separate Condition entry is allowed for each inoperable RPI and each demand position indicator.” The Bases for the Note states that the Note is acceptable because the RAs for each condition provide appropriate compensatory actions for each inoperable indicator.

There is one demand position indicator per group of rods, two demand indicators per bank in those banks with two groups. The separate condition entry Note modifying the TS 3.1.7 Actions states that separate condition entry is allowed for inoperable demand position indicators which means that Condition C is applicable to more than one inoperable demand position indicator per bank. The proposed change makes the existing Condition C terminology consistent with the Note.

The regulation at 10 CFR 50.36(a)(1) states, in part: “A summary statement of the bases or reasons for such specifications shall also be included in the application, but shall not become part of the technical specifications.” Accordingly, the NRC staff determined that the proposed changes align the Prairie Island, Units 1 and 2, TSs with previously approved changes to the TSs, and do not impact the applicability or the conclusions presented in the SE of TSTF-547. The changes are, therefore, acceptable.

### 3.7 Variations from TSTF-547 Review

The NRC staff reviewed the variations from TSTF-547 proposed by the licensee. Most of the variations are editorial in nature; however, the licensee proposed some variations that are

intended to align the Prairie Island TSs with previously approved changes to the STSs as discussed below.

1. TSTF-547 deletes TS 3.1.4 RA B.1 to restore rod to within limit. This RA is not in Prairie Island TS. Therefore, the NRC staff finds it acceptable for the licensee to not add the RA B.1 proposed in TSTF-547.
2. TSTF-547 and standard TS 3.1.4 RA B.2 reduces Thermal Power to  $\leq 75\%$  RTP. The equivalent RA for the current Prairie Island TS is to reduce the High Neutron Flux Trip setpoint to  $\leq 85\%$ . The licensee proposes to reflect the TSTF and standard by changing RA B.2 to require a reduction of thermal power to  $\leq 75\%$ . In addition, the associated Completion Time for RA B.2 in the standard TS is 2 hours whereas the Completion Time in the Prairie Island TS is 8 hours. The licensee proposes to keep the existing Prairie Island RA B.2 Completion Time. The proposed change to the thermal power to  $\leq 75\%$  and frequency for performing TS 3.1.4 is consistent with the STSs.
3. TSTF-547 and standard TS 3.1.4 RA B.5 is, "Re-evaluate safety analyses and confirm results remain valid for duration of operation under these conditions." The equivalent RA for the current Prairie Island TS is, "Re-evaluate safety analyses and determine the THERMAL POWER for which the results remain valid for duration of operation under these conditions." The licensee proposes to keep the existing RA (renumbered). In addition, the associated RA B.5 Completion Time in the standard TS is 5 days whereas the RA B.5 Completion Time in the Prairie Island TS is 30 days. The licensee proposes to keep the existing Prairie Island RA B.5 Completion Time. The proposed change to the frequency for performing SR 3.1.4 is consistent with the STSs.
4. For TS 3.1.5 and TS 3.1.6, TSTF-547 moves a note from the Applicability section to the LCO section. The equivalent of this note in the Prairie Island TS 3.1.5 and TS 3.1.6 is already associated with the LCO in the Prairie Island TS. The LAR proposes to adopt the wording from TSTF-547 in the note. Therefore, the proposed change TS 3.1.5 and TS 3.1.6 is an editorial change.
5. TS 3.1.7 for Prairie Island TSs uses the term, "core power distribution measurement information" instead of referring to "movable incore detectors" as is done in the standard TS and in TSTF-547. Prairie Island license amendment numbers 201 (Unit 1) and 188 (Unit 2) permit the use of BEACON power distribution monitoring system or movable incore detectors for the purpose of rod position verification in the associated TS 3.1.7 RAs. Therefore, the proposed change TS 3.1.7 is an editorial change.
6. TS 3.1.7, Condition A: Prairie Island TS and TS Bases 3.1.7 will not include RA A.2.2 and will renumber RA A.2.1 to RA A.2. The Pressurized Water Reactor Owner's Group notified Tennessee Valley Authority of a generic error in TSTF-547, Revision 1. The TSTF includes a new RA A2.2 that requires the inoperable RPI to be returned to OPERABLE status prior to entering MODE 2 from MODE 3. This new RA A.2.2 is made irrelevant, as the logical "OR" connector would allow the licensee to transition from RA A.2.1 and RA A.2.2 into either RA A.1 or RA A.3 (which do not have that requirement), and thereby not have to restore the inoperable RPI to OPERABLE status. TSTF-547 proposed a



new RA A.2.2 that would require the inoperable DRPI to be restored to operable status prior to entering startup (MODE 2) from hot standby (MODE 3). The licensee provided justification that showed that this RA would never be limiting or implemented because the RAs are joined by a logical "OR," any one of the RAs may be chosen. In addition, when an LCO is not met, LCO 3.0.4.a allows entry into a MODE in which an LCO is applicable when the associated actions to be entered permit continued operation in the MODE for an unlimited period of time. Since the LCO permits continued operation with the specified RAs, entering startup from hot standby is allowed. Based on the above, the NRC staff agrees that not including a new RA A.2.2 is appropriate because it is unnecessary and could cause confusion.

7. TS 3.1.7 for Prairie Island uses the term manual control as is done in the standard and in TSTF-547. The standard TS includes RA B.1 to place control rods under manual control that is not part of Prairie Island TS. The licensee has determined that incorporating the RA to place control rods in manual is a prudent action and proposes to add this RA to the Prairie Island TS. The proposed change to the frequency for performing SR 3.1.7 is consistent with the STSs.
8. Current TS 3.1.7 Condition B, RA B.3, verifies the position of the rods and is deleted in TSTF-547. The equivalent proposed Prairie Island RA B.2 will not be deleted. The proposed Prairie Island RA B.2 includes the position verification from Condition C of the standard, which was incorporated in Prairie Island RA B.2. The proposed change to the frequency for performing SR 3.1.7 is consistent with the STSs.

The September 28, 2020, supplement provided two additional variations. These variations revised the Note in LCO 3.1.4 and added a Note to LCO 3.1.7. As discussed in Section 3.3 of this SE, the proposed changes continue to specify the minimum performance level of equipment needed for safe operation of the facility and continues to specify the appropriate remedial measures if the LCO is not met.

As summarized above, the NRC staff determined that the proposed variations are editorial in nature or align the Prairie Island, TSs with previously approved changes to the TSs, and do not impact the applicability or the conclusions presented in the SE of TSTF-547. The changes are, therefore, acceptable.

### 3.8 Summary of NRC Staff Conclusions

The regulations at 10 CFR 50.36 require that TSs will include items in specified categories, including LCOs and SRs. The proposed changes modify the LCOs, Conditions, RAs, Completion Times, and SRs applicable to control rod and shutdown rod insertion and alignment limits and the instrumentation to monitor rod position and alignment. The TSs continue to specify the LCOs and specify the remedial measures to be taken if one of these requirements is not satisfied. The TSs continue to specify the appropriate SRs for tests and inspections to ensure the necessary quality of affected structures, systems and components is maintained. The NRC staff finds that the proposed LCOs and SRs meet the requirements of 10 CFR 50.36(c)(2) and 50.36(c)(3), respectively.

#### 4.0 STATE CONSULTATION

In accordance with the Commission's regulations, the Minnesota State official was notified of the proposed issuance of the amendments on October 8, 2020. The State official had no comments.

#### 5.0 ENVIRONMENTAL CONSIDERATION

The amendments change the requirements with respect to installation or use of a facility component located within the restricted area as defined in 10 CFR Part 20 or change the surveillance requirements. The staff has determined that the amendments involve no significant increase in the amounts, and no significant change in the types, of any effluents that may be released offsite, and that there is no significant increase in individual or cumulative occupational radiation exposure. The Commission has previously issued a proposed finding that the amendments involve no significant hazards consideration and there has been no public comment on such finding (85 FR 10733). Accordingly, the amendments meet the eligibility criteria for categorical exclusion set forth in 10 CFR 51.22(c)(9). Pursuant to 10 CFR 51.22(b), no environmental impact statement or environmental assessment need be prepared in connection with the issuance of the amendments.

#### 6.0 CONCLUSION

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

Principal Contributor: Chris Jackson

Date of Issuance: November 18, 2020

SUBJECT: PRAIRIE ISLAND NUCLEAR GENERATING PLANT, UNITS 1 AND 2 - ISSUANCE OF AMENDMENT NOS. 233 AND 221 RE: ADOPTION OF TECHNICAL SPECIFICATIONS TASK FORCE (TSTF) TRAVELER TSTF-547, "CLARIFICATION OF ROD POSITION REQUIREMENTS" (EPID L-2019-LLA-0295) DATED NOVEMBER 18, 2020

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