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September 30, 2021

L-PI-21-032
10 CFR 50.90

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

Prairie Island Nuclear Generating Plant, Units 1 and 2
Docket Nos. 50-282 and 50-306
Renewed Facility Operating License Nos. DPR-42 and DPR-60

Response to Request for Additional Information RE: Amendment request to adopt TSTF-471 and 571-T for Prairie Island

References:

1) Letter (L-PI-21-007) from NSPM to the NRC, "Application to Revise Technical Specifications to Adopt TSTF-471, 'Eliminate Use of the Term CORE ALTERATIONS in ACTIONS and Notes'", dated April 19, 2021 (ADAMS Accession No. ML21109A385)

2) Email from the NRC to NSPM, "Request for Additional Information RE: Amendment request to adopt TSTF-471 and 571-T for Prairie Island", dated August 30, 2021 (ADAMS Accession No. ML21252A012)

In Reference 1, Northern States Power Company, a Minnesota corporation, doing business as Xcel Energy (hereafter "NSPM"), submitted a license amendment request to the Technical Specifications (TS) for the Prairie Island Nuclear Generating Plant (PINGP), Units 1 and 2. The proposed amendment would modify TS requirements to adopt TSTF-471, "Eliminate Use of the Term CORE ALTERATIONS in ACTIONS and Notes," and TSTF-571-T, "Revise Actions for Inoperable Source Range Neutron Flux Monitor." The NRC identified the need for additional information and provided the Request for Additional Information (RAI) in Reference 2. The enclosure to this letter provides NSPM's response to the NRC RAI.

The information provided in this letter does not alter the evaluations performed in accordance with 10 CFR 50.92 in Reference 1.

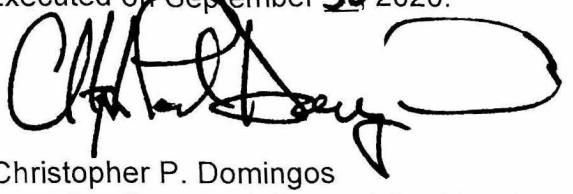
NSPM is notifying the State of Minnesota of this request by transmitting a copy of this letter and enclosures to the designated State Official.

Please contact Mr. Jeff Kivi at (612) 330-5788 or Jeffrey.L.Kivi@xcelenergy.com if there are any questions or if additional information is needed.

Summary of Commitments

This letter makes no new commitments and no revisions to existing commitments.

I declare under penalty of perjury, that the foregoing is true and correct.
Executed on September 30, 2020.



Christopher P. Domingos
Site Vice President, Prairie Island Nuclear Generating Plant
Northern States Power Company – Minnesota

Enclosure

cc: Administrator, Region III, USNRC
Project Manager, Prairie Island, USNRC
Resident Inspector, Prairie Island, USNRC
State of Minnesota

Response to Request for Additional Information

License Amendment Request to Revise Technical Specifications to Adopt TSTF-471, "Eliminate Use of the Term CORE ALTERATIONS in ACTIONS and Notes," and TSTF-571-T, "Revise Actions for Inoperable Source Range Neutron Flux Monitor"

1.0 BACKGROUND

In Reference 1, Northern States Power Company, a Minnesota corporation, doing business as Xcel Energy (hereafter "NSPM"), submitted a license amendment request to the Technical Specifications (TS) for the Prairie Island Nuclear Generating Plant (PINGP), Units 1 and 2. The proposed amendment would modify TS requirements to adopt TSTF-471, "Eliminate Use of the Term CORE ALTERATIONS in ACTIONS and Notes," and TSTF-571-T, "Revise Actions for Inoperable Source Range Neutron Flux Monitor." The NRC identified the need for additional information and provided the Request for Additional Information (RAI) in Reference 2. The following section provides NSPM's response to the NRC RAI.

2.0 RESPONSES TO REQUEST FOR ADDITIONAL INFORMATION

2.1 RAI-1

The amendment proposes to remove Required Action C.2 from LCO 3.9.3. This Required Action is included in the PINGP technical specifications, but not in the standard technical specifications for Westinghouse plants. Since Technical Specification Task Force (TSTF) Traveler TSTF-471 was written to modify standard technical specifications (TSs), it does not refer to this Required Action.

This action requires suspension of core alterations when one required core subcritical neutron flux monitor audible count rate circuit is inoperable. However, the basis for this limiting condition of operation states that audible count rate circuits serve to "alert the operator in containment in the event of a dilution accident or improperly loaded fuel assembly," as noted in Section 3.1 of the amendment request. The amendment request also stated that considering an improperly loaded fuel assembly in discussion of the audible count rate circuit is not consistent with the rest of the PINGP TS 3.9.3 bases.

Request

Describe the portions of PINGP's licensing basis that consider improper loading of a fuel assembly and explain why these basis support removal of Required Action C.2.

NSPM Response to RAI-1

NSPM reviewed the TS Bases and USAR and determined that improperly loading a fuel assembly in the reactor vessel is only addressed in the PINGP TS 3.9.3 Bases for the Limiting Condition of Operation and without reference to any safety analyses. The

USAR includes an improperly loaded fuel assembly analysis in the spent fuel pool, but this is not relevant to TS 3.9.3. In addition, none of the current Required Actions associated with TS 3.9.3 provide a tie to a misloaded fuel assembly in the reactor vessel within the TS Bases.

Furthermore, in 2016, the TS Task Force (TSTF) approved TSTF-555-T, "Clarify the Nuclear Instrumentation Bases Regarding the Detection of an Improperly Loaded Fuel Assembly," to correct an error in the Standard TS Bases. Specifically, TSTF-555-T notes a Standard TS Bases statement that the source range neutron flux monitors can detect a fuel assembly misloaded into the reactor vessel is neither consistent with the licensing basis nor supported by operating experience or reactor physics. NSPM will be revising TS Bases to incorporate TSTF-555-T in accordance with TS 5.5.12, "Technical Specifications (TS) Bases Control Program". A revision to the TS 3.9.3 Bases markups provided with Reference 1 is attached for information only.

2.2 RAI-2

Technical or Regulatory Issue

In the current TSs, Required Action C.2 of LCO 3.9.3 requires that core alterations be suspended if one required core subcritical neutron flux monitor audible count rate circuit is inoperable. The current LAR proposes to remove this Required Action. Section "TS 3.9.3, Required Actions A.1 and C.2" of the LAR, states that this Required Action has no effect on the initial conditions or mitigation of a boron dilution accident. However, as written, the proposed change would allow for positive reactivity additions when in Condition C. This contradicts the statement in section "TS 3.9.1" of the LAR that suspending positive reactivity additions is the only action needed to mitigate a boron dilution event. It also appears to be inconsistent with TSTF-471, which explains that suspending core alterations provides no safety benefit if Required Actions that suspend core alterations also suspend movement of recently irradiated fuel. The proposed Required Actions in Condition C would not require suspension of movement of recently irradiated fuel.

Request

Please clarify why a requirement to suspend positive reactivity additions or movement of recently irradiated fuel is not needed to replace the requirement to suspend core alterations in Condition C of LCO 3.9.3, and why this change would have no effect on the initial conditions or mitigation of a boron dilution accident in this condition.

NSPM Response to RAI-2
A requirement to suspend positive reactivity additions or movement of recently irradiated fuel is not needed to replace the requirement to suspend core alterations for an inoperable audio count rate circuit. The proposed change has no effect on the initial conditions or mitigation of boron dilution accident with the audible count rate circuit inoperable. As noted in Reference 1, movement of control rods or fuel do not affect the

initial conditions of a boron dilution accident as it is assumed that the control rods and fuel are in the most adverse conditions with a large safety margin (keff ≤ 0.95). Thus, the only Required Action needed for TS 3.9.3, Condition C, audible count rate circuit inoperable, is to isolate unborated water sources to preclude a dilution accident because the potential reactivity issues resulting from moving fuel are bounded by having the correct minimum refueling boron concentration. As part of the Startup and Operations Report, Westinghouse calculates a minimum refueling boron concentration. The minimum refueling boron concentration is calculated to ensure that K_{eff} will remain less than 0.95 with all rods out and any single fuel assembly temporarily stored in an arbitrary location in the reactor vessel during the fuel shuffle.

This does not contradict the need for a Required Actions for TS 3.9.1 to suspend positive reactivity additions. The difference between TS 3.9.1 and TS 3.9.3 is that, when in Limiting Condition for Operation (LCO) 3.9.1, boron concentration is not within limits specified in the Core Operating Limits Report (COLR) and positive reactivity additions need to be suspended to protect shutdown margin. The TS 3.9.3 Required Action C.1 to isolate unborated water sources precludes a boron dilution event and is sufficient by itself to protect shutdown margin, as long as LCO 3.9.1 is met, because having boron concentration within the limits specified in the COLR ensures shutdown margin is protected regardless of the configurations of fuel in the vessel.

As noted in response to RAI-1, the subcritical neutron flux monitors will not aid the detection of a misloaded fuel assembly and, as such, neither will the audible countrate circuit. So, with K_{eff} less than 0.95 and refueling boron concentration within its analyzed limits, there is sufficient shutdown margin to permit fuel movement with an inoperable audible countrate circuit. Other positive reactivity additions (specifically, boron dilution) are precluded by Required Action C.1 to isolate unborated water sources.

3.0 REFERENCES

1. Letter (L-PI-21-007) from NSPM to the NRC, “Application to Revise Technical Specifications to Adopt TSTF-471, ‘Eliminate Use of the Term CORE ALTERATIONS in ACTIONS and Notes’”, dated April 19, 2021 (ADAMS Accession No. ML21109A385)

2. Email from the NRC to NSPM, “Request for Additional Information RE: Amendment request to adopt TSTF-471 and 517-T for Prairie Island”, dated August 30, 2021 (ADAMS Accession No. ML21252A012)

ENCLOSURE, ATTACHMENT

PRAIRIE ISLAND NUCLEAR GENERATING PLANT, UNITS 1 AND 2

Response to Request for Additional Information

License Amendment Request

TSTF-471, "Eliminate Use of the Term CORE ALTERATIONS in ACTIONS and Notes"

REVISED TECHNICAL SPECIFICATION 3.9.3 BASES PAGES (MARKUP)

FOR INFORMATION ONLY

(4 Pages Follow)

B 3.9 REFUELING OPERATIONS

B 3.9.3 Nuclear Instrumentation

BASES

BACKGROUND

Core subcritical neutron flux monitors are used during refueling operations to monitor the core reactivity condition. The installed core subcritical neutron flux monitors are part of the Nuclear Instrumentation System (NIS). These detectors (N-31, N-32, N-51, and N-52) are located external to the reactor vessel and detect neutrons leaking from the core.

The installed core subcritical neutron flux monitors are:

a. BF3 detectors operating in the proportional region of the gas filled detector characteristic curve; or

b. Fission chambers.

The detectors monitor the neutron flux in counts per second. The instrument range used for monitoring changes in subcritical multiplication typically covers six decades of neutron flux. The detectors provide continuous visual indication in the control room. The installed BF3 neutron flux monitors provide an audible indication to alert operators in containment to a possible dilution accident. The NIS is designed in accordance with the criteria presented in Reference 1.

APPLICABLE SAFETY ANALYSES

Two OPERABLE core subcritical neutron flux monitors are required to provide a signal to alert the operator to unexpected changes in core reactivity such as with a boron dilution accident (Ref. 2) ~~or an improperly loaded fuel assembly~~.

The core subcritical neutron flux monitors satisfy Criterion 3 of 10 CFR 50.36(c)(2)(ii).

BASES (continued)

LCO

This LCO requires that two core subcritical neutron flux monitors, capable of monitoring subcritical neutron flux, be OPERABLE to ensure that redundant monitoring capability is available to detect changes in core reactivity. Neutron detectors N-31, N-32, N-51 and N-52 may be used to satisfy this LCO requirement.

This LCO also requires that one audible countrate circuit, associated with either N-31 or N-32, be OPERABLE to ensure that audible indication is available to alert the operator in containment in the event of a dilution accident ~~or improperly loaded fuel assembly~~.

APPLICABILITY

In MODE 6, the core subcritical neutron flux monitors must be OPERABLE to determine changes in core reactivity. There are no other direct means available to check core reactivity levels. In MODES 2, 3, 4, and 5, the installed detectors and circuitry are also required to be OPERABLE by LCO 3.3.1, "Reactor Trip System (RTS) Instrumentation."

ACTIONS

A1 and A.2

positive reactivity additions and movement of fuel, sources, and reactivity control components within the reactor vessel

With only one required core subcritical neutron flux monitor OPERABLE, redundancy has been lost. Since these instruments are the only direct means of monitoring core reactivity conditions, ~~CORE ALTERATIONS and introduction of coolant into the RCS with boron concentration less than required to meet the minimum boron concentration of LCO 3.9.1~~ must be suspended immediately. ~~Suspending the introduction of coolant into the RCS with boron concentration less than required to meet the minimum boron concentration of LCO 3.9.1 is required to assure continued safe operation. Introduction of coolant inventory must be from sources that have a boron concentration greater than that required in the RCS for minimum SDM or refueling boron concentration. This may result in an overall reduction in RCS boron concentration, but provides acceptable margin to maintaining subcritical operation.~~

BASES

ACTIONS

A.1 and A.2 (continued)

Introduction of temperature changes, including temperature increases when operating with a positive moderator temperature coefficient (MTC), must also be evaluated to not result in reducing SDM below the required value. Performance of Required Action A.1 shall not preclude completion of movement of a component to a safe position.

Insert A

B.1

With no required core subcritical neutron flux monitor OPERABLE, action to restore a monitor to OPERABLE status shall be initiated immediately. Once initiated, action shall be continued until a required core subcritical neutron flux monitor is restored to OPERABLE status.

B.2

With no required core subcritical neutron flux monitor OPERABLE, there are no direct means of detecting changes in core reactivity. However, since ~~CORE ALTERATIONS and~~ positive reactivity additions that could lead to reducing SDM below the required value are not to be made, the core reactivity condition is stabilized until the core subcritical neutron flux monitors are OPERABLE. This stabilized condition is determined by performing SR 3.9.1.1 to ensure that the required boron concentration exists.

The Completion Time of once per 12 hours is sufficient to obtain and analyze a reactor coolant sample for boron concentration and ensures that unplanned changes in boron concentration would be identified. The 12 hour Frequency is reasonable, considering the low probability of a change in core reactivity during this time period.

Insert A

Suspending the movement of fuel, sources, and reactivity control components ensures that positive reactivity is not inadvertently added to the reactor core while the source range neutron flux monitor is inoperable. Required Action A.2 is modified by a Note that states that fuel assemblies, sources, and reactivity control components may be moved if necessary to facilitate repair or replacement of the inoperable source range neutron flux monitor. It may be necessary to move these items away from the locations in the core close to the source range neutron flux monitor to minimize personnel radiation dose during troubleshooting or repair. The Note also permits completion of movement of a component to a safe position, should the source range neutron flux monitor be discovered inoperable during component movement.