Xcel Energy®

Monticello Nuclear Generating Plant
2807 W County Road 75
Monticello, MN 55362

September 18, 2012

L-MT-12-074
10 CFR 50.90

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

Monticello Nuclear Generating Plant
Docket 50-263
Renewed Facility Operating License No. DPR-22

License Amendment Request: Adoption of Technical Specifications Task Force (TSTF) Traveler TSTF–476, Revision 1, "Improved BPWS Control Rod Insertion Process (NEDO–33091)"

Pursuant to 10 CFR 50.90, Northern States Power Company – Minnesota (NSPM), doing business as Xcel Energy, Inc., proposes to revise Monticello Nuclear Generating Plant (MNGP) Technical Specifications (TS) Sections 3.1.6, "Rod Pattern Control," and 3.3.2.1, "Control Rod Block Instrumentation," to allow MNGP to reference a new Banked Position Withdrawal Sequence (BPWS) shutdown sequence in the TS Bases. In addition, a footnote is revised in Table 3.3.2.1–1, "Control Rod Block Instrumentation," to allow operators to bypass the rod worth minimizer if conditions for the optional BPWS shutdown process are satisfied.

The changes are consistent with NRC approved Industry Technical Specification Task Force (TSTF) Standard Technical Specification Change Traveler, TSTF–476, Revision 1, "Improved BPWS Control Rod Insertion Process (NEDO–33091)." The availability of this TS improvement was announced in the *Federal Register* on May 23, 2007 (72 FR 29004) as part of the consolidated line item improvement process (CLIIP).

Enclosure 1 provides a description and assessment of the proposed changes and includes the technical evaluation and associated no significant hazards determination and environmental evaluation. Enclosure 2 provides a marked-up copy of the existing TS pages showing the proposed changes. Enclosure 3 provides a marked-up copy of the TS Bases pages showing the proposed changes.

NSPM requests approval of this license amendment request by September 15, 2013, with the amendment being implemented within 60 days of NRC approval.

In accordance with 10 CFR 50.91(a)(1), the analysis about the issue of no significant hazards consideration using the standards in 10 CFR 50.92 is being provided to the Commission.

The MNGP Plant Operations Review Committee has reviewed this application. In accordance with 10 CFR 50.91, a copy of this application, with enclosures, is being provided to the designated Minnesota Official.

Should you have questions regarding this letter, please contact Mr. Richard Loeffler at (763) 295-1247.

Summary of Commitments

This letter makes two new commitments as discussed in Section 5.1 of Enclosure 1, and no revisions to existing commitments:

- Before reducing power to the low power setpoint (LPSP), operators shall confirm control rod coupling integrity for all rods that are fully withdrawn. Control rods that have not been confirmed coupled and which are in intermediate positions must be fully inserted prior to power reduction to the LPSP. No action is required for fully-inserted control rods.

  If a shutdown is required and all rods which are not confirmed coupled cannot be fully inserted prior to the power dropping below the LPSP, then the original/ standard BPWS must be adhered to.

- After reactor power drops below the LPSP, rods may be inserted from notch position 48 to notch position 00 without stopping at intermediate positions. However, it is recommended that operators insert control rods in the same order as specified for the original/standard BPWS as much as reasonably possible. When in the process of shutting down following improved BPWS with the power below the LPSP, no control rod shall be withdrawn unless the control rod pattern is in compliance with standard BPWS requirements.

I declare under penalty of perjury that the foregoing is true and correct.
Executed on September 18, 2012.

Mark A. Schimmel
Site Vice President, Monticello Nuclear Generating Plant
Northern States Power Company - Minnesota

Enclosures (3)

cc: Administrator, Region III, USNRC
Project Manager, Monticello, USNRC
Resident Inspector, Monticello, USNRC
Minnesota Department of Commerce

ENCLOSURE 1

MONTICELLO NUCLEAR GENERATING PLANT

LICENSE AMENDMENT REQUEST

ADOPTION OF TECHNICAL SPECIFICATIONS TASK FORCE (TSTF) TRAVELER TSTF–476, REVISION 1, "IMPROVED BPWS CONTROL ROD INSERTION PROCESS (NEDO–33091)"

DESCRIPTION OF CHANGES

(6 pages follow)

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DESCRIPTION OF CHANGES

ADOPTION OF TECHNICAL SPECIFICATIONS TASK FORCE (TSTF) TRAVELER TSTF–476, REVISION 1, "IMPROVED BPWS CONTROL ROD INSERTION PROCESS (NEDO–33091)"

1.0 SUMMARY DESCRIPTION

Pursuant to 10 CFR 50.90, Northern States Power Company – Minnesota (NSPM), doing business as Xcel Energy Inc., proposes to revise Monticello Nuclear Generating Plant (MNGP) Technical Specification (TS). The proposed changes would revise the Bases section of TS 3.1.6, "Rod Pattern Control," and 3.3.2.1, "Control Rod Block Instrumentation," along with TS Table 3.3.2.1-1, "Control Rod Block Instrumentation," to allow reference to an improved, optional Banked Position Withdrawal Sequence (BPWS) for use during reactor shutdown.

The new BPWS is described in Topical Report NEDO-33091-A, Revision 2, "Improved BPWS Control Rod Insertion Process," dated July 2004, and approved by the NRC by Safety Evaluation (SE) dated June 16, 2004. Technical Specification Task Force (TSTF) change traveler TSTF-476, Revision 1, "Improved BPWS Control Rod Insertion Process (NEDO-33091)" (Reference 1) was announced for availability in the *Federal Register* on May, 23, 2007 [72 FR 29004] as part of the Consolidated Line Item Improvement Process (CLIIP) (Reference 2).

2.0 PROPOSED CHANGES

Consistent with NRC-approved TSTF–476, Revision 1, the proposed TS and Bases changes include:

- Revised TS Section 3.1.6 Bases to allow use of an optional BPWS during plant shutdown.

- Revised TS Section 3.3.2.1 Bases to allow bypassing of the rod worth minimizer during the optional BPWS shutdown sequence.

- Revised TS Table 3.3.2.1–1, "Control Rod Block Instrumentation," which revises a footnote that allows operators to bypass the rod worth minimizer if conditions for the optional BPWS shutdown process are satisfied.

A mark-up of the proposed TS changes is provided in Enclosure 2. Enclosure 3 provides a marked-up copy of the TS Bases pages showing the proposed changes.

3.0 BACKGROUND

The background for this application is as stated in the model Safety Evaluation (SE) in NRC's Notice of Availability published in the *Federal Register* on May 23, 2007 (72 FR 29004), the NRC Notice for Comment published in the *Federal Register* on May 3, 2006 (71 FR 26118), and TSTF-476, Revision 1.

4.0 TECHNICAL ANALYSIS

NSPM has reviewed NEDO-33091-A, Revision 2, (Reference 4) and the staff's SE dated June 16, 2004, as well as TSTF-476, Revision 1, and the model SE published in the *Federal Register* on May 23, 2007 (72 FR 29004) as part of the CLIIP Notice for Comment. NSPM has applied the methodology in NEDO-33091-A, Revision 2 to develop the proposed TS changes. NSPM has also concluded that the justifications presented in TSTF-476, Revision 1 and the model SE prepared by the NRC staff are applicable to MNGP, and justify this amendment for the incorporation of the changes to the MNGP Technical Specifications.

5.0 REGULATORY ANALYSIS

A description of this proposed change and its relationship to applicable regulatory requirements and guidance was provided in the NRC Notice of Availability published on May 23, 2007 (72 FR 29004), the NRC Notice for Comment published on May 3, 2006 (71 FR 26118) (Reference 3), and TSTF–476, Revision 1.

5.1 Regulatory Commitments

As discussed in the model SE published in the *Federal Register* on May 23, 2007 (72 FR 29004) for this Technical Specifications improvement, the following plant-specific verification/commitments were performed. The safety evaluation for NEDO-33091-A explained that the potential for a control rod drop accident (CRDA) will be eliminated by the following changes to the operational procedures, which NSPM will commit to make prior to implementation:

1. Before reducing power to the low power setpoint (LPSP), operators shall confirm control rod coupling integrity for all rods that are fully withdrawn. Control rods that have not been confirmed coupled and which are in intermediate positions must be fully inserted prior to power reduction to the LPSP. No action is required for fully-inserted control rods.

   If a shutdown is required and all rods which are not confirmed coupled cannot be fully inserted prior to the power dropping below the LPSP, then the original/ standard BPWS must be adhered to. The original/standard BPWS can be found in Licensing Topical Report (LTR) NEDO-21231, "Banked Position Withdrawal Sequence," January 1977, and is referred to in NUREG-1433 and NUREG-1434.

2. After reactor power drops below the LPSP, rods may be inserted from notch position 48 to notch position 00 without stopping at intermediate positions. However, GE Nuclear Energy recommends that operators insert control rods in the same order as specified for the original/standard BPWS as much as reasonably possible. If a plant is in the process of shutting down following improved BPWS with the power below the LPSP, no control rod shall be withdrawn unless the control rod pattern is in compliance with standard BPWS requirements.

In addition to the procedure changes specified above, the staff previously concluded, based on its review of NEDO–33091–A, that no single failure of the boiling water reactor control rod drive (CRD) mechanical or hydraulic system can cause a control rod to drop completely out of the reactor core during the shutdown process. Therefore, the proper use of the improved BPWS will prevent a CRDA from occurring while power is below the LPSP.

NSPM has verified, in accordance with NEDO–33091–A, Revision 2, that no single failure of the boiling water reactor CRD mechanical or hydraulic system can cause a control rod to drop completely out of the reactor core during the shutdown process.

The model Safety Evaluation discuss the applicable regulatory requirements and guidance, including the 10 CFR 50, Appendix A, General Design Criteria (GDC). MNGP was designed largely before the publishing of the 70 General Design Criteria (GDC) for Nuclear Power Plant Construction Permits proposed by the Atomic Energy Commission (AEC) for public comment in July 1967, and constructed prior to the 1971 publication of the 10 CFR 50, Appendix A, GDC. As such, MNGP was not licensed to the Appendix A, GDC.

The MNGP USAR, Section 1.2, lists the Principal Design Criteria (PDC) for the design, construction and operation of the plant. MNGP USAR Appendix E provides a plant comparative evaluation to the 70 proposed AEC design criteria. It was concluded that the plant conforms to the intent of the GDC. The applicable GDC and PDC are discussed below.

- PDC 1.2.2 – Reactor Core

d. Power excursions which could result from any credible reactivity addition accident do not cause damage, either by motion or rupture, to the reactor vessel or impair operation of required safeguards.

The applicable 70 Draft AEC General Design Criteria (AEC-GDC) are:

- Criterion 31 - Reactivity Control Systems Malfunction (Category B)

The reactivity control systems shall be capable of sustaining any single malfunction, such as unplanned continuous withdrawal (not ejection) of a control rod, without

causing a reactivity transient which could result in exceeding acceptable fuel damage limits.

- Criterion 32 - Maximum Reactivity Worth of Control Rods (Category A)

Limits, which include considerable margin, shall be placed on the maximum reactivity worth of control rods or elements and on rates at which reactivity can be increased to ensure that the potential effects of a sudden or large change of reactivity cannot (a) rupture the reactor coolant pressure boundary or (b) disrupt the core, its support structures, or other vessel internals sufficiently to impair the effectiveness of emergency core cooling.

As discussed in the model Safety Evaluation for TSTF-476, Rev. 1 (72 FR 29004), 10 CFR 50, Appendix A, Criterion 28 states that the reactivity control systems shall be designed with appropriate limits on the potential amount and rate of reactivity increase to assure that the effects of postulated reactivity accidents can neither (1) result in damage to the reactor coolant pressure boundary greater than limited local yielding nor (2) sufficiently disturb the core, its support structures or other reactor pressure vessel internals to impair significantly the capability to cool the core. The NRC staff concluded that proper use of the improved BPWS will prevent a Control Rod Drop Accident (CRDA) from occurring while power is below the Low Power Setpoint (LPSP). The proposed TS changes do not alter the means of compliance with GDC 28.

NSPM has evaluated the proposed changes against the applicable regulatory requirements and acceptance criteria. The proposed TS changes will continue to assure that the design requirements and acceptance criteria for MNGP are met.

6.0 NO SIGNIFICANT HAZARDS CONSIDERATION

NSPM has reviewed the proposed no significant hazards consideration determination published in the *Federal Register* on May 23, 2007 (72 FR 29004) as part of the CLIIP. NSPM has concluded that the proposed determination presented in the notice is applicable to MNGP, and the determination is hereby incorporated by reference to satisfy the requirements of 10 CFR 50.91 (a).

7.0 ENVIRONMENTAL EVALUATION

NSPM has reviewed the environmental consideration included in the model SE published in the *Federal Register* on May 23, 2007 (72 FR 29004) as part of the CLIIP. NSPM has concluded that the staff's findings presented therein are applicable to MNGP and the determination is hereby incorporated by reference for this application.

8.0 REFERENCES

1. NRC Approved Technical Specification Task Force (TSTF) Improved Standard Technical Specification Change Traveler, TSTF- 476, Revision 1, "Improved BPWS Control Rod Insertion Process (NEDO-33091)".

2. Federal Register Notice published on May 23, 2007 [72 FR 29004], NRC Notice of Availability of Model Safety Evaluation and Model License Amendment Request on Technical Specification Improvement Regarding Use of the Improved Banked Position Withdrawal Sequence for General Electric Boiling Water Reactors Using the Consolidated Line Item Improvement Process.

3. Federal Register Notice published on May 3, 2006 [71 FR 26118], NRC Notice of Opportunity To Comment on Model Safety Evaluation and Model License Amendment Request on Technical Specification Improvement Regarding Use of the Improved Bank Position Withdrawal Sequence for General Electric Boiling Water Reactors Using the Consolidated Line Item Improvement Process.

4. Licensing Topical Report NEDO-33091-A, Revision 2, "Improved BPWS Control Rod Insertion Process," July, 2004, including the staff's Safety Evaluation dated June 16, 2004.

ENCLOSURE 2

MONTICELLO NUCLEAR GENERATING PLANT

LICENSE AMENDMENT REQUEST

ADOPTION OF TECHNICAL SPECIFICATIONS TASK FORCE (TSTF) TRAVELER TSTF–476, REVISION 1, "IMPROVED BPWS CONTROL ROD INSERTION PROCESS (NEDO–33091)"

MARKED-UP TECHNICAL SPECIFICATION PAGES

(2 pages follow)

Table 3.3.2.1-1 (page 1 of 1)
Control Rod Block Instrumentation

	FUNCTION	APPLICABLE MODES OR OTHER SPECIFIED CONDITIONS	REQUIRED CHANNELS	SURVEILLANCE REQUIREMENTS	ALLOWABLE VALUE
1.	Rod Block Monitor				
	a. Low Power Range - Upscale	(a)	2	SR 3.3.2.1.1 SR 3.3.2.1.4[(h)(i)] SR 3.3.2.1.5	As specified in COLR
	b. Intermediate Power Range - Upscale	(b)	2	SR 3.3.2.1.1 SR 3.3.2.1.4[(h)(i)] SR 3.3.2.1.5	As specified in COLR
	c. High Power Range - Upscale	(c), (d)	2	SR 3.3.2.1.1 SR 3.3.2.1.4[(h)(i)] SR 3.3.2.1.5	As specified in COLR
	d. Inop	(d), (e)	2	SR 3.3.2.1.1	NA
2.	Rod Worth Minimizer	1[(f)], 2[(f)]	1	SR 3.3.2.1.2 SR 3.3.2.1.3 SR 3.3.2.1.6 SR 3.3.2.1.8	NA
3.	Reactor Mode Switch - Shutdown Position	(g)	2	SR 3.3.2.1.7	NA

(a) THERMAL POWER ≥ 30% and < 65% RTP and MCPR is below the limit specified in COLR.

(b) THERMAL POWER ≥ 65% and < 85% RTP and MCPR is below the limit specified in COLR.

(c) THERMAL POWER ≥ 85% and < 90% RTP and MCPR is below the limit specified in COLR.

(d) THERMAL POWER ≥ 90% RTP and MCPR is below the limit specified in COLR.

(e) THERMAL POWER ≥ 30% and < 90% RTP and MCPR is below the limit specified in COLR.

(f) With THERMAL POWER ≤ 10% RTP.

Insert "1" Attached

(g) Reactor mode switch in the shutdown position.

(h) If the as-found channel setpoint is not the Nominal Trip Setpoint (NTSP) but is conservative with respect to the Allowable Value, then the channel shall be evaluated to verify that it is functioning as required before returning the channel to service.

(i) The instrument channel setpoint shall be reset to the Nominal Trip Setpoint at the completion of the surveillance; otherwise, the channel shall be declared inoperable. The NTSP shall be specified in the COLR. The methodology used to determine the NTSP is specified in the Technical Requirements Manual.

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TS Table 3.3.2.1-1, Control Rod Block Instrumentation

Insert 1 (Note (f))

, except during the reactor shutdown process if the coupling of each withdrawn control rod has been confirmed.

ENCLOSURE 3

MONTICELLO NUCLEAR GENERATING PLANT

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MARKED-UP TECHNICAL SPECIFICATION BASES PAGES

(9 pages follow)

B 3.1 REACTIVITY CONTROL SYSTEMS

B 3.1.6 Rod Pattern Control

BASES

BACKGROUND

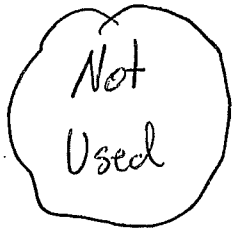
Control rod patterns during startup conditions are controlled by the operator and the rod worth minimizer (RWM) (LCO 3.3.2.1, "Control Rod Block Instrumentation"), so that only specified control rod sequences and relative positions are allowed over the operating range of all control rods inserted to 10% RTP. The sequences limit the potential amount of reactivity addition that could occur in the event of a Control Rod Drop Accident (CRDA).

This Specification assures that the control rod patterns are consistent with the assumptions of the CRDA analyses of References 1, 2, and 3.

APPLICABLE SAFETY ANALYSES

The analytical methods and assumptions used in evaluating the CRDA are summarized in References 1, 2, and 3. CRDA analyses assume that the reactor operator follows prescribed withdrawal sequences. These sequences define the potential initial conditions for the CRDA analysis. The RWM (LCO 3.3.2.1) provides backup to operator control of the withdrawal sequences to ensure that the initial conditions of the CRDA analysis are not violated.

Prevention or mitigation of positive reactivity insertion events is necessary to limit the energy deposition in the fuel, thereby preventing significant fuel damage which could result in the undue release of radioactivity. Since the failure consequences for UO_2 have been shown to be insignificant below fuel energy depositions of 300 cal/gm (Ref. 4), the fuel design limit of 280 cal/gm provides a margin of safety from significant core damage which would result in release of radioactivity (Ref. 5). Generic evaluations (Refs. 6 and 7) of a design basis CRDA (i.e., a CRDA resulting in a peak fuel energy deposition of 280 cal/gm) have shown that if the peak fuel enthalpy remains below 280 cal/gm, then the maximum reactor pressure will be less than the required ASME Code limits (Ref. 8) and the calculated offsite doses will be well within the required limits (Ref. 9).



Control rod patterns analyzed in Reference 1 follow the banked position withdrawal sequence (BPWS). The BPWS is applicable from the condition of all control rods fully inserted to 10% RTP (Ref. 2). For the BPWS, the control rods are required to be moved in groups, with all control rods assigned to a specific group required to be within specified banked positions (e.g., between notches 08 and 12). The banked positions are established to minimize the maximum incremental control rod worth without being overly restrictive during normal plant operation.

BASES

APPLICABLE SAFETY ANALYSES (continued)

Insert "2" Attached

Generic analysis of the BPWS (Ref. 1) has demonstrated that the 280 cal/gm fuel design limit will not be violated during a CRDA while following the BPWS mode of operation. The generic BPWS analysis (Ref. 10) also evaluates the effect of fully inserted, inoperable control rods not in compliance with the sequence, to allow a limited number (i.e., eight) and distribution of fully inserted, inoperable control rods.

Rod pattern control satisfies Criterion 3 of 10 CFR 50.36(c)(2)(ii).

LCO

Compliance with the optional BPWS control rod insertion process prevents a CRDA from occurring.

Compliance with the prescribed control rod sequences minimizes the potential consequences of a CRDA by limiting the initial conditions to those consistent with the BPWS analysis. This LCO only applies to OPERABLE control rods. For inoperable control rods required to be inserted, separate requirements are specified in LCO 3.1.3, "Control Rod OPERABILITY," consistent with the allowances for inoperable control rods in the BPWS.

APPLICABILITY

In MODES 1 and 2, when THERMAL POWER is ≤ 10% RTP, the CRDA is a Design Basis Accident and, therefore, compliance with the assumptions of the safety analysis is required. When THERMAL POWER is > 10% RTP, there is no credible control rod configuration that results in a control rod worth that could exceed the 280 cal/gm fuel design limit during a CRDA (Ref. 2). In MODES 3 and 4, the reactor is shut down and the control rods are not able to be withdrawn since the reactor mode switch is in the shutdown position and a control rod block is applied, therefore a CRDA is not postulated to occur. In MODE 5, since the reactor is shut down and only a single control rod can be withdrawn from a core cell containing fuel assemblies, adequate SDM ensures that the consequences of a CRDA are acceptable, since the reactor will remain subcritical with a single control rod withdrawn.

ACTIONS

A.1 and A.2

With one or more OPERABLE control rods not in compliance with the prescribed control rod sequence, actions may be taken to either correct the control rod pattern or declare the associated control rods inoperable within 8 hours. Noncompliance with the prescribed sequence may be the result of "double notching," drifting from a control rod drive cooling water transient, leaking scram valves, or a power reduction to ≤ 10% RTP before establishing the correct control rod pattern. The number of OPERABLE control rods not in compliance with the prescribed sequence is limited to eight, to prevent the operator from attempting to correct a control rod pattern that significantly deviates from the prescribed sequence.

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Bases 3.1.6, Rod Pattern Control

Insert 2 (Bases 3.1.6, Applicable Safety Analyses)

When performing a shutdown of the plant, an optional BPWS control rod sequence (Ref. 11) may be used. Before reducing power to the low power setpoint (LPSP), control rod coupling integrity shall be confirmed for all rods that are fully withdrawn. Control rods that have not been confirmed coupled and which are in intermediate positions must be fully inserted prior to power reduction to the LPSP. No action is required for fully-inserted control rods. If a shutdown is required and all rods which are not confirmed coupled cannot be fully inserted prior to the power dropping below the LPSP, then the original BPWS must be adhered to. The rods may be fully inserted without the need to stop at intermediate positions since the possibility of a CRDA is eliminated by the confirmation that withdrawn control rods are coupled (Ref. 11). It is recommended that control rods be inserted in the same order as specified for the original BPWS as much as reasonably possible. When in the process of shutting down following optional BPWS with the power below the LPSP, no control rod shall be withdrawn unless the control rod pattern is in compliance with original BPWS requirements.

When using the Reference 11 control rod sequence for shutdown, the rod worth minimizer may be bypassed in accordance with the allowance provided in the Applicability Note for the Rod Worth Minimizer in Table 3.3.2.1-1.

In order to use the Reference 11 BPWS shutdown process, an extra check is required in order to consider a control rod to be "confirmed" to be coupled. This extra check ensures that no Single Operator Error can result in an incorrect coupling check. For purposes of this shutdown process, the method for confirming that control rods are coupled varies depending on the position of the control rod in the core. Details on this coupling confirmation requirement are provided in Reference 11. If the requirements for use of the BPWS control rod insertion process contained in Reference 11 are followed, the plant is considered to be in compliance with BPWS requirements, as required by LCO 3.1.6.

BASES

REFERENCES

1. NEDE-24011-P-A, "General Electric Standard Application for Reactor Fuel" (revision specified in Specification 5.6.3).

2. Letter from T.A. Pickens (BWROG) to G.C. Lainas (NRC), "Amendment 17 to General Electric Licensing Topical Report NEDE-24011-P-A," BWROG-8644, August 15, 1986.

3. USAR, Section 14.7.1.

4. NUREG-0979, Section 4.2.1.3.2, April 1983.

5. NUREG-0800, Section 15.4.9, Revision 2, July 1981.

6. NEDO-21778-A, "Transient Pressure Rises Affected Fracture Toughness Requirements for Boiling Water Reactors," December 1978.

7. NEDO-10527, "Rod Drop Accident Analysis for Large BWRs," (including Supplements 1 and 2), March 1972.

8. ASME, Boiler and Pressure Vessel Code.

9. 10 CFR 50.67.

10. NEDO-21231, "Banked Position Withdrawal Sequence," January 1977.

Insert "3" Attached

License Amendment Request: Adoption of Technical Specifications Task Force (TSTF) Traveler TSTF-476, Revision 1, "Improved BPWS Control Rod Insertion Process (NEDO-33091)"

Bases 3.1.6, Rod Pattern Control

Insert 3 (Bases 3.1.6, REFERENCES)

11. NEDO 33091-A, Revision 2, "Improved BPWS Control Rod Insertion Process," July 2004.

BASES

APPLICABLE SAFETY ANALYSES, LCO, and APPLICABILITY (continued)

accuracy. Use of this method and verification provides the assurance that if the setpoint is found conservative to the Allowable Value during surveillance testing, the instrumentation would have provided the required trip function by the time the process reached the analytic limit for the applicable events, thereby protecting the SL.

For the digital RBM, there is a normalization process initiated upon rod selection, so that only RBM input signal drift over the interval from the rod selection to rod movement needs to be considered in determining the nominal trip setpoints. The RBM has no drift characteristic with no as-left or as-found tolerances since it only performs digital calculations on the digitized input signals provided by the APRMs.

The NTSP (or Limiting Trip Setpoint) is the LSSS since the RBM has no drift characteristic. The RBM Allowable Value demonstrates that the analytic limit would not be exceeded, thereby protecting the safety limit. The trip setpoints and Allowable Values determined in this manner provide adequate protection because instrumentation uncertainties, process effects, calibration tolerances, instrument drift, and environment errors are accounted for and appropriately applied for the RBM. There are no margins applied to the RBM nominal trip setpoint calculations which could mask RBM degradation.

The RBM is assumed to mitigate the consequences of an RWE event when operating ≥ 30% RTP. Below this power level, the consequences of an RWE event will not exceed the MCPR SL and, therefore, the RBM is not required to be OPERABLE (Ref. 3). When operating < 90% RTP, analyses have shown that with an initial MCPR ≥ the cycle and power specific limit specified in the current COLR, no RWE event will result in exceeding the MCPR SL. Also, the analyses demonstrate that when operating at ≥ 90% RTP with MCPR ≥ the cycle and power specific limit specified in the current COLR, no RWE event will result in exceeding the MCPR SL. Therefore, under these conditions, the RBM is also not required to be OPERABLE.

2. Rod Worth Minimizer

9 and 14

Standard

The RWM enforces the banked position withdrawal sequence (BPWS) to ensure that the initial conditions of the CRDA analysis are not violated. The analytical methods and assumptions used in evaluating the CRDA are summarized in References 4, 5, 6, ~~and~~ 7. The BPWS requires that control rods be moved in groups, with all control rods assigned to a specific group required to be within specified banked positions. Requirements that the control rod sequence is in compliance with the BPWS are specified in LCO 3.1.6, "Rod Pattern Control."

Insert "4" Attached

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Bases 3.3.2.1, Control Rod Block Instrumentation

Insert 4 (Bases 3.3.2.1, APPLICABLE SAFETY ANALYSES, LCO, AND APPLICABILITY)

When performing a shutdown of the plant, an optional BPWS control rod sequence (Ref. 14) may be used if the coupling of each withdrawn control rod has been confirmed. The rods may be inserted without the need to stop at intermediate positions. When using the Reference 14 control rod insertion sequence for shutdown, the rod worth minimizer may be bypassed if it is not programmed to reflect the optional BPWS shutdown sequence, as permitted by the Applicability Note for the RWM in Table 3.3.2.1-1.

BASES

REFERENCES (continued)

12. Amendment No. 159, "Issuance of Amendment Re: Request to Install Power Range Neutron Monitoring System, dated February 3, 2009. (ADAMS Accession No. ML083440681)

13. U.S. NRC Regulatory Issue Summary 2006 17, "NRC Staff Position on the Requirements of 10 CFR 50.36, "Technical Specifications," Regarding Limiting Safety System Settings During Periodic Testing and Calibration of Instrument Channels," dated August 24, 2006.

Insert "5" Attached

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Bases 3.3.2.1, Control Rod Block Instrumentation

Insert 5 (Bases 3.3.2.1, REFERENCES)

14. NEDO 33091-A, Revision 2, "Improved BPWS Control Rod Insertion Process," July 2004.