



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

May 4, 2011

Mr. Mark A. Schimmel
Site Vice President
Prairie Island Nuclear Generating Plant
Northern States Power Company - Minnesota
1717 Wakonade Drive East
Welch, MN 55089-9642

SUBJECT: PRAIRIE ISLAND NUCLEAR GENERATING PLANT, UNITS 1 AND 2 - ISSUANCE
OF AMENDMENTS RE: USE OF BEACON™ POWER DISTRIBUTION
MONITORING SYSTEM (TAC NOS. ME4059 AND ME4060)

Dear Mr. Schimmel:

The U.S. Nuclear Regulatory Commission has issued the enclosed Amendment No. 201 to Facility Operating License No. DPR-42 and Amendment No. 188 to Facility Operating License No. DPR-60 for the Prairie Island Nuclear Generating Plant, Units 1 and 2 (PINGP), respectively. The amendments consist of changes to the Technical Specifications (TSs) in response to your application dated June 14, 2010 (Agencywide Documents Access and Management System (ADAMS) Accession No. ML101650544).

The amendments make TS changes to allow the use of a dedicated on-line core power distribution monitoring system (PDMS) to enhance surveillance of core thermal limits. The PDMS to be used at PINGP is the Westinghouse proprietary core analysis system called Best Estimate Analyzer for Core Operations – Nuclear (BEACON™).

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

Sincerely,

A handwritten signature in black ink, appearing to read "Thomas J. Wengert".

Thomas J. Wengert, Senior Project Manager
Plant Licensing Branch III-1
Division of Operating Reactor Licensing
Office of Nuclear Reactor Regulation

Docket Nos. 50-282 and 50-306

Enclosures:

1. Amendment No. 201 to DPR-42
2. Amendment No. 188 to DPR-60
3. Safety Evaluation

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UNITED STATES
NUCLEAR REGULATORY COMMISSION
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NORTHERN STATES POWER COMPANY - MINNESOTA

DOCKET NO. 50-282

PRAIRIE ISLAND NUCLEAR GENERATING PLANT, UNIT 1

AMENDMENT TO FACILITY OPERATING LICENSE

Amendment No. 201
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 June 14, 2010, 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 Facility Operating License No. DPR-42 is hereby amended to read as follows:

Technical Specifications

The Technical Specifications contained in Appendix A, as revised through Amendment No. 201, are hereby incorporated in the 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 prior to December 31, 2011.

FOR THE NUCLEAR REGULATORY COMMISSION



Robert J. Pascarelli, Chief
Plant Licensing Branch III-1
Division of Operating Reactor Licensing
Office of Nuclear Reactor Regulation

Attachment: Changes to the Facility Operating License
and Technical Specifications

Date of Issuance: May 4, 2011



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 FACILITY OPERATING LICENSE

Amendment No. 188
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 June 14, 2010, 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 Facility Operating License No. DPR-60 is hereby amended to read as follows:

Technical Specifications

The Technical Specifications contained in Appendix A, as revised through Amendment No. 188, are hereby incorporated in the 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 prior to December 31, 2011.

FOR THE NUCLEAR REGULATORY COMMISSION



Robert J. Pascarelli, Chief
Plant Licensing Branch III-1
Division of Operating Reactor Licensing
Office of Nuclear Reactor Regulation

Attachment: Changes to the Facility Operating License
and Technical Specifications

Date of Issuance: May 4, 2011

ATTACHMENT TO LICENSE AMENDMENT NOS. 201 AND 188

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

DOCKET NOS. 50-282 AND 50-306

Replace the following pages of the Facility Operating License No. DPR-42 and DPR-60 with the attached revised pages. The changed areas are identified by a marginal line.

REMOVE

INSERT

DPR-42, License Page 3
DPR-60, License Page 3

DPR-42, License Page 3
DPR-60, License Page 3

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

INSERT

3.1.7-1
3.1.7-2
3.2.1-4
3.2.1-5
3.2.4-5
3.3.1-11
3.3.1-12

3.1.7-1
3.1.7-2
3.2.1-4
3.2.1-5
3.2.4-5
3.3.1-11
3.3.1-12

- (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 amended 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. 201, are hereby incorporated in the 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 Safeguards Information protected under 10 CFR 73.21, is entitled: "Prairie Island Nuclear Generating Plant Security Plan, Training and Qualification Plan, Safeguards Contingency Plan, and Independent Spent Fuel Storage Installation Security Program," Revision 1, submitted by letters dated October 18, 2006, and January 10, 2007.

- (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 amended 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. 188, are hereby incorporated in the 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 Safeguards Information protected under 10 CFR 73.21, is entitled: "Prairie Island Nuclear Generating Plant Security Plan, Training and Qualification Plan, Safeguards Contingency Plan, and Independent Spent Fuel Storage Installation Security Program," Revision 1, submitted by letters dated October 18, 2006, and January 10, 2007.

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 may be outside their limits for ≤ 1 hour following substantial rod movement.

APPLICABILITY: MODES 1 and 2.

ACTIONS

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

CONDITION	REQUIRED ACTION	COMPLETION TIME
A. One RPI per group inoperable for one or more groups.	A.1 Verify the position of the rod(s) with inoperable position indicators by using core power distribution measurement information.	Once per 8 hours
	<p style="text-align: center;"><u>OR</u></p> A.2 Reduce THERMAL POWER to $\leq 50\%$ RTP.	8 hours

ACTIONS (continued)

CONDITION	REQUIRED ACTION	COMPLETION TIME
<p>B. More than one RPI per group inoperable for one or more groups.</p>	<p>B.1 Monitor and record demand position indication for rods with inoperable RPI.</p>	<p>Once per hour</p>
	<p><u>AND</u></p>	
	<p>B.2 Monitor and record reactor coolant system average temperature.</p>	<p>Once per hour</p>
	<p><u>AND</u></p>	
	<p>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.</p>	<p>Once per 4 hours</p>
	<p><u>AND</u></p>	
	<p>B.4 Restore inoperable RPIs to OPERABLE status such that a maximum of one RPI per group is inoperable.</p>	<p>24 hours</p>

SURVEILLANCE REQUIREMENTS

-----NOTE-----
 During power escalation at the beginning of each cycle, THERMAL POWER may be increased until an equilibrium power level has been achieved, at which a power distribution measurement is obtained.

SURVEILLANCE	FREQUENCY
SR 3.2.1.1 Verify F _q ^c (Z) is within limit.	Once after each refueling prior to THERMAL POWER exceeding 75% RTP <u>AND</u> Once within 12 hours after achieving equilibrium conditions after exceeding, by ≥ 10% RTP, the THERMAL POWER at which F _q ^c (Z) was last verified <u>AND</u> 31 effective full power days (EFPD) thereafter

SURVEILLANCE REQUIREMENTS (continued)

SURVEILLANCE	FREQUENCY
<p>SR 3.2.1.2 -----NOTE-----</p> <p>If measurements indicate that the</p> <p style="text-align: center;">maximum over z $\left[\frac{F_q^c(Z)}{K(Z)} \right]$</p> <p>has increased since the previous evaluation of $F_q^c(Z)$:</p> <p>a. Increase $F_q^w(Z)$ by an appropriate factor specified in the COLR and reverify $F_q^w(Z)$ is within limits; or</p> <p>b. Repeat SR 3.2.1.2 once per 7 EFPD until either a. above is met or two successive power distribution measurements indicate that the</p> <p style="text-align: center;">maximum over z $\left[\frac{F_q^c(Z)}{K(Z)} \right]$</p> <p>has not increased.</p> <p>-----</p> <p>Verify $F_q^w(Z)$ is within limit.</p>	<p>Once within 12 hours after achieving equilibrium conditions after each refueling after THERMAL POWER exceeds 75% RTP</p> <p><u>AND</u></p>

SURVEILLANCE REQUIREMENTS

SURVEILLANCE	FREQUENCY
<p>SR 3.2.4.1 -----NOTES-----</p> <ol style="list-style-type: none"> 1. With input from one Power Range Neutron Flux channel inoperable and THERMAL POWER \leq 85% RTP, the remaining three power range channels can be used for calculating QPTR. 2. SR 3.2.4.2 may be performed in lieu of this Surveillance. <p>-----</p> <p>Verify QPTR is within limit by calculation.</p>	<p>7 days</p>
<p>SR 3.2.4.2 -----NOTE-----</p> <p>Not required to be performed until 12 hours after input from one or more Power Range Neutron Flux channels are inoperable with THERMAL POWER $>$ 85% RTP.</p> <p>-----</p> <p>Verify QPTR is within limit using core power distribution measurement information.</p>	<p>12 hours</p>

SURVEILLANCE REQUIREMENTS (continued)

SURVEILLANCE	FREQUENCY
<p>SR 3.3.1.3 -----NOTES-----</p> <ol style="list-style-type: none"> 1. Adjust NIS channel if absolute difference is $\geq 2\%$. 2. Not required to be performed until 72 hours after THERMAL POWER is $\geq 15\%$ RTP. <p>-----</p> <p>Compare results of the core power distribution measurements to NIS AFD.</p>	<p>31 effective full power days (EFPD)</p>
<p>SR 3.3.1.4 -----NOTE-----</p> <p>This Surveillance must be performed on the reactor trip bypass breaker prior to placing the bypass breaker in service.</p> <p>-----</p> <p>Perform TADOT.</p>	<p>31 days on a STAGGERED TEST BASIS</p>
<p>SR 3.3.1.5 Perform ACTUATION LOGIC TEST.</p>	<p>31 days on a STAGGERED TEST BASIS</p>

SURVEILLANCE REQUIREMENTS (continued)

SURVEILLANCE	FREQUENCY
<p>SR 3.3.1.6 -----NOTE----- Not required to be performed until 24 hours after THERMAL POWER is \geq 75% RTP. -----</p> <p>Calibrate excore channels to agree with core power distribution measurements.</p>	<p>92 EFPD</p>
<p>SR 3.3.1.7 -----NOTE----- Not required to be performed for source range instrumentation prior to entering MODE 3 from MODE 2 until 4 hours after entry into MODE 3. -----</p> <p>Perform COT.</p>	<p>92 days</p>



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SAFETY EVALUATION BY THE OFFICE OF NUCLEAR REACTOR REGULATION
RELATED TO AMENDMENT NO. 201 TO FACILITY OPERATING LICENSE NO. DPR-42
AND AMENDMENT NO. 188 TO FACILITY OPERATION 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 letter dated June 14, 2010 (Agencywide Documents Access and Management System (ADAMS) Accession No. ML101650544), Northern States Power Company, a Minnesota corporation (NSPM, the licensee), doing business as Xcel Energy, requested to amend facility operating licenses DPR-42 and DPR-60, as necessary, to implement the Westinghouse proprietary power distribution monitoring system (PDMS) Best Estimate Analyzer for Core Operations – Nuclear (BEACON™) for Prairie Island Nuclear Generating Plant, Units 1 and 2 (PINGP). The implementation modifies those Surveillance Requirements (SRs) and Limiting Conditions for Operation (LCOs) in the PINGP Technical Specifications (TS) that concern core power distribution.

Specifically, the proposed amendment would revise TS 3.1.7, "Rod Position Indication," TS 3.2.1, "Heat Flux Hot Channel Factor ($F_Q(Z)$)," TS 3.2.4, "Quadrant Power Tilt Ratio (QPTR)," and TS 3.3.1, "Reactor Trip System (RTS) Instrumentation," to permit use of the BEACON™ PDMS, as described in WCAP-12472-P-A, "BEACON Core Monitoring and Operations Support System" (ADAMS Accession No. ML092050097)¹ to perform power distribution surveillances.

The new BEACON™ PDMS would augment the functional capability of the neutron flux mapping system for the purposes of power distribution surveillances at PINGP. Certain Required Actions, for when an LCO is not met, and certain SRs would be changed to refer to power distribution measurements of measurement information of the core.

Westinghouse developed the BEACON™ system to improve operational support for pressurized water reactors (PWRs). It is a core monitoring and support package that uses Westinghouse standard instrumentation in conjunction with an analytical methodology for online generation of three-dimensional power distributions. The system provides the following for the core: monitoring, measurement reduction, analysis, and predictions. Since BEACON™ does not have any direct input to the RTS, BEACON™ will not affect any of the accident analyses in the PINGP

¹ This is a proprietary, non-public document. A non-proprietary copy is available in the NRC's Public Document Room, Legacy Library Accession Number 9409280021.

licensing basis. Furthermore, as stated in Enclosure 1 to its June 14, 2010, letter, the licensee will not use BEACON™ to relax the key safety parameter limits of levels of margin at PINGP.

2.0 REGULATORY EVALUATION

Section 182a of the Atomic Energy Act requires applicants for nuclear power plant operating licenses to include TSs as part of the license. The TSs ensure the operational capability of structures, systems, and components that are required to protect the health and safety of the public. The Nuclear Regulatory Commission's (NRC's) regulatory requirements related to the content of the TSs are contained in Section 50.36, "Technical specifications," of Title 10 of the *Code of Federal Regulations* (10 CFR 50.36), which requires that the TSs include items in the following categories: (1) safety limits, limiting safety system settings, and limiting control settings; (2) LCOs; (3) SRs; (4) design features; and (5) administrative controls. However, the rule does not specify the particular requirements to be included in a plant's TSs. As stated in 10 CFR 50.36(c)(2)(i), LCOs are "the lowest functional capability or performance levels of equipment required for safe operation of the facility. When a limiting condition for operation of a nuclear reactor is not met, the licensee shall shut down the reactor or follow any remedial action permitted by the technical specifications..." The regulations in 10 CFR 50.36(c)(3) state that SRs 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 limiting conditions for operation will be met."

As required by 10 CFR 50.36(c)(2)(ii), a TS LCO of a nuclear reactor must be established for each item meeting one or more of the following criteria:

- Criterion 1: Installed instrumentation that is used to detect, and indicate in the control room, a significant abnormal degradation of the reactor coolant pressure boundary.
- Criterion 2: A process variable, design feature, or operating restriction that is an initial condition of a design basis accident or transient analysis that either assumes the failure of or presents a challenge to the integrity of a fission product barrier.
- Criterion 3: A structure, system, or component that is part of the primary success path and which functions or actuates to mitigate a design basis accident or transient that either assumes the failure of or presents a challenge to the integrity of a fission product barrier.
- Criterion 4: A structure, system, or component, which operating experience or probabilistic safety assessment has shown to be significant to public health and safety.

Those items that do not fall within or satisfy any of the above criteria do not need to be included in the LCOs of the TSs. The PDMS instrumentation does not meet any of the criteria of 10 CFR 50.36(c)(2)(ii) for inclusion in the TSs. Therefore, the licensee will include the PDMS requirements and controls in the PINGP Technical Requirements Manual (TRM). The Technical

Requirements are plant-specific administrative controls on equipment, similar to TS controls, but are maintained by the licensee in accordance with 10 CFR 50.59, "Changes, tests, and experiments."

There are no specific regulatory requirements on PDMSs, such as the BEACON™ system; however, the use of such systems by licensees in monitoring the power distribution in the reactor core during power operation must be consistent with the safe operation of the plant.

3.0 TECHNICAL EVALUATION

3.1 Proposed TS Changes

In its application dated June 14, 2010, the licensee proposed the following changes to TSs 3.1.7, 3.2.1, 3.2.4, and 3.3.1:

- For TS LCO 3.1.7, replace the phrase, "movable incore detectors," with, "core power distribution measurement information," in Required Actions A.1 and B.3.
- For TS 3.2.1:
 - Replace the phrase, "power distribution map," with, "power distribution measurement," in the Note to the Surveillance Requirements Table.
 - Replace the phrase, "flux maps," with, "power distribution measurements," in Part b. of the Note associated with SR 3.2.1.2.
- For TS SR 3.2.4.2, replace the phrase, "the movable incore detectors or thermocouples," with, "core power distribution measurement information."
- For TS SRs 3.3.1.3 and 3.3.1.6, replace the phrase, "incore detector," with, "core power distribution."

3.2 NRC Staff Technical Evaluation

The licensee is proposing changes to the TSs to allow the use of a PDMS at PINGP. The PDMS would be an enhancement to the PINGP power distribution measurement and indication capability. The core power distribution information that is to be referred to in the proposed changes to the TS would be information from either the existing incore detector system or the PDMS.

The PDMS to be used is the BEACON™ system, which was developed by Westinghouse to improve the monitoring support by Westinghouse-designed PWRs, such as PINGP. The BEACON™ PDMS is a core monitoring and support package, which uses Westinghouse standard instrumentation in conjunction with an analytical methodology for online generation of three-dimensional power distributions to provide core monitoring, core measurement reduction, core analysis, and core predictions. The BEACON™ PDMS is calibrated by the existing incore detector system.

The BEACON™ system is described in the topical report WCAP-12472-P-A, "BEACON: Core Monitoring and Operations Support System," which was approved by the NRC staff for Westinghouse reactors in its letter dated February 16, 1994, which transmitted the NRC staff's safety evaluation report (SER) endorsing the November 18, 1993, Brookhaven National Laboratory Technical Evaluation Report (TER), "Technical Evaluation of the BEACON Core Monitoring and Operations Support System Topical Report WCAP-12474-P." The topical report (ADAMS Accession No. ML092050097), which also contains the copy of the NRC staff's letter dated February 16, 1994, is subject to conditions and limitations delineated in Section 4.0 of the TER. These conditions are the following:

1. In the cycle-specific applications of BEACON, the power peaking uncertainties $U_{\Delta h}$ and U_Q must provide 95% probability upper tolerance limits at the 95% confidence level (Section 3.3 [of the TER])
2. In order to insure that the assumptions made in the BEACON uncertainty analysis remain valid, the generic uncertainty components may require reevaluation when BEACON is applied to plant or core designs that differ sufficiently to have a significant impact on the WCAP-12472-P database (Section 3.4 [of the TER]), and
3. The BEACON Technical Specifications should be revised to include the changes described in Section 3 [of the TER] concerning Specifications 3.1.3.1 and 3.1.3.2, and the Core Operating Limits Report (Section 3.6 [of the TER]).

In addressing Condition 1, in Enclosure 1 to its application dated June 14, 2010, the licensee stated that:

Cycle-specific BEACON calibrations performed before startup and at beginning-of-cycle conditions will ensure that power peaking uncertainties provide 95% probability upper tolerance limits at the 95% confidence level. These calibrations are to be performed using the Westinghouse methodology. Until these calibrations are complete, more conservative default uncertainties will be applied. These calibrations will be documented and retained as records.

In addressing Condition 2 in Enclosure 1 to its application dated June 14, 2010, the licensee stated that:

The PINGP utilizes a Westinghouse 2-loop pressurized water reactor (PWR) nuclear steam supply system (NSSS) with movable incore instrumentation and other core power distribution monitoring instrumentation described by Section 1.0 of the Safety Evaluation Report (SER) for WCAP-12472-P-A. The SER states the general applicability of the WCAP to Westinghouse PWRs. Therefore, PINGP does not differ significantly from the plants that form the WCAP database.

During review of [WCAP-12472-P-A], the NRC requested additional information on how the BEACON methodology treats core loadings with different fuel designs and the impact to the BEACON uncertainty analysis. Westinghouse responded

that for all BEACON applications, the previous operating cycle is examined to establish reference uncertainties. This examination accounts for loading of fuel of different designs by comparing a BEACON model to actual operating data over the cycle. At the beginning of cycle, thermocouple data is verified and calibration/uncertainty components are updated as necessary. In addition, the initial flux mapping at the start of the cycle insures model calibration factors that reflect the actual fuel in the reactor before the BEACON system is declared OPERABLE.

In addressing Condition 3 in Enclosure 1 to its application dated June 14, 2010, the licensee stated that:

[WCAP-12472-P-A] describes an application of BEACON where the core operating limits are changed. [NSPM] is proposing only to use BEACON as a core TS monitor for conformance to the existing PINGP TS limits. The TS changes pertaining to this question are not applicable or of concern to the more limited changes being proposed by NSPM for the intended use of BEACON. Therefore, this condition does not apply to the amendment requested for PINGP.

The NRC staff reviewed the licensee's responses to the three conditions and concludes that the responses are acceptable. The licensee has not proposed changes to the Core Operating Limits Report (COLR) or the core safety limits for PINGP, and the proposed TS changes are to allow the core power distribution to be determined at PINGP by either the existing movable incore detector system or the BEACON™ system; the proposed core power distribution measurement language will cover both surveillance approaches. Also, as stated by the licensee, and identified in the TRM in Enclosure 5 to the June 14, 2010 letter, the BEACON™ PDMS is not required to be operable below 25-percent rated thermal power (RTP), but is required to be operable at all other times in MODE 1, when used for the surveillances described in the requested TS changes. Furthermore, Required Action A.1 associated with TRM LCO 3.2.4 requires that the PDMS be suspended when RTP is below 25-percent. This is because the accuracy of the calculated core power distribution may not be bounded by the uncertainties in WCAP-12472-P-A at these reduced power levels. Based on this Technical Requirement, and on the discussion provided above, the NRC staff concludes that the licensee has provided an acceptable disposition of the WCAP-12472-P-A conditions, and it is acceptable for the licensee to use the BEACON™ system described in WCAP-12472-P-A at PINGP.

In its application dated June 14, 2010, the licensee stated that it intended to use BEACON™ to augment the functional capability of its core flux mapping system for the purpose of power distribution surveillances. Although WCAP-12472-P-A discusses an application of BEACON™ in which there is continuous flux monitoring by control room operators, the licensee is proposing a more conservative application of BEACON™ in which the core power distribution limits themselves remain unchanged. The licensee intends to use the BEACON™ PDMS as the primary method for performing power distribution surveillances, and to use the flux mapping system as an alternative for such purposes, when the reactor power is greater than 25-percent RTP, or when the PDMS is inoperable, the existing movable incore detector system would be used.

In Enclosure 2 to its June 14, 2010 application, the licensee addressed whether the PDMS needed to have an LCO added to the TS to state that the system is required to be operable. The licensee concluded that an LCO for the PDMS was not required, because it did not meet the criteria set forth in 10 CFR 50.36(c)(2)(ii).

The PDMS instrumentation provides the capability to monitor core parameters at more frequent intervals than is currently required by the TS. The PDMS combines inputs from currently installed plant instrumentation and design data for each fuel cycle, and does not modify or eliminate existing plant instrumentation. It provides a continuous means to monitor the power distribution limits including limiting peaking factors and quadrant power tilt ratio. The PDMS is used for periodic measurement of the core power distribution to confirm operation within design limits, and for periodic calibration of the ex-core detectors, and it does not initiate any automatic protection action. The PDMS instrumentation does not change any of the key safety parameter limits or levels of margin as considered in the reference design basis evaluations. These limits are not revised by this license amendment, and can be determined independently of the operability of the PDMS. Based on these considerations, the NRC staff also concludes that the PDMS itself does not meet any of the 10 CFR 50.36(c)(2)(ii) selection criteria for inclusion in the TS. Therefore, the NRC staff concludes that 10 CFR 50.36 does not require the PDMS to have an LCO in the TS.

Based on its review of the proposed changes to TS 3.1.7, 3.2.1, 3.2.4, and 3.3.1, identified in Section 3.1 of this SE, the NRC staff concludes that replacing the current TS references to incore detectors, power distribution maps, and flux maps, with references to core power distribution measurement information (from either the movable incore detector system or the BEACON™ system) is consistent with the technical requirements of the NRC-approved WCAP-12472-P-A and, therefore, the proposed changes are acceptable. Based on this conclusion, the NRC staff further concludes that the proposed changes are adherent to 10 CFR 50.36 requirements, and therefore, the proposed amendment is acceptable

4.0 STATE CONSULTATION

In accordance with the Commission's regulations, the Minnesota State official was notified of the proposed issuance of the amendments. 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 (75 FR 57527). 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) 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.

7.0 LICENSEE COMMITMENT

The licensee made the following regulatory commitment in its June 14, 2010, license amendment request:

1. Cycle-specific BEACON calibrations performed before startup and at beginning-of cycle conditions will ensure that power peaking uncertainties provide 95% probability upper tolerance limits at the 95% confidence level. These calibrations are to be performed using the Westinghouse methodology. Until these calibrations are complete, more conservative default uncertainties will be applied. The calibrations will be documented and retained as records.

Principal Contributor: B. Parks, NRR

Date: May 4, 2011

May 4, 2011

Mr. Mark A. Schimmel
Site Vice President
Prairie Island Nuclear Generating Plant
Northern States Power Company - Minnesota
1717 Wakonade Drive East
Welch, MN 55089-9642

SUBJECT: PRAIRIE ISLAND NUCLEAR GENERATING PLANT, UNITS 1 AND 2 - ISSUANCE OF AMENDMENTS RE: USE OF BEACON™ POWER DISTRIBUTION MONITORING SYSTEM (TAC NOS. ME4059 AND ME4060)

Dear Mr. Schimmel:

The U.S. Nuclear Regulatory Commission has issued the enclosed Amendment No. 201 to Facility Operating License No. DPR-42 and Amendment No. 188 to Facility Operating License No. DPR-60 for the Prairie Island Nuclear Generating Plant, Units 1 and 2 (PINGP), respectively. The amendments consist of changes to the Technical Specifications (TSs) in response to your application dated June 14, 2010 (Agencywide Documents Access and Management System (ADAMS) Accession No. ML101650544).

The amendments make TS changes to allow the use of a dedicated on-line core power distribution monitoring system (PDMS) to enhance surveillance of core thermal limits. The PDMS to be used at PINGP is the Westinghouse proprietary core analysis system called Best Estimate Analyzer for Core Operations – Nuclear (BEACON™).

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

Sincerely,

/RA/

Thomas J. Wengert, Senior Project Manager
Plant Licensing Branch III-1
Division of Operating Reactor Licensing
Office of Nuclear Reactor Regulation

Docket Nos. 50-282 and 50-306

Enclosures:

1. Amendment No. 201 to DPR-42
2. Amendment No. 188 to DPR-60
3. Safety Evaluation

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Accession Number: ML103430498

*via memo dated 10/15/2010

OFFICE	NRR/LPL3-1 PM	NRR/LPL3-1 LA	NRR/DSS/SRXB/BC	NRR/DIRS/ITSB/BC	OGC	NRR/LP3-1/BC
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DATE	5/04/11	5/04/11	10/15/10	3/9/11	3/14/11	5/04/11

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