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10 CFR 50 Appendix H

U S Nuclear Regulatory Commission
ATTN: Document Control Desk
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Prairie Island Nuclear Generating Plant Units 1 and 2
Dockets 50-282 and 50-306
License Nos. DPR-42 and DPR-60

Request for Revision to Reactor Vessel Material Surveillance Capsule Withdrawal Schedule for Prairie Island Nuclear Generating Plant (PINGP)

References: 1. Letter from Nuclear Management Company, LLC (NMC) to NRC, "Application for Renewed Operating Licenses", dated April 11, 2008, ADAMS Accession Number ML081130666.

Pursuant to 10 CFR 50 Appendix H, Section III.B.3, Northern States Power Company, a Minnesota corporation (NSPM), doing business as Xcel Energy, hereby requests approval for a revision to the PINGP, Units 1 and 2, reactor vessel material surveillance capsule withdrawal schedule. In reference 1, NMC* submitted an application for a renewed operating license which would allow PINGP operation to be extended for 20 years. To support the proposed extended period of plant operations, NSPM proposes to remove Capsule N from Unit 1 during the Spring 2011 refueling outage and remove Capsule S from Unit 2 during the Spring 2012 refueling outage. The existing removal schedule states that the remaining capsules are in "standby". The details of the proposed schedule revision are contained in Enclosure 1 to this letter. Based on the technical evaluation in Enclosure 1, NSPM concludes that the proposed withdrawal schedule complies with the requirements of the American Society for Testing and Materials (ASTM) standard ASTM E 185-82.

To support implementation of the revised withdrawal schedule, NSPM requests approval of this proposed change by April 1, 2011.

* On September 22, 2008, NMC transferred its operating authority to NSPM, doing business as Xcel Energy. By letter dated September 3, 2008, NSPM assumed responsibility for actions and commitments previously submitted by NMC.

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If there are any questions or if additional information is needed, please contact Mr. Dale Vincent, P.E., at 651-388-1121.

Summary of Commitments

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

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

Enclosures (1)

cc: Administrator, Region III, USNRC
Project Manager, PINGP, USNRC
Resident Inspector, PINGP, USNRC

Enclosure 1

Request for Revision to Reactor Vessel Material Surveillance Capsule Withdrawal Schedule for Prairie Island Nuclear Generating Plant (PINGP)

1. BACKGROUND

Appendix H of 10 CFR Part 50 describes reactor vessel material surveillance program requirements. Paragraph (III)(B)(3) of this Appendix states that proposed withdrawal schedules must be submitted with a technical justification per 10 CFR 50.4, and approved prior to implementation.

The design of the reactor vessel surveillance program and the withdrawal schedule must meet the requirements of the edition of American Society for Testing and Materials (ASTM) standard ASTM E 185 that is current on the issue date of the American Society of Mechanical Engineers (ASME) Code to which the reactor vessel was purchased. The applicable ASTM E 185 version for PINGP, Units 1 and 2, is ASTM E 185-70. In addition, to the extent practicable, the test procedures and reporting requirements for each capsule withdrawal must comply with ASTM E 185-82. Tables 1 and 2, which were derived from the Pressure and Temperature Limits Report, show the withdrawal schedule for PINGP, Units 1 and 2, respectively, reactor vessel surveillance capsules.

Table 1
Unit 1 Reactor Vessel Surveillance Capsule Removal Schedule

Capsule	Vessel Location (degree)	Lead[a] Factor	Withdrawal EFPY[b]	Fluence[a] (n/cm2, E>1.0 MeV)
V	77	2.94	1.34	5.630×10^{18}[c]
P	247	1.72	4.60	1.318×10^{19}[c]
R	257	2.99	8.56	4.478×10^{19}[c]
S	57	1.77	18.12	4.017×10^{19}[c]
T	67	1.89	Standby	- - - - -
N	237	1.77	Standby	- - - - -

Table 2
Unit 2 Reactor Vessel Surveillance Capsule Removal Schedule

Capsule	Vessel Location (degree)	Lead[a] Factor	Withdrawal EFPY[b]	Fluence[d] (n/cm2, E>1.0 MeV)
V	77	2.95	1.39	6.206×10^{18}[c]
T	67	1.75	4.00	1.199×10^{19}[c]
R	257	2.99	8.81	4.376×10^{19}[c]
P	247	1.84	17.24	4.165×10^{19}[c]
N	237	1.72	Standby	- - - - -
S	57	1.72	Standby	- - - - -

a. Updated in Capsule S dosimetry analysis
b. Effective full power years (EFPY) from plant startup
c. Plant specific evaluation
d. Updated in Capsule P dosimetry analysis

2. PROPOSED REVISION TO THE WITHDRAWAL SCHEDULE

The proposed schedule is to withdraw Unit 1 Capsule N during the Spring 2011 outage, and Unit 2 Capsule S during the Spring 2012 outage. Unit 1 Capsule T and Unit 2 Capsule N will remain in standby. As shown below in Section 3, the proposed withdrawal schedules satisfy the requirements of ASTM E 185-70, the version that was current at the time the reactor vessels were purchased and ASTM E 185-82. Therefore, the withdrawal schedules satisfy the requirements of Appendix H to 10 CFR Part 50.

3. TECHNICAL JUSTIFICATION

Northern States Power Company, a Minnesota corporation (NSPM), doing business as Xcel Energy, submitted an application for renewal of the PINGP operating licenses (Reference 1), which proposed to extend plant operation for an additional 20 years. To account for license renewal, NSPM proposes to withdraw one of the two remaining capsules from each unit after the capsule receives a neutron fluence equivalent to the 60-year vessel fluence. The remaining spare capsules (one per unit) will stay in the reactor vessel to provide meaningful metallurgical data for potential future license renewals.

The proposed surveillance capsule withdrawal schedule is based on the requirements specified in ASTM E 185-82, Section 7.6. Six surveillance capsules were installed in each unit at PINGP. Four capsules have been removed per the

established withdrawal schedule. The last capsule to be removed from Unit 1 was Capsule S at 18.12 EFPY and the last capsule removed from Unit 2 was Capsule P at 17.24 EFPY. In accordance with the requirements of ASTM E 185-82, Section 7.6.2, NSPM proposes to withdraw one of the remaining capsules from each unit when its neutron fluence exposure exceeds the new peak end-of-life (EOL) (54 EFPY) vessel fluence, but prior to exceeding twice that fluence exposure.

The maximum reactor vessel fluence at 54 EFPY for Unit 1 is projected to be 5.162E19 n/cm^2 (E>1.0 MeV), and for Unit 2 is projected to be 5.196E19 n/cm^2 (E>1.0 MeV). Per the requirements of ASTM E 185-82, Section 7.6, the surveillance capsules should be removed when their neutron fluence exceeds the new peak EOL vessel fluence (i.e., 5.162E19 n/cm^2 for Unit 1 at 54 EFPY, and 5.196E19 n/cm^2 for Unit 2 at 54 EFPY), but prior to exceeding twice that fluence exposure (i.e., 1.032E20 n/cm^2 for Unit 1, and 1.039E20 n/cm^2 for Unit 2). Calculations have been performed to determine the earliest withdrawal times for the remaining capsules which are shown in Table 3.

Table 3
Earliest Withdrawal Times

Unit	Capsule	Lead Factor	Removal Time (≥EFPY)
1	T	1.89	24.2
	N	1.77	26.5
2	N	1.72	28.5
	S	1.72	28.5

As of August 1, 2009, the total lifetime performance of Unit 1 was 30 EFPY and of Unit 2 was 29.9 EFPY. Additional calculations have been performed to estimate the neutron fluence of each capsule at the time of the proposed next withdrawal. The results are shown in Table 4.

Table 4
Projected Fluences

Unit	Capsule	Proposed Removal	EFPY	Projected Fluence (n/cm^2)
1	T	Standby	31.6	6.292E19
	N	Spring 2011	31.6	5.893E19
2	N	Standby	32.2	5.739E19
	S	Spring 2012	32.2	5.739E19

After capsule removal, the surveillance specimens will be tested in accordance with the requirements of 10 CFR 50, Appendix H and ASTM E 185-82. The results of materials testing, fluence analysis, and effective full power years (EFPY) from startup are used to predict the effects of neutron embrittlement through the end of extended life.

4. REFERENCES

1. Letter from Nuclear Management Company, LLC (NMC) to NRC, "Application for Renewed Operating Licenses", dated April 11, 2008, ADAMS Accession Number ML081130666.