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November 6, 2017

L-PI-17-042
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 Regarding License Amendment Request to Revise the NDE Inspection Interval for Special Lifting Devices (CAC Nos. MG0072 and MG0073)

- References:
- 1) Letter from NSPM to the NRC, "License Amendment Request to Revise the NDE Inspection Interval for Special Lifting Devices," dated August 4, 2017. (ADAMS Accession Number ML17216A236)
 - 2) Email from the NRC to NSPM, "Request for additional information: RE: Prairie Island Special Heavy Lifting Devices LAR (CAC Nos. MG0072 and MG0073)," dated October 4, 2017. (ADAMS Accession Number ML17277B333)

Pursuant to 10 CFR 50.90, Northern States Power Company, a Minnesota Corporation, doing business as Xcel Energy (hereafter "NSPM"), requested in Reference 1 an amendment to the licensing basis for the Prairie Island Nuclear Generating Plant (PINGP). Specifically, the proposed change would revise the PINGP Updated Safety Analysis Report (USAR) Section 12.2.12.3, "Special Lifting Devices Evaluation," to modify the non-destructive examination (NDE) inspection interval for Special Lifting Devices from annually or prior to each use, typically at each refueling outage, to a ten year interval. In Reference 2, the NRC provided NSPM with Requests for Additional Information (RAIs) pertaining to information needed to support the staff's review of NSPM's application in Reference 1. The enclosure to this letter provides NSPM's response to the NRC RAIs.

The supplemental information provided herein does not change the conclusions of the No Significant Hazards Consideration and the Environmental Consideration evaluations provided in Reference 1.

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If there are any questions or if additional information is needed, please contact Mr. Peter Gohdes at (612) 330-6503 or Peter.Gohdes@xenuclear.com.

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 November 6, 2017.



Scott Northard
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 the
NDE Inspection Interval for Special Lifting Devices**

Pursuant to 10 CFR 50.90, Northern States Power Company, a Minnesota Corporation, doing business as Xcel Energy (hereafter "NSPM"), requested in Reference 1 an amendment to the licensing basis for the Prairie Island Nuclear Generating Plant (PINGP). Specifically, the proposed change would revise the PINGP Updated Safety Analysis Report (USAR) Section 12.2.12.3, "Special Lifting Devices Evaluation," to modify the non-destructive examination (NDE) inspection interval for Special Lifting Devices from annually or prior to each use, typically at each refueling outage, to a ten year interval. In Reference 2, the NRC provided NSPM with Requests for Additional Information (RAIs) pertaining to information needed to support the staff's review of NSPM's application in Reference 1. The responses to this request for additional information (RAI) are provided below.

RAI-SBPB-01

The guidelines of Section 5.5 of ANSI N14.6-1978 specify that inspections of special lifting devices using liquid penetrant or magnetic particle examination shall be performed by procedures and personnel qualified in accordance with the rules in the current edition of the American Society of Mechanical Engineers (ASME) Boiler and Pressure Vessel Code (BPVC), Section V. The guidelines of Section 5.5 of ANSI N14.6-1978 also specify that the acceptance standards for these examinations be as specified in the ASME BPVC, Section III, Division 1. As provided in Attachment 1 to the Enclosure provided with the amendment request dated August 4, 2017, Section 12.2.12.3, "Special Lifting Devices Evaluation," of the PINGP Updated Safety Analysis Report (USAR), Revision 35P, states the following:

In lieu of the surface NDE defined in ANSI N14.6-1978, a volumetric NDE using acoustic emission (AE) technique may be used. If indications are identified by AE, then supplemental ultrasonic (UT), Magnetic Particle (MT), or Liquid Penetrant (PT) techniques may be used for flaw characterization. (Reference 74)

This statement reflects a change from the latest PINGP USAR update submitted to the NRC (Revision 34, dated June 3, 2016 (ADAMS Accession No. ML16168A361)), and this change introduced the permitted use of the AE technique. Reference 74 is not included in Revision 34 to Section 12 of the PINGP USAR. Clarify the quality standards that apply to the procedures and personnel used in the performance of the AE and the acceptance criteria that apply to the examination results. Explain how the AE method of examination would provide detection sensitivity for likely weld defects or cracks that is equivalent to or better than magnetic particle and liquid penetrant examinations conducted as specified in Section 5.5 of ANSI N14.6.

NSPM Response

Reference 74 on page 12.2.12-8 of the PINGP USAR, is included in the pending volume (Revision 35P) for changes not yet submitted to the NRC in accordance with the requirements

of 10 CFR 50.71(e). Specifically, this reference is a 10 CFR 50.59 evaluation that was completed in order to update the USAR to list AE as an acceptable alternative NDE method.

As stated in the USAR, AE is a volumetric NDE method and as such, is considered a special process as described in NSPM's Quality Assurance Topical Report (Reference 3). Consequently, control of AE examination quality standards, acceptance criteria, and detection sensitivity fall underneath NSPM's quality assurance program, which requires that special processes are accomplished by qualified personnel using qualified procedures and equipment. Special processes are performed in accordance with applicable codes, standards, specifications, criteria, or other specially established requirements, which are discussed in further detail as follows.

AE Examinations Quality Standards

The procedures used for performance of the AE examinations at PINGP are developed based upon Electric Power Research Institute (EPRI) technical report TR-107147 (Reference 4). Personnel performing AE examinations at PINGP are certified in compliance with the American Society for Nondestructive Testing (ASNT) Recommended Practice No. SNT-TC-1A, 1984-2011. This meets or exceeds the requirements of American National Standards Institute (ANSI)/ASNT CP-189 2011 and earlier editions, as modified by ASME Boiler and Pressure Vessel Code (B&PV), Section XI.

The equipment used in AE is described in ASME B&PV, Section V, Articles 11, 12, and 13. Calibration and verification standards for AE instrumentation used at PINGP are described in several ASTM Standards: ASTM E1106, "Standard Test Method for Primary Calibration of Acoustic Emission Sensors", ASTM E976, "Standard Guide for Determining the Reproducibility of Acoustic Emission Sensor Response", ASTM E2374, "Standard Guide for Acoustic Emission System Performance Verification", and ASTM E750, "Standard Practice for Characterizing Acoustic Emission Instrumentation".

AE Acceptance Criteria

The AE examination acceptance criteria were developed as a continuation of the original work described in the EPRI technical report (Reference 4). The criteria do not determine the acceptability or rejectability of a possible indication, they are applied to determine if other techniques (visual, surface, or volumetric) should be used in order to locate and characterize (size, shape) an indication. The AE acceptance criteria used to evaluate whether other techniques are needed to characterize emissive zones is based upon the EPRI test report. For active cracks, the level of emission activity in terms of energy counts is typically in the high hundreds to low thousands. Zones that produce emissions less than the acceptance criteria are evaluated as acceptable, not requiring any further action. Zones producing emissions greater than the acceptance criteria result in further inspection utilizing other NDE methods.

AE Detection Sensitivity

AE is considered a volumetric examination method, whereas MT and PT, as prescribed in Section 5.5 of ANSI N14.6-1978, are surface examination methods. A volumetric exam ensures 100% verification of the examined materials when compared to a surface exam, which is limited to surface identifiable discontinuities only.

As summarized in an NRC Safety Evaluation in Appendix B of Reference 4, the AE method can only detect that there is an active flaw present under load and with software processing of the data generated, can locate the source of the acoustic emission. It cannot measure the size of a flaw or characterize the flaw. If there are no AE emitting flaws in a structure under load, it can be predicted that there will be no failure. Even if a structure has no flaws, but is overloaded such that there is permanent deformation, AE will detect such conditions and provide a warning of the overload. It provides a much higher assurance than surface or visual examinations, which can only detect and provide a measure of flaws on the surface.

AE is, therefore, considered a “better” method for identification of potential defects, which may result in failure of the special lifting device. The subsequent actual characterization of any indication identified can be determined with methods such as UT, MT or PT, which produce dimensional exam results for evaluation.

RAI-SBPB-02

Attachment 2 to the Enclosure to the amendment request dated August 4, 2017, provided an evaluation of the past relevant indications from available special lifting device NDE results. The results presented include only indications identified through magnetic particle or liquid penetrant examinations of the PINGP, Unit 2 internals lifting rig. Explain why the fabrication defect identified in October 2015 would first be identified at that time, when the lifting rig had been in service for many years and had been subject to numerous inspections. Also, identify the last examination method used for each special lifting device and the date of that examination.

NSPM Response

The following discusses the October 2015 indication and the dates and methods used in the most recent NDE examinations.

October 2015 Indication

The considerations of the previous NDE examinations for this indication attributed to a fabrication defect are unknown. Based upon review of the photographic information associated with the inspection report, there was no identifiable crack to indicate a service induced failure. Due to the depths of indication from the surface, it was likely undetectable to the inspection technique until multiple surface conditioning operations removed enough material to make the sub-surface discontinuity detectable. The area of the indication was also easily identifiable at the intersection of two separate welds to have most likely resulted during fabrication. The area

of the indication was removed and rework completed on the weld to ensure there would be no future issue during examination of this weld.

Dates and Examination Methods

Please reference the following table for the examination methods and dates of the most recent NDE inspections prior to submittal of this amendment on August 4, 2017 (Reference 1):

Special Lifting Device	Method	Inspection Date
U2 Reactor Head Lifting Rig	MT	10/23/15
U2 Internals Lifting Rig	MT/PT	10/26/15
Turbine Spreader Assembly	MT	8/26/16
U1 Reactor Head Lifting Rig	AE	10/21/16
U1 Internals Lifting Rig	AE	10/21/16

References

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3. Letter from NSPM to the NRC, "Submittal of Quality Assurance Topical Report (NSPM-1), Revision 11", dated August 1, 2017. (ADAMS Accession Number ML17213A036)
4. Electric Power Research Institute (EPRI) Topical Report, EPRI TR-107147, "Acoustic Emission Monitoring of Reactor Vessel Head and Internals Lift Rigs", December 1996.