



**UNITED STATES  
NUCLEAR REGULATORY COMMISSION  
ADVISORY COMMITTEE ON REACTOR SAFEGUARDS  
WASHINGTON, DC 20555 - 0001**

December 10, 2009

The Honorable Gregory B. Jaczko  
Chairman  
U. S. Nuclear Regulatory Commission  
Washington, DC 20555-0001

**SUBJECT:     REPORT ON THE SAFETY ASPECTS OF THE LICENSE RENEWAL  
                  APPLICATION FOR THE PRAIRIE ISLAND NUCLEAR GENERATING PLANT,  
                  UNITS 1 AND 2**

Dear Chairman Jaczko:

During the 568<sup>th</sup> meeting of the Advisory Committee on Reactor Safeguards, December 3-5, 2009, we completed our review of the license renewal application for the Prairie Island Nuclear Generating Plant (PINGP), Units 1 and 2, and the final Safety Evaluation Report (SER) prepared by the NRC staff. Our Plant License Renewal Subcommittee also reviewed this matter during its meeting on July 7, 2009. During these reviews, we had the benefit of discussions with representatives of the NRC staff and the applicant, Northern States Power Company, a Minnesota Corporation, (NSPM). We also had the benefit of the documents referenced. This report fulfills the requirement of 10 CFR 54.25 that the ACRS review and report on all license renewal applications.

#### **CONCLUSION AND RECOMMENDATION**

1. The programs established and committed to by the applicant to manage age-related degradation provide reasonable assurance that PINGP, Units 1 and 2 can be operated in accordance with their current licensing bases for the period of extended operation without undue risk to the health and safety of the public.
2. The NSPM application for renewal of the operating licenses of PINGP, Units 1 and 2 should be approved.

#### **BACKGROUND AND DISCUSSION**

PINGP consists of two two-loop pressurized water reactors with dry ambient pressure containments and is located approximately 39 miles southeast of Minneapolis, MN. The licensed power output of each unit is 1650 megawatts thermal with a gross electrical output of approximately 575 megawatts-electric. NSPM requested renewal of the PINGP, Units 1 and 2 operating licenses for 20 years beyond the current license terms, which expire on August 9, 2013, for Unit 1, and on October 29, 2014, for Unit 2.

In the final SER, the staff documented its review of the license renewal application and other information submitted by the applicant or obtained from the staff audits and inspections at the plant site. The staff reviewed the completeness of the applicant's identification of the structures,

systems, and components (SSCs) that are within the scope of license renewal; the integrated plant assessment process; the applicant's identification of the plausible aging mechanisms associated with passive, long-lived components; the adequacy of the applicants Aging Management Programs (AMPs); and the identification and assessment of time-limited aging analyses (TLAAs) requiring review.

In the license renewal application, NSPM identified the SSCs that fall within the scope of license renewal. For these SSCs, the applicant performed a comprehensive aging management review. Based on this review, the applicant will implement 43 AMPs for license renewal, which include existing, new, and enhanced programs. Ten programs have exceptions to the corresponding programs described in the Generic Aging Lessons Learned (GALL) Report. Two of the programs are plant-specific programs that do not have counterparts in the GALL Report.

The NSPM application either demonstrates consistency with the GALL Report or documents deviations to the approaches specified in that Report. As noted above, 10 of the AMPs include exceptions to the corresponding programs in the GALL Report. We reviewed these exceptions and agree with the staff that they are acceptable. The staff conducted two license renewal audits and one inspection at the PINGP site. The audits and in-office reviews verified the appropriateness of the scoping and screening methodology, AMPs, aging management review, and TLAAs. The inspections verified that the license renewal requirements are appropriately implemented. Based on the audits, in-office reviews, and inspections, the staff concluded in the final SER that the proposed activities will adequately manage the effects of aging of SSCs identified in the application and that the intended functions of these SSCs will be maintained during the period of extended operation. We agree with this conclusion.

For 20 years, both PINGP units have experienced intermittent leakage of borated water from their refueling cavities, when flooded for refueling, into and through the reinforced concrete structures within containments. The leak rate has been 1 to 2 gallons per hour, as measured by accumulation in lower levels of the containments. Earlier efforts to locate and seal the sources of this leakage were not effective, and additional measures have recently been taken to prevent further leakage.

The staff established an Open Item to address three issues related to the prior, and any future, refueling cavity leakage: (1) the leaking borated water may contact the containment vessel, remain in contact with the vessel between outages, and cause degradation; (2) the leaking borated water may contact the concrete reinforcement and cause degradation; and (3) the leaking borated water may react with the concrete and cause degradation.

As described in the final SER, the applicant has performed a number of inspections and evaluations to verify that no unacceptable degradation has occurred. Also, the applicant has committed to perform additional inspections and evaluations, prior to entering the period of extended operation, to ensure that no unacceptable degradation of the containment vessel, the concrete reinforcement, or the concrete has occurred as a result of the intermittent leakage from the refueling cavities. The commitments include the removal of concrete from a low point in the containment and inspection of the exposed containment vessel bottom head and reinforcing steel. Also, the applicant will remove concrete samples known to have been exposed to borated water leakage, test them for compressive strength, and perform a petrographic examination to evaluate for degradation.

Repairs performed during the fall 2009 Unit 1 refueling outage appear to have reduced the leak rate substantially. Similar repairs are planned for Unit 2 during the 2010 spring refueling outage. During the two consecutive refueling outages following cavity leak repairs in each unit, the applicant will perform visual inspections of the areas where reactor cavity leakage had been observed previously to confirm that the leakage issue has been resolved.

The staff concludes that these inspections, evaluations, and commitments are adequate to address the refueling cavity leakage issue. We agree with this conclusion.

The staff identified water in manholes as a generic, current operating plant issue in Information Notice 2002-12, "Submerged Safety-Related Electrical Cables," and Generic Letter 2007-01, "Inaccessible or Underground Power Cable Failures that Disable Accident Mitigation Systems or Cause Plant Transients." There is one manhole at PINGP that contains medium voltage cables in scope of license renewal and is subject to periodic inspection for the accumulation of water.

NSPM has committed to implement a Non-EQ Inaccessible Medium-Voltage Cables Program involving two parts: first, inspection (and draining, if necessary) of the applicable manholes on a periodic basis; and second, the conduct of periodic testing to confirm that the condition of the conductor insulation on the applicable cables is not degrading. This new AMP will be implemented prior to entering the period of extended operation.

The staff has determined that implementation of the Non-EQ Inaccessible Medium-Voltage Cables Program will ensure that the aging effects on inaccessible medium-voltage cables will be adequately managed during the period of extended operation. We agree with this conclusion.

The applicant identified the systems and components requiring TLAAAs and reevaluated them for the period of extended operation. The staff concluded that the applicant has provided an adequate list of TLAAAs. Further, the staff concluded that the applicant has met the requirements of the License Renewal Rule by demonstrating that the TLAAAs will remain valid for the period of extended operation; or the TLAAAs have been projected to the end of the period of extended operation; or the aging effects will be adequately managed for the period of extended operation.

We agree with the staff that there are no issues related to the matters described in 10 CFR 54.29(a)(1) and (a)(2) that preclude renewal of the operating licenses for PINGP, Units 1 and 2. The programs established and committed to by NSPM provide reasonable assurance that the PINGP Units 1 and 2 can be operated in accordance with their current licensing bases for the period of extended operation without undue risk to the health and safety of the public. The NSPM application for renewal of the operating licenses for PINGP, Units 1 and 2 should be approved.

Sincerely,

*/RA/*

Mario V. Bonaca  
Chairman

**REFERENCES**

1. Memorandum to E. M. Hackett, Executive Director, Advisory Committee on Reactor Safeguards, transmitting Advisory Committee on Reactor Safeguards Review of the Prairie Island Nuclear Generating Plant, Units 1 and 2 License Renewal Application - Safety Evaluation Report, 10/16/2009 (ML092730160 and ML092890209)
2. Letter to U.S. Nuclear Regulatory Commission, transmitting Prairie Island, Units 1 and 2 Application for Renewed Operating Licenses, 04/11/2009 (ML081130666)
3. Letter to M. D. Wadley, Site Vice President, Prairie Island Nuclear Generating Plant, transmitting Prairie Island Nuclear Generating Plant, Units 1 and 2 NRC License Renewal Scoping, Screening, and Aging Management Inspection Report 05000282/2009006; 05000306/2009006, 03/27/2009 (ML090860804)
4. Letter to M. D. Wadley, Site Vice President, Prairie Island Nuclear Generating Plant, transmitting Prairie Island Nuclear Generating Plant, Units 1 and 2, License Renewal Safety Audit Report, 04/21/2009 (ML090850009)
5. U.S. Nuclear Regulatory Commission, NUREG-1801, Volumes 1 & 2, Revision 1, "Generic Aging Lessons Learned Report," 09/2005 (ML052700171)
6. U. S. Nuclear Regulatory Commission, Information Notice 2002-12: Submerged Safety-Related Electrical Cables, 03/21/2002 (ML020790238)
7. U. S. Nuclear Regulatory Commission, Generic Letter 2007-01: Inaccessible or Underground Power Cable Failures that Disable Accident Mitigation Systems or Cause Plant Transients, 02/07/2007 (ML070360665)

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Sincerely,  
 /RA/  
 Mario V. Bonaca  
 Chairman

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Letter to the Honorable Gregory B Jaczko, Chairman, NRC, from Mario V. Bonaca, Chairman, ACRS, dated December 10, 2009

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