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

August 31, 2009

Mr. Michael D. Wadley
Site Vice President
Prairie Island Nuclear Generating Plant
Northern States Power - Minnesota
1717 Wakonade Drive East
Welch, MN 55089

SUBJECT: PRAIRIE ISLAND NUCLEAR GENERATING PLANT, UNITS 1 AND 2 - CORRECTION TO SAFETY EVALUATION SUPPORTING AMENDMENT NOS. 192 AND 181 RE: TECHNICAL SPECIFICATION CHANGES TO ALLOW USE OF WESTINGHOUSE 0.422-INCH OD 14 X 14 VANTAGE+ FUEL (TAC NOS. MD9142 AND MD9143)

Dear Mr. Wadley:

On July 1, 2009, the Nuclear Regulatory Commission (NRC) issued Amendment No. 192 to Facility Operating License No. DPR-42 and Amendment No. 181 to Facility Operating License DPR-60 for the Prairie Island Nuclear Generating Plant, Units 1 and 2 (PINGP), respectively. These amendments changed the PINGP Technical Specifications (TSs) to allow the use of Westinghouse 422 VANTAGE+ nuclear fuel and made changes to certain references identified in the Design Features section of the TSs.

Subsequent to the issuance, Mr. Len Sueper of your staff pointed out some errors in the safety evaluation (SE) supporting the amendments. We agree that editorial errors had been inadvertently made, resulting in some inaccurate statements in the SE. Enclosed please find the corrected pages 29, 30, and 51 of the SE, with side bars highlighting the areas of correction.

The NRC regrets any inconvenience that these editorial errors may have caused. If there are any questions regarding this matter, please contact me at 301-415-4037.

Sincerely,

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

Enclosure:
As stated

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2.4.2.2 LOCA Technical Evaluation

The specific evaluations performed by the licensee address the acceptance criteria contained in 10 CFR 50.46(b)(1) through (b)(3), and (b)(5). By demonstrating compliance with these criteria, regarding PCT, local and core-wide oxidation, and long-term cooling capability, the licensee adequately demonstrates compliance with 10 CFR 50.46(b)(4), which requires that the core remain in a coolable geometry.

2.4.2.2.A Large Break LOCA

By letter dated July 6, 2006, the licensee for PINGP Units 1 and 2 requested to implement new analytic methods to analyze large break LOCAs. Based on its detailed review of the licensee's (1) selection of analytic techniques, (2) implementation of analytic techniques, and (3) results of analysis, the NRC staff concluded that the licensee could use the referenced methods to analyze LOCAs and demonstrate compliance with the requirements of 10 CFR 50.46. Reference 25 contains the staff's evaluation; the NRC staff summarizes in the following section the methods, their implementation, and the analytic results, which are based on the same method as described in Reference 25 but account for the fuel transition.

Large break LOCA analyses supporting the proposed fuel upgrade were performed by the licensee using the NRC-approved Automated Statistical Treatment of Uncertainty Method (ASTRUM) best-estimate large break LOCA (BE-LBLOCA) methodology (Reference 26). The licensee's method was approved by the NRC for implementation at PINGP Units 1 and 2 by Amendment 179 to the PINGP Unit 1 Facility Operating License, and Amendment 169 to the PINGP Unit 2 Facility Operating License. The NRC staff reviewed the fuel transition-related analytic results to confirm that they were acceptable.

The purpose of the licensee's analysis was to demonstrate conformance with the 10 CFR 50.46 requirements using the ASTRUM method. Important input assumptions, as well as analytical models and analysis methodology for the BE-LBLOCA were provided. Analysis results were also provided, which showed that no design or regulatory limit related to the BE-LBLOCA would be exceeded at the analyzed conditions.

The licensee provided results of the PINGP Units 1 and 2 BE-LBLOCA analysis in the LR, assuming that each plant is operating at 1,683 MWt, in accordance with the statistical best estimate approach. The licensee correctly assumed a loss of offsite power. The licensee evaluated transition core effects and concluded that the ASTRUM analysis for the 422V+ core at both units bounds both the 400V+ and transition cores. The results for calculated PCTs, the maximum local cladding oxidations, and the maximum core-wide cladding oxidations are repeated in the following table, based on the limiting results obtained in Unit 1:

Parameter	PINGP Unit 1 Result	10 CFR 50.46 Limit
Limiting Break Size/Location	Split Break/Cold Leg (Reference 36)	N/A
Cladding Material	ZIRLO™	(Cylindrical) Zircaloy or ZIRLO™
Peak Cladding Temperature	1765°F	2200°F
Maximum Local Oxidation	0.62-percent	17.0-percent
Maximum Total Core-Wide Oxidation	0.014-percent	1.00-percent

Revised by letter dated August 31, 2009

These results demonstrate acceptable compliance with 10 CFR 50.46(b)(1) through (b)(3). The results are discussed further in Reference 1.

The NRC staff reviewed the ASTRUM methodology, and confirmed that, in addition to the limiting split break, the method also considers slot breaks in the RCS cold leg. On this basis, the NRC staff finds the licensee's conclusion that the PINGP Units 1 and 2 PCT-limiting transient is a split break acceptable, because uncertainties related to break type and size were included in the modeling approach.

The licensee evaluated the possibility of a return to criticality during the reflood stage of the LOCA and confirmed that an increase in the TS minimum boric acid concentration in the ECCS equipment would be needed. This change is acceptable with respect to the BE-LBLOCA evaluation because the increase is explicitly calculated and shown to prevent a return to criticality. This change is also evaluated for the potential for boric acid precipitation in Section 2.4.2.2.D of this SE, and the TS change request is evaluated in Section 3.2 of this SE.

Based on its review of the licensee's application of the ASTRUM BE-LBLOCA methodology, the NRC staff concluded that the Westinghouse BE LBLOCA methodology is acceptable for use for PINGP Units 1 and 2 in demonstrating compliance with the requirements of 10 CFR 50.46(b)(1) through (b)(3), operating with the requested fuel upgrade. The NRC staff's conclusion was based on the fact that the PINGP Units 1 and 2 analyses were conducted within the conditions and limitations, and supporting technical basis, of the NRC-approved Westinghouse BE LBLOCA methodology.

2.4.2.2.B Small Break LOCA

The small break LOCA (SBLOCA) includes all postulated pipe ruptures with a total cross-sectional area less than 1.0 square foot. The SBLOCAs analyzed are for those breaks beyond the capability of a single charging pump, resulting in the actuation of the ECCS. The analysis was performed to demonstrate conformance with the 10 CFR 50.46 requirements for the fuel upgrade conditions associated with PINGP, Units 1 and 2.

The licensee analyzed small break LOCAs using the NOTRUMP-EM as described in WCAP-10054-P-A, WCAP-10054-P-A, Addendum 2, and WCAP-10079-P-A (Reference 27). In consideration of the proposed fuel transition, the NRC staff reviewed the results to confirm that the licensee complies with the 10 CFR 50.46 requirements.

The licensee considered a spectrum of cold-leg break sizes that included equivalent diameters of 1.5, 2, 3, 4, 6, and 8 inches and an accumulator line break of 10.126 inches. At Unit 1, the 3-inch break was limiting with a PCT of 959°F, and at Unit 2, the 2-inch break was limiting with a PCT of 965°F. Intermediate break sizes were not considered because the evaluated spectrum demonstrated significant margin to the 2200°F limit set forth by 10 CFR 50.46. The licensee's results indicated that, for the 1.5, 6, 8, and 10.126-inch breaks, core uncovery was not expected at either unit.

The licensee acknowledged an NRC concern that top-oriented breaks could lead to longer term core uncovery due to the potential for RCP loop seal plugging. The licensee stated that such a scenario is very unlikely because it relies on a very delicate set of conditions. The licensee indicated that a more likely scenario would be core mixture level oscillations associated with the loop seals plugging with water and subsequently clearing due to the buildup of steam pressure

Use of Westinghouse 0.422-inch OD 14x14 VANTAGE+ Fuel (TAC Nos. MD9142 and MD9143) – Letter to U. S. Nuclear Regulatory Commission, May 4, 2009 (ADAMS Accession No. ML091310384).

36. Dederer, S.I. et al., Westinghouse Electric Company, LLC, "Application of Best Estimate Large Break LOCA Methodology to Westinghouse PWRs With Upper Plenum Injection," WCAP-14449-P-A, Revision 1, October 1999.

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