January 27, 2003

Mr. Mano Nazar
Site Vice President
Prairie Island Nuclear Generating Plant
Nuclear Management Company, LLC
1717 Wakonade Drive East
Welch, MN 55089

SUBJECT: PRAIRIE ISLAND NUCLEAR GENERATING PLANT, UNITS 1 AND 2 - TOPICAL REPORT, NSPNAD-97002-P, "PRAIRIE ISLAND NUCLEAR GENERATING PLANT MAIN STEAM LINE BREAK METHODOLOGY" (TAC NOS. MB5644 AND MB5645)

Dear Mr. Nazar:

In a letter dated July 19, 2002, you informed us of an inconsistency both within the subject topical report and the associated Nuclear Regulatory Commission (NRC) staff safety evaluation, dated January 21, 2000. Specifically, the inconsistency pertains to whether it is within the Prairie Island licensing basis to assume an active failure of a main steamline nonreturn check valve.

Your July 19, 2002, letter stated as follows:

> The licensing basis for the non-return check valves (NRCVs) regarding single failure criteria is that they are considered subject to "passive failure" criteria, as supported by AEC/NRC staff practice at the time of the licensing of Prairie Island. However, in the topical report Prairie Island made statements referring to analysis that had been performed assuming the failure of a NRCV and that this was a less limiting single failure than other postulated failures with regard to peak containment pressure and temperature. The NRC's SER [safety evaluation report] appears to accept the topical report partially based on the report's discussion that this was not the limiting failure. However, the sensitivity studies which established that failure of a NRCV was less limiting were performed using an earlier version of the methodology than the final methodology submitted for review. There was an oversight in not removing the discussion (of the sensitivity studies of failure of the NRCV) from the topical report since the intention at the time of submittal was to treat the valves per the licensing basis.

The issue of crediting the nonreturn check valve is discussed in Section 3.6 of the NRC staff's safety evaluation as follows:

> The licensee's analysis takes credit for the operation of the main steam nonreturn check valve associated with the ruptured steamline. This is a change from previous analysis assumptions since the nonreturn check valve was relied upon only in the case that the MSIVs [main steam isolation valves] failed to operate.

> Previous analyses assumed that steamline isolation did not occur until 10 seconds after initiation of the break, which effectively ignores the steamline nonreturn check valves and relies exclusively on the MSIVs to prevent blowdown of the unaffected steam generator. The MSIV and nonreturn check valves are of identical construction except for the air cylinder operator on the MSIV. The licensee estimates that the check valves will close in less than 0.1 seconds for a double-ended guillotine MSLB [main steamline break], and that they would close in less than 0.5 seconds relying only on gravity. The licensee assumed for all cases analyzed, that the check valve closes 1 second after forward steam flow through the valve ceases.
>
> SRP [Standard Review Plan] 6.2.1.4 discusses appropriate single failure considerations for MSLB. The SRP allows for the operation of nonsafety grade equipment to backup assumed failures of steam or feed system isolation safety-grade equipment. SRP 15.1.5 states that for main steam system pipe failures inside containment and upstream of the MSIVs, only safety grade equipment should be assumed operative. The SRP also discusses the option to use non-safety-grade components as backup to failed safety-grade components.
>
> The licensee provided information indicating that the nonreturn check valves are included as safety-related components in the Quality Assurance program and are included in both the inservice inspection and the inservice testing programs (Reference 5) [Northern States Power letter from Roger O. Anderson (NSP) to NRC, "Additional Information on Proposed Revision to Main Steam Line Break Methodology dated June 26, 1997," December 17, 1998]. The licensee also provided information in response to staff questions regarding the ability of the nonreturn check valves to withstand the loads expected during MSLB and the basis for the estimated closure time for the valves for all break sizes evaluated. The licensee referenced information from the USAR [Updated Safety Analysis Report] for the plant that included structural analyses demonstrating that the valves would withstand MSLB loads (Reference 2) [Northern States Power letter from Roger O. Anderson (NSP) to NRC, "Additional Information on Proposed Revision to Main Steam Line Break Methodology, dated June 26, 1997," August 18, 1999]. The analysis was performed for the worst-case loading conditions for the MSIV resulting from MSLB, which bound the loads that the nonreturn check valve would experience during the event.
>
> The licensee also referred to USAR information that included analyses of closure times for the check valves. The analyses concluded that the valves would shut in 0.5 seconds by gravity alone. Therefore, the assumption that the valves close in 1 second after forward flow ceases appears to be conservative for all of the break sizes considered.

The performance information discussed above provides reasonable assurance that the nonreturn check valves will perform the required function on demand. In addition, your treatment of the nonreturn check valve failure to reposition as a passive failure is consistent with your licensing basis. As a result, the single failure consideration does not need to include the nonreturn check valve failure. Therefore, the NRC staff concludes that nonreturn check valve operation can be credited in the MSLB analysis.

Based on the above excerpt from the NRC staff's safety evaluation, it is clear that the assumed operation of the main steamline nonreturn check valve associated with the ruptured steamline is

allowed, as proposed in the topical report. However, it is also clear that this NRC staff position was partially based on the discussion in the topical report, which stated that assumed check valve failure was less limiting than other postulated single failures.

In your July 19, 2002, letter, you stated that a recent reanalysis results showed that failing a nonreturn check valve resulted in a slightly higher containment peak temperature and pressure than what had been considered the limiting single failure. We note that the operating procedures were promptly changed to ensure that the postulated peak containment pressure would remain below the acceptable limit in the event of an MSLB inside the containment, and the procedural limits remain in place.

This completes our review under TAC Nos. MB5644 and MB5645.

If you have any questions regarding this matter, please contact me at (301) 415-1446.

Sincerely,

/RA/

John G. Lamb, Project Manager, Section 1
Project Directorate III
Division of Licensing Project Management
Office of Nuclear Reactor Regulation

Docket Nos. 50-282 and 50-306

cc: See next page

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