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U S Nuclear Regulatory Commission
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PRAIRIE ISLAND NUCLEAR GENERATING PLANT

Docket Nos. 50-282 License Nos. DPR-42
50-306 DPR-60

**Main Steam Line Break Topical Report, NSPNAD-97002-P, "Prairie Island Nuclear
Generating Plant Main Steam Line Break Methodology"**

The purpose of this letter is to inform the USNRC concerning an inconsistency between the licensing basis for Prairie Island Units 1 and 2 and the USNRC Safety Evaluation Report (SER) approving the application of the subject topical report.

By letter dated June 26, 1997, as supplemented July 29, October 16, and December 17, 1998, and August 18, 1999, Prairie Island requested NRC approval of the subject topical report. The report describes the reload safety evaluation analysis methodology for plant response during postulated design-basis main steam line break (MSLB) events for both Unit 1 and Unit 2. By letter dated January 21, 2000, the NRC determined that the topical report methodology was acceptable for modeling the reactor coolant system and core response, as well as the containment pressure and temperature response to MSLB events at Prairie Island, subject to certain limitations discussed in the NRC's SER.

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 that indicate that analysis 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 appears to accept the topical report partially based on the report's discussion that this was not the limiting failure.

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In February 2002, we determined that topical report statements regarding the treatment of the consideration of active failures of the Main Steam NRCVs were confusing relative to those assumptions in the Prairie Island licensing basis, and that the NRC staff may have misunderstood those assumptions when reviewing and approving the topical report. A Condition Report was written in February 2002 to address the possible misunderstanding; this letter is one of the corrective actions resulting from that Condition Report. Further information is included in the attachment.

Since the plant's licensing basis is that these valves need not be assumed to actively fail, it is appropriate for the methodology presented in the topical report to be used assuming the closure of these valves upon flow reversal. This letter is intended to inform the NRC staff that the topical report statements to the contrary are in error and to request NRC concurrence with the NMC staff's understanding of the Prairie Island licensing basis and associated topical report statements. In this letter we have made no new regulatory commitments. Please contact Jack Leveille (651-388-1121, ext. 4142) if you have any questions related to this letter.



Mano K. Nazar
Site Vice President
Prairie Island Nuclear Generating Plant

c: Regional Administrator - Region III, NRC
Senior Resident Inspector, NRC
NRR Project Manager, NRC

Attachment

Attachment

Background

By letter dated June 26, 1997, as supplemented July 29, October 16, and December 17, 1998, and August 18, 1999, Prairie Island requested NRC approval of the subject topical report. The report describes the reload safety evaluation analysis methodology for plant response during postulated design-basis main steam line break (MSLB) events for both Unit 1 and Unit 2. By letter dated January 21, 2000, the NRC determined that the topical report methodology was acceptable for modeling the reactor coolant system and core response, as well as the containment pressure and temperature response to MSLB events at Prairie Island, subject to certain limitations discussed in the NRC's Safety Evaluation Report (SER).

Discussion

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 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.

Upon discovery of the apparent discrepancy between the topical report statements (saying the NRCVs are considered subject to "passive failure" criteria versus failure of a NRCV being non-limiting), an analysis was performed which showed that, indeed, failing a NRCV resulted in a slightly higher containment peak temperature and pressure than what had been considered the limiting single failure. The postulated peak containment pressure slightly exceeded the acceptance criteria, assuming the operating parameters allowed by plant operating procedures in place at the time.

Because of the uncertainty regarding the basis for the NRC approval of the methodology, the operating procedures were promptly changed. The changes ensured that the postulated peak containment pressure would remain below the acceptable limit in the event of a MSLB inside containment (MSLBIC). The procedural limits continue to protect that limit, assuming NRCV failure.

Since our understanding of the plant's licensing basis is that these valves need not be assumed to actively fail, it is appropriate for the methodology presented in the topical

report to be used assuming the closure of these valves upon flow reversal. Support for our understanding comes from two main sources:

1) USAR discussion of General Design Criteria

USAR Section 1.5 has a discussion of "General Design Criteria" (GDC). The GDC for Prairie Island were based on the AEC's GDC published on July 10, 1967 which preceded the GDC published as Appendix A to 10 CFR 50 in 1971.

The USAR discussion of GDC, Criterion 21 - "Single Failure Definition" defines a passive failure in a fluid system as a "breach in the fluid pressure boundary or a mechanical failure which adversely affect a flow path. Examples include the failure of a simple check valve to move to its correct position when required or leakage from failed components (such as a pump seal or valve packing)." The discussion of this criterion also allows that, during the short term, "the single failure considered may be limited to an active failure."

Thus, each NRCV, as a simple check valve, may be assumed to move to its correct position for the MSLB accident analysis since the need for this valve to be in its correct position is only in the very short term.

2) NRC Guidance on Single Failure Criterion

SECY-77-439, dated August 17, 1977, provides a staff information paper on single failure criterion and its application. This information paper clearly indicates that the staff considered a check valve failure to reposition as a passive failure; specifically refer to section 2.D in the paper. This information paper was issued subsequent to licensing Prairie Island; however, with regards to application of single failure assumptions to check valves, it is considered to be consistent with the regulatory practice at the time of Prairie Island licensing. The change to assuming check valves failure as an active failure occurred subsequent to the issuance of this document. This is discussed in Section 6 of the SECY paper. In Section 6, the SECY paper discusses ongoing activities related to single failure criterion and application; specifically, the paper discusses ANS standard ANSI N658 (issued in 1975). To quote:

"The staff review of this Standard disclosed several deficiencies which relate primarily to inconsistencies with current regulatory practice and to areas which staff application of the Single Failure Criterion is not yet fully defined. For example: (1) ..., (2) some passive failures would be treated as active failures (e.g., check valves) contrary to staff practice."

Note that, subsequently, the NRC staff practice has changed to consider check valves as active failures. However, this does not affect the Prairie Island licensing basis.

Summary

Discussion of failure of the NRCVs with relation to limiting cases was inappropriate since the valves are considered subject to the "passive failure" criteria of Prairie Island's licensing basis. Thus, it is appropriate that the methodology treat the valves as performing their isolation function, without failure, within 1 second as discussed in the topical report.