



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

SAFETY EVALUATION BY THE OFFICE OF NUCLEAR REACTOR REGULATION
RELATED TO AMENDMENT NO. 58 TO FACILITY OPERATING LICENSE NO. DPR-42
AND AMENDMENT NO. 52 TO FACILITY OPERATING LICENSE NO. DPR-60
NORTHERN STATES POWER COMPANY
PRAIRIE ISLAND NUCLEAR GENERATING PLANT, UNIT NOS. 1 AND 2
DOCKET NOS. 50-282 AND 50-306

I. Introduction

By letter dated June 14, 1982 (Ref. 1), Northern States Power Company made application to amend the Technical Specifications for Prairie Island Nuclear Generating Plant, Units 1 and 2, in order to continue the current Cycle 7 operation of Unit 1 to higher fuel exposure. The change involved an exposure-dependent power peaking factor limit defined over a range of 0 to 41,850 MWd/MtU peak pellet exposure. In our letter dated July 16, 1982 (Ref. 2), we approved an extension in the range of this limit to 47,000 MWd/MtU. This change expanded the burnup range over which the limit was defined to accommodate anticipated exposures at Prairie Island. Our approval, however, was based on the licensee's documentation (Ref. 3) supporting operation to 47,000 MWd/MtU, rather than a somewhat higher value (50,000 MWd/MtU) actually requested by the licensee.

In a letter dated July 7, 1982 (Ref. 4), Northern States Power Company provided additional information supporting operating beyond 47,000 MWd/MtU and, in a letter dated September 24, 1982 (Ref. 5), requested an extension to 51,000 MWd/MtU.

Evaluation

We have examined the supporting documents (Refs. 3-4) for this request, which describe LOCA reanalyses by Exxon. Most of the methods employed have been

previously reviewed and approved by the staff and are therefore acceptable for this application. Three exceptions to this general conclusion were identified in our approval (Ref. 2) of the extension to 47,000 MWd/MtU. These exceptions were (1) cladding swelling and rupture behavior, (2) improved neutronics input, and (3) application of analytical methods at high burnup.

Our previous evaluation of the first two exceptions continues to apply to the extension beyond 47,000 MWd/MtU. The third issue involves the application of analytical methods at high burnup, where the models may not have been verified. This issue was identified in 1981 (Ref. 6) when the NRC staff, after meeting with key industry representatives, recommended that the industry limit burnup levels to those previously experienced by each plant or to batch average discharge exposures of 33,000 MWd/MtU, whichever was greater. The basis for this recommendation was that safety analysis methods were generally verified only to the burnup levels sought at that time, approximately 33,000 MWd/MtU on a batch average basis, and requests for higher burnup levels would require a technical justification to support application of the methods at higher burnup levels.

Assuming a peak pellet-to-batch average burnup ratio of 1.3, the previously-approved extension to 47,000 MWd/MtU would result in a batch average discharge exposure of 36,150 MWd/MtU. Coincidentally, this value corresponds to the previous maximum batch-average discharge exposure at the Prairie Island Station and, therefore, conformed to those limits recommended by the staff.

The proposed extension of the burnup limit to 51,000 MWd/MtU peak pellet would result in batch average discharge exposures in excess of those previously achieved at Prairie Island. However, the staff recommendation on operation at high burnup was informal and was not based on any existing regulatory requirement. Because the staff recommendation was not binding and because the current analysis was performed with methods acceptable to us and otherwise conforms with all regulations, we find the proposed extension acceptable.

In addition, the analysis supports the extension of the normalized burnup dependent function, $BU(E_j)$ currently in the Prairie Island technical specifications Figure TS 3.10-7. This figure defining the coordinates of $BU(E_j)$ vs. Burnup as (0.0, 1.00), (36.7, 1.00) and (51, 0.86) is acceptable.

In arriving at this conclusion, we find that a number of related comments should be made.

1. In the case of Prairie Island, the fuel vendor (Exxon) has submitted a generic topical report (Ref. 7) which does provide a basis for applying the Exxon methods at extended burnup. Our review of this document is not yet completed. However, the vendor has identified no unanticipated problems in applying the methods at high burnup and, as of this writing, neither has the staff.
2. The fact that the licensee was required to submit the proposed extension for review is an artifact of the analyses employed. The previous fuel vendor for Prairie Island (Westinghouse) did not incorporate a burnup dependence in the Technical Specification total peaking factor. As a result, the licensee would not have had to change the Technical Specifications in order to achieve higher burnups if Westinghouse fuel were still being used.
3. The incremental increase in discharge exposure (approximately 3,000 MWd/MtU on a batch average basis) is relatively small and the peak burnups will be achieved in only a few assemblies. The change should thus preclude any sudden, unexpected changes in fuel behavior.

III. Conclusions

We have examined the licensee's request for an extension of the exposure-dependent power peaking factor at Prairie Island Unit 1 as defined in Reference 5. We find the proposed change acceptable for both Units to a peak pellet exposure of 51,000 MWd/MtU.

Environmental Consideration

We have determined that the amendments do not authorize a change in effluent types or total amounts nor an increase in power level and will not result in any significant environmental impact. Having made this determination, we have further concluded that the amendments involve an action which is insignificant from the standpoint of environmental impact and, pursuant to 10 CFR §51.5(d)(4), that an environmental impact statement or negative declaration and environmental impact appraisal need not be prepared in connection with the issuance of these amendments.

Conclusion

We have concluded, based on the considerations discussed above, that: (1) because the amendments do not involve a significant increase in the probability or consequences of an accident previously evaluated, do not create the possibility of an accident of a type different from any evaluated previously, and do not involve a significant reduction in a margin of safety, the amendments do not involve a significant hazards consideration, (2) there is reasonable assurance that the health and safety of the public will not be endangered by operation in the proposed manner, and (3) such activities will be conducted in compliance with the Commission's regulations and the issuance of the amendments will not be inimical to the common defense and security or to the health and safety of the public.

Date: October 18, 1982

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REFERENCES

1. D. Musolf (NSP) letter to the Director, Office of Nuclear Reactor Regulation (NRC) on "License Amendment Request", dated June 14, 1982.
2. D. C. DiIanni (NRC) letter to D. M. Musolf (NSP) dated July 16, 1982.
3. "LOCA ECCS Limiting Break and Exposure Sensitivity Analysis for ENC XN1 and XN2 Reloads at Prairie Island Unit 1 with 5 Percent Steam Generator Tubes Plugged Using ENC WREM IIA PWR Evaluation Model," Exxon Nuclear Company Report XN-NF-81-06 dated February 6, 1981 and transmitted by D. Musolf (NSP) letter to the Director, Office of Nuclear Reactor Regulation (NRC) dated June 15, 1982.
4. "LOCA ECCS Limiting Break and Exposure Sensitivity Analysis for ENC XN1 and XN2 Reloads at Prairie Island Unit 1 with 5 Percent Steam Generator Tubes Plugged Using ENC WREM IIA PWR Evaluation Model," Exxon Nuclear Company Report XN-NF-81-06, Supplement 1, dated June 29, 1982 and transmitted by D. Musolf (NSP) letter to the Director, Office of Nuclear Reactor Regulation (NRC) dated July 7, 1982).
5. D. Musolf (NSP) letter to the Director, Office of Nuclear Reactor Regulation (NRC) dated September 24, 1982.
6. M. Tokar (NRC) memorandum for W. V. Johnston (NRC) on "Extended Burnup Fuel - Generic Kickoff Meeting" dated February 18, 1981.
7. M. J. Ades, "Qualifications of Exxon Nuclear Fuel for Extended Burnup," Exxon Nuclear Company Report XN-NF-82-06, dated March 1982.