

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

SAFETY EVALUATION BY THE OFFICE OF NUCLEAR REACTOR REGULATION

RELATED TO AMENDMENT NO. 97 TO FACILITY OPERATING LICENSE NO. DPR-63

NIAGARA MOHAWK POWER CORPORATION

NINE MILE POINT NUCLEAR POWER STATION, UNIT NO. 1

DOCKET NO. 50-220

INTRODUCTION

By letter (NMP1L 0177) from C. V. Mangan, Niagara Mohawk Power Corporation (NMPC), to NRC dated August 21, 1987 (Ref. 1), Technical Specification (TS) changes were requested for Specification 3.1.7, Figure 3.1.7f and the Bases for 3.1.7 and 4.1.7 set forth in Appendix A to that license be amended to reflect new methodology in establishing the Maximum Average Planar Linear Heat Generation Rates (MAPLHGR) for the P8DRB299 fuel type. In a separate submittal by letter (NMP1L 0210) from T. Lempges (NMPC) to NRC dated December 18, 1987 (Ref. 2), NMPC has proposed that Specifications 2.1.1 and 3.1.7, Figures 2.1.1 and 3.1.7g, and the associated Bases for 2.1.1, 3.1.7, and 4.1.7 be amended in order to reflect the Maximum Total Peaking Factor and addition of the MAPLHGR for the General Electric Fuel bundle type BD321B (GE8x8EB) (Ref. 2a).

By letter (NMP1L 1086) dated September 14, 1987, the licensee applied for withholding from public disclosure, as proprietary, a report that accompanied the August 21, 1987 letter. A non-proprietary version of that report was provided with the licensee's letter NMP1L 0208, dated December 17, 1987. The staff's consideration of the September 14 and December 17 letters has only to do with making a finding related to the proprietary nature of a document and does not affect this safety evaluation; it will be reported separately.

By letter (NMP1L 0232) dated March 9, 1988, the licensee provided clarifying information concerning the new fuel and indicated a minor change in the fuel mix for Cycle 10. The effect of this change has been considered in the staff's evaluation. Because the submittal provided supplemental information which did not modify any proposed TS, it did not affect the substance of the proposed action or the staff's initial determination published in the Federal Register on February 10, 1988.

DISCUSSION AND EVALUATION

Reload Description

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The Nine Mile Point Unit 1 (NMP-1) Cycle 10 reload (Ref. 3) will retain 156 P8DNB277 fuel assemblies from Cycle 8 and 200 P8DRB299 fuel assemblies from Cycle 9, and will add 176 new BD321B fuel assemblies (GE8x8EB) (Ref. 2a). The loading will be a conventional scatter pattern with low reactivity fuel on the periphery.

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Fuel Design

The new fuel assembly to be used for NMP-1 Cycle 10, BD321B (GE8x8EB fuel) has been approved for inclusion in NEDE-24011, GESTAR II (Amendment 18). This fuel type has been analyzed for this application (Refs. 4a and 4b) with approved methods (Ref. 5) and meets the approved limits of GESTAR II (Ref. 6). Therefore, the new fuel is acceptable for NMP-1 Cycle 10.

Nuclear Design

The nuclear design for NMP-1 Cycle 10 has been performed with the methodology described in GESTAR II (Ref. 6). The results of those analyses are given in Reference 3. The shutdown margin (SDM) is 4.6% delta k at the beginning of cycle and 1.2% delta k at the minimum conditions. Therefore, it meets the required .38% delta k shutdown margin. The standby liquid control system also meets shutdown requirements with a shutdown margin of 4.1% delta k. Since these and other NMP-1 Cycle 10 nuclear design parameters have been obtained with previously approved methods and fall within expected ranges, the nuclear design is acceptable.

Thermal-Hydraulic Design

The thermal-hydraulic design for NMP-1 Cycle 10 has been performed with the methodology described in GESTAR II (Ref. 6) and the results are given in Reference 3 for the NMP-1.

The licensee has proposed that two MAPLHGR curves for the fresh fuel bundles of BD321B (Figure 3.1.7g) and P8DRB299 (Figure 3.1.7f) be added to the NMP-1 Cycle 10 Technical Specifications. These MAPLHGR curves are generated based on the approved methodology (Ref. 5) and the results, which conform to 10 CFR 50 Appendix K requirements and meet 10 CFR 50.46 criteria, are given in References 4a and 4b. We find these changes are acceptable.

The licensee has also proposed to eliminate exposure dependent Minimum Critical Power Ratio (MCPR) limits and to use one MCPR which is applicable for the entire cycle. The MCPR limits were calculated using approved methodology (Ref. 6) and documented in Reference 3. The limiting transients have been analyzed and the results indicate that if a MCPR of 1.37 is maintained throughout the cycle, it will assure that the safety limit MCPR will not go below 1.07. Therefore, we find the TS MCPR of 1.4 through the entire cycle to be acceptable.

NMP-1 Cycle 10 uses the approved GE fuel type GE8x8EB which has been shown to have adequate stability margin (Ref. 7) and therefore is acceptable and its reload cycle is exempted from the current requirement to submit a cycle specific stability analysis to the NRC.

Transient and Accident Analyses

The transient and accident analysis methodologies used for NMP-1 Cycle 10 are described in GESTAR II (Ref. 6) and the results are provided in Reference 3. The core wide transient including loss of 100°F feedwater heating, turbine

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trip without bypass and feedwater controller failure, local rod withdrawal error, and the Main Steam Isolation Valve Closure (no scram) are performed using approved methods (Ref. 6) and the results are acceptable and fall within expected ranges.

The Rod Drop Accident (RDA) was not specifically analyzed for NMP-1 Cycle 10. NMP-1 uses a Banked Position Withdrawal Sequence for control rod withdrawal. For plants using this system the RDA event has been statistically analysed generically and it was found that with a high degree of confidence the peak fuel enthalpy would not approach the NRC limit of 280 cal/gm for this event. This approach and analysis has been approved by the NRC (Ref. 6). This approach is acceptable for NMP-1 Cycle 10.

Technical Specifications

The Technical Specification changes are for the most part minor and provide the MAPLHGR limits for a new fuel type. Details of the specification changes follow:

1) Specification 2.1.1, Bases 2.2.1 and Figure 2.1.1 - Changes include the formula contained in Figure 2.1.1 for adjusting the flow biased scram and APRM rod block setpoints in those cases where the calculated total peaking factor exceeds the maximum total peaking factor for the fuel type, specifically the GE8x8EB is the new fuel to be added to the core during the 1988 refueling and maintenance outage. The maximum total peaking factor for the GE8x8EB fuel was calculated by GE to be 2.90. This change has been clarified in the note of Figure 2.1.1, which reads: in cases where for a short period the total peaking factor (PKFL) exceeds the maximum total peaking factor (MTPF), rather than adjusting the APRM setpoints, the APRM gain may be adjusted so that the APRM readings are greater than or equal to core power X PKFL/MTPF provided that the adjusted APRM reading does not exceed 100% of rated thermal power and a notice of adjustment is posted on the reactor control panel. We find that this revision provides needed flexibility during startup and power escalation to rated conditions and is acceptable. Due to addition of new fuel GE8x8EB, a 2.9 maximum total peaking factor (MTPF) for GE8x8EB fuel was included in Bases 2.1.1. We find this to be acceptable. Addition of Reference 15 to References for Bases 2.1.1 and 2.1.2 is acceptable. This Reference 15 is a letter from C. Thomas (NRC) to J. Charnley (GE) dated May 28, 1985, "Acceptance for Referencing of Licensing Topical Report NEDE-24011-P-A, Amendment 10."

2) Specification 3.1.7, Bases 3.1.7 and 4.1.7 and Figures 3.1.7f and 3.1.7g -The proposed changes to Specification 3.1.7 and the addition of Figures 3.1.7f and 3.1.7g reflects the use of the SAFER/CORECOOL/GESTAR-LOCA computer codes and methodology (Ref. 4b) and the addition of maximum average planar linear heat generation rate (MAPLHGR) limits for the GE8x8EB fuel. The methods used to analyze the loss of coolant accident response of P8DRB299 and GE8x8EB fuel conform to 10 CFR 50 Appendix K requirement and were approved by the staff (Ref. 5). Therefore, the changes are acceptable. The results of the limiting transients (Ref. 3) indicate that if a minimum critical power ratio of 1.37 is maintained throughout the cycle, it will assure that the minimum critical power ratio will not go below 1.07 during the most limiting transient. The

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proposed TS change to 1.40 MCPR throughout the entire fuel cycle is above the minimum required critical power ratio of 1.37. Therefore, the TS change is acceptable.

The supporting documents (refs. 4a and 4b) to be added as references 15 and 16 for Bases 3.1.7 and 4.1.7 are acceptable.

As a result of our review, we conclude that the proposed reload and technical specification changes are acceptable.

ENVIRONMENTAL CONSIDERATION

This amendment involves a change in the installation or use of the facility components located within the restricted areas as defined in 10 CFR 20. The staff has determined that this amendment involves no significant increase in the amounts, and no significant change in the types, of any effluents that may be released offsite and that there is no significant increase in individual or cumulative occupational radiation exposure. The Commission has previously issued a proposed finding that this amendment involves no significant hazards consideration and there has been no public comment on such finding. Accordingly, this amendment meets the eligibility criteria for categorical exclusion set forth in 10 CFR 51.22(c)(9). Pursuant to 10 CFR 51.22(b) no environmental impact statement or environmental assessment need be prepared in connection with the issuance of this amendment.

CONCLUSION

We have concluded, based on the considerations discussed above, that: (1) there is reasonable assurance that the health and safety of the public will not be endangered by operation in the proposed manner, and (2) such activities will be conducted in compliance with the Commission's regulations and the issuance of this amendment will not be inimical to the common defense and security or to the health and safety of the public.

Dated: April 19, 1988

PRINCIPAL CONTRIBUTOR:

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- Letter from C. V. Mangan, (NMPC), to NRC (NMP1L 0177) dated August 21, 1987 with Attachment A, "Proposed Changes to Technical Specifications (Appendix A)," and Attachment B, "Supporting Information and No Significant Hazards Conditions Analysis."
- Letter from T. E. Lempges, (NMPC), to NRC (NMP1L 0210) dated December 18, 1987 with Attachment A, "Proposed Changes to Technical Specifications (Appendix A)," and Attachment B, "Supporting Information and No Significant Hazards Consideration Analysis."
- 2a. Letter from C. V. Mangan, (NMPC), to NRC (NMP1L 0232) dated March 9, 1988 with Attachment 23A5862, pages 7 and 14.
- 3. 23A5862, Revision O, October 1987, "Supplemental Reload Licensing Submittal for Nine Mile Point Nuclear Power Station Unit 1, Reload 11."
- 4a. NEDC-31446P, June 1987, "Nine Mile Point Nuclear Station Unit One SAFER/ CORECOOL/GESTAR-LOCA Loss-of-Coolant Accident Analysis."
- 4b. NEDC-31446P-1, September 1987, "Supplement 1 to Nine Mile Point Unit 1 SAFER/CORECOOL/GESTAR-LOCA Loss-of-Coolant Accident Analysis."
- Letter, A. C. Thadani (NRC) to H. C. Pfefferlen (GE), "Acceptance for Referencing of Licensing Topical Report NEDE-30996-P, Volume II, 'SAFER Model for Evaluation of Loss-of-Coolant Accidents for Jet and Non-jet Pump Plants,'" May 1987.
- 6. NEDE-24011-P-A-US, May 1986, "General Electric Standard Application for Reactor Fuel," (GESTAR II).
- 7. Letter, C. O. Thomas (NRC) to H. C. Pfefferlen (GE), "Acceptance for Referencing of Licensing Topical Report NEDE-24011, Rev. 6, Amendment 8 'Thermal Hydraulic Stability Amendment to GESTAR II,'" dated April 24, 1985.

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