



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

SAFETY EVALUATION BY THE OFFICE OF NUCLEAR REACTOR REGULATION
RELATED TO AMENDMENT NO. 82 TO FACILITY OPERATING LICENSE NO. NPF-69
NIAGARA MOHAWK POWER CORPORATION
NINE MILE POINT NUCLEAR STATION, UNIT 2
DOCKET NO. 50-410

1.0 INTRODUCTION

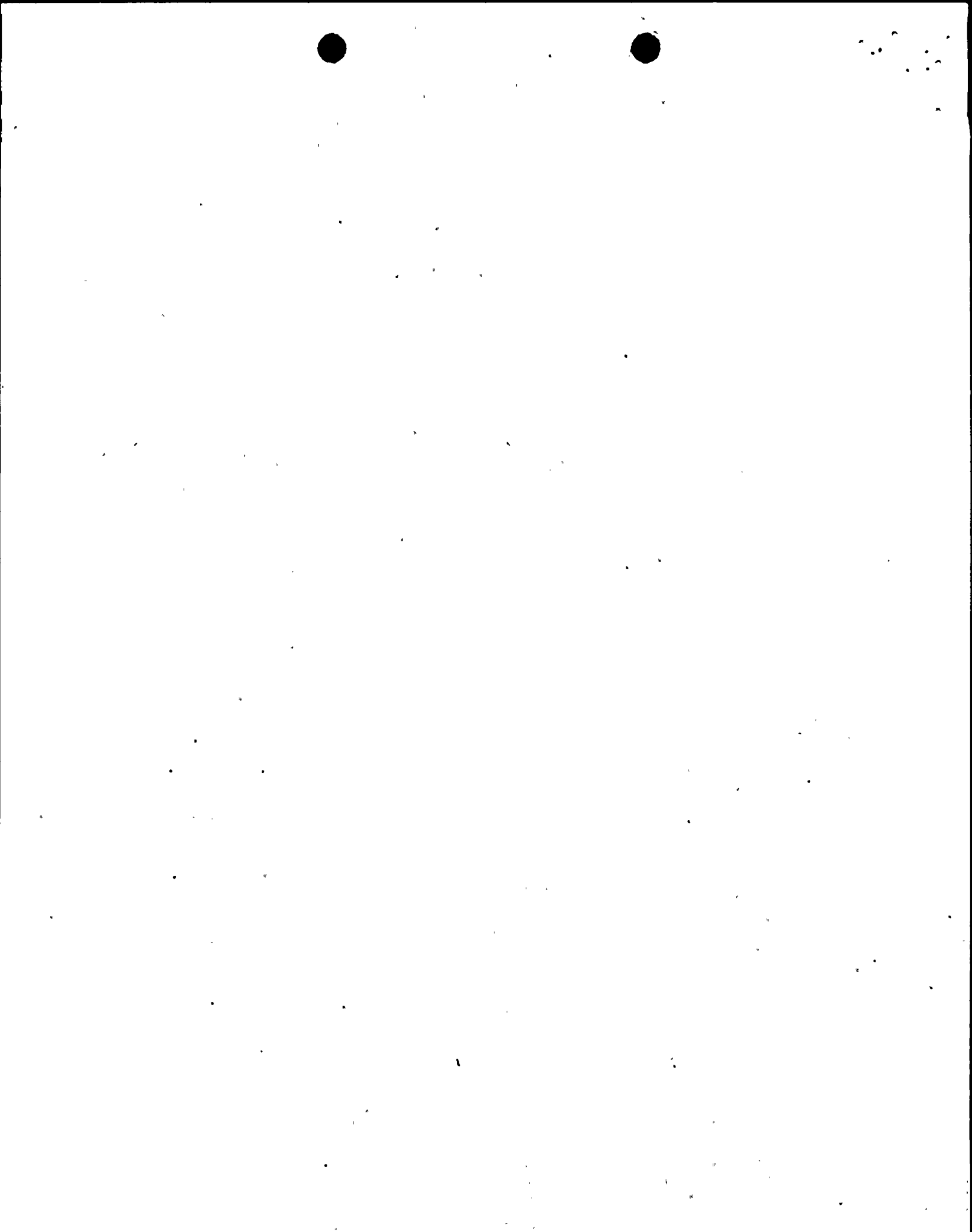
By letter dated December 15, 1997, as supplemented April 24, 1998, Niagara Mohawk Power Corporation (NMPC or licensee) submitted an application to amend the operating license (NPF-69) for Nine Mile Point Nuclear Station Unit 2 (NMP2). The proposed amendment would revise Technical Specifications (TSs) 2.1.2, "Safety Limits--Thermal Power, High Pressure and High Flow," and 3.4.1.1, "Reactor Coolant System--Recirculation System--Recirculation Loops--Limiting Conditions for Operation," by changing the minimum critical power ratio (MCPR) safety limit for the upcoming fuel operating cycle (Cycle 7). The MCPR values would change from 1.07 to 1.09 for operation with both recirculation loops, and from 1.08 to 1.10 for operation with one recirculation loop. An obsolete footnote in TS 3.4.1.1 which states that "The MCPR Safety Limit of 1.07 will be used through the first operating cycle," would be deleted. The associated Bases 2.1 would be changed to (1) reflect the new MCPR values, (2) delete certain details (including Bases Table B2.1.2-1, "Uncertainties Used in the Determination of the Fuel Cladding Safety Limit," and Bases Table B2.1.2-2, "Nominal Values of Parameters Used in the Statistical Analysis of Fuel Cladding Integrity Safety Limit,") and (3) substitute for the deleted detail a reference to General Electric (GE) Standard Application for Reactor Fuel (GESTAR II), NEDE-24011, and to the cycle-specific analysis. The TS Index would be changed to reflect deletion of Bases Tables B2.1.2-1 and B2.1.2-2.

By letter dated April 24, 1998, the licensee supplemented the initial application for amendment to add a footnote stating that the MCPR values are applicable to Cycle 7 operation only. Limiting the new MCPR values to Cycle 7 is consistent with the TS changes as described in the Federal Register (63 FR 4314, January 28, 1998), and does not affect the Commission's finding of initial proposed no significant hazards consideration.

2.0 BACKGROUND

On May 24, 1996, GE notified the NRC staff, pursuant to 10 CFR Part 21, of an error in its generic safety limit calculational methodology, to the effect that the generic MCPR safety limit might be non-conservative when applied to some cycle-specific core and fuel designs. Consequently, GE performed a cycle-specific safety limit calculation for NMP2 Cycle 5. NMPC submitted Licensee Event Report (LER) 96-06, "Incorrect Safety Limit Caused by Inadequate Calculational Procedure," dated June 3, 1996, and provided additional information to the NRC regarding the impact of the nonconservative values. NMPC concluded that neither the MCPR safety limit nor the MCPR operating limit would have been exceeded for any analyzed plant transient, based on the increased safety limit value and the core performance up to that point in

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the operating cycle. For Cycle 6 (which began in November 1996, and ended May 2, 1998, with the start of the current refueling outage), NMPC revised the Supplemental Reload Licensing Report, the Updated Safety Analysis Report (USAR), and Core Operating Limits Report (COLR) to correct the MCPR safety limit. NMPC did not submit an application for license amendment for Cycle 6 to implement the corrective actions described in LER 96-06. Therefore, the current TSs do not reflect the Cycle 6 MCPR safety limit of 1.10 for two recirculation loop operation and the corresponding single loop MCPR safety limit of 1.12. The current NMP2 TSs specify MCPR safety limits of 1.07 for two-loop operation and 1.08 for single-loop operation.

"General Electric Standard Application for Reactor Fuel" (NEDE-24011-P-A), GESTAR II, describes the approved analytical methodologies and requirements for determining the MCPR safety limit and the MCPR operating limit. The cycle-specific thermal limit parameters, including the MCPR operating limit, are specified in the COLR, which the licensee reissues every cycle. GESTAR II specifies, in part, that:

- (1) For every new fuel design, a generic MCPR will be calculated for a large high-power density plant, assuming a bounding equilibrium core;
- (2) For each new fuel design, the applicability of the generic equilibrium core MCPR safety limit will be confirmed for each operating cycle or a plant-specific analysis will be performed; and
- (3) The critical power ratio correlation will be reconfirmed or a new one established whenever there is a change in the wetted parameters of the flow geometry (i.e., fuel, water rod diameter, channel sizing, spacer design).

In addition, NRC and GE instituted interim implementing procedures, which were developed as corrective actions to issues identified in GE's Part 21 reporting and in a notice of noncompliance issued to GE as a result of an NRC inspection in May 1996. Amendment 25 to GESTAR II (NEDE-24011-P-A), which is being reviewed by the NRC staff, incorporates the corrective actions. The interim procedures require, in part, that licensees perform a core-specific MCPR safety limit evaluation for each cycle until the NRC staff approves Amendment 25 to GESTAR II.

3.0 EVALUATION

In the application for amendment, NMPC reaffirmed that the MCPR safety limit for NMP2 Cycle 7 was analyzed in accordance with the NRC-approved methods described in NEDE-24011-P-A-13 (the latest approved revision of GESTAR II) and the subsequent NRC/GE interim procedures documented in Amendment 25 to GESTAR II, which is being reviewed by the NRC staff. NMPC also stated that it will perform the cycle-specific MCPR safety limit calculations for future core reloads using the cycle-specific core loading pattern and power distribution until the NRC staff approves Amendment 25 to GESTAR.

In response to an NRC request, the licensee submitted a supplement to the application for amendment, dated April 24, 1998, to add footnotes to TS Sections 2.1.2 and 3.4.1.1 and TS Bases 2.1.0 that restrict the MCPR safety limit values to Cycle 7.

GE uses a parameter, called "R-factor," to characterize the local peaking pattern relative to any given fuel rod. The NRC staff previously reviewed the R-factor calculation method for the GE11 fuel product line used at NMP2. The proposed cycle-specific MCPR safety limit analysis is based



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on the NRC-approved methodologies specified in GESTAR II (NEDE-24011-P-A-13, Sections 1.1.5 and 1.2.5, which references NEDE-10985-A, "General Electric BWR Thermal Analysis Basis (GETAB): Data, Correlation and Design Application," dated January 1977) for two-loop operations. The revised R-factor calculation method uses the same NRC-approved equation stated in GESTAR II, except that it substitutes rod-integrated powers for the lattice peaking factors to account for the effects of the part-length rod design. The NRC staff finds this approach acceptable.

Appendices D and F of the application for amendment contains GE's evaluation. These appendices discuss the basis for the NMP2 cycle-specific MCPR safety limit evaluation for Cycle 6 and Cycle 7, including the GE11 core-specific input parameters, and the corresponding assumptions. It also explains why the cycle-specific MCPR safety limit calculations for Cycle 6 yield higher values in comparison with the upcoming Cycle 7 values.

The NMP2 Cycle 7 MCPR safety limits were derived using cycle-specific fuel and core parameters, including the actual core loading, conservative variations of projected control blade patterns, the actual bundle parameters, and the cycle exposure range. The key parameters for the MCPR safety limit calculations developed by GE indicate that the cycle-specific safety limit for Cycle 7 has a flatter radial power distribution than Cycle 6. However, the Cycle 7 in-bundle critical power ratio distributions are more peaked than in Cycle 6. The higher core enrichment and the flatter core-wide power distribution for Cycle 7 are offset by the more peaked pin power in comparison to Cycle 6. Consequently, the Cycle 7 MCPR safety limit for NMP2 resulted in a lower value than for the Cycle 6.

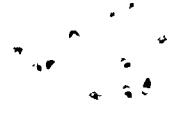
On the basis of its review, the NRC staff finds the proposed changes to Sections 2.1.2 and 3.4.1 of the NMP2 TSs acceptable, because the MCPR safety limits: (1) are based on cycle-specific inputs and analysis; (2) were obtained using NRC-approved methods and procedures; and (3) ensure that 99.9 percent of the fuel rods in the core will not experience boiling transition during an anticipated operational occurrence.

The Cycle 7 MCPR safety limits may not bound the cycle-specific MCPR safety limits for future cycles. Consequently, the MCPR safety limit values are limited to the Cycle 7 reload as stated in the proposed footnotes added to Sections 2.1.2 (including TS Bases 2.1) and 3.4.1.1 of the NMP2 TSs.

The NRC staff also finds that the existing footnote in TS Section 3.4.1.1 that imposes a condition applicable only to the first operating cycle, is obsolete, and thus, its deletion is acceptable. Similarly, the proposed changes to the TS Bases are acceptable as an administrative matter because the changes remove redundant information that is available in the licensing topical report, GESTAR II. The corresponding changes to the index to reflect deleted tables are also acceptable.

3.0 STATE CONSULTATION

In accordance with the Commission's regulations, the New York State official was notified of the proposed issuance of the amendment. The State official had no comments.



4.0 ENVIRONMENTAL CONSIDERATION

The amendment changes a requirement with respect to installation or use of a facility component located within the restricted area as defined in 10 CFR Part 20. The NRC staff has determined that the 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 the amendment involves no significant hazards consideration, and there has been no public comment on such finding (63 FR 4314). Accordingly, the 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 the amendment.

6.0 CONCLUSION

The Commission has 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, (2) such activities will be conducted in compliance with the Commission's regulations, and (3) the issuance of the amendment will not be inimical to the common defense and security or to the health and safety of the public.

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