



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

ATTACHMENT

SAFETY EVALUATION OFFICE OF NUCLEAR REACTOR REGULATION  
AMENDMENT NO. TO LICENSE NO. NPF-69  
NIAGARA MOHAWK CORPORATION  
NINE MILE POINT, UNIT 2  
DOCKET NO. 50-410

1 INTRODUCTION

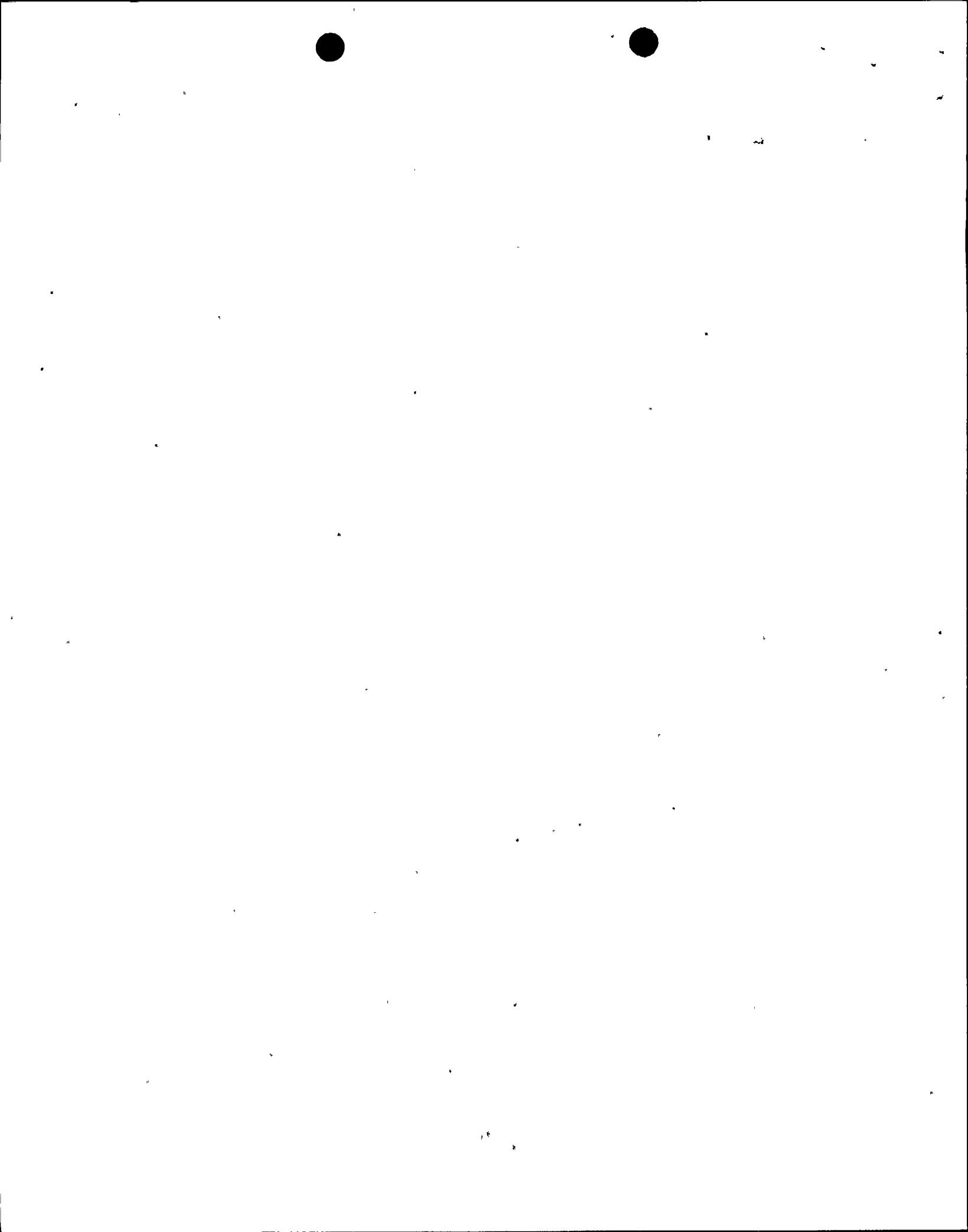
In its application of December 15, 1997, supplemented by its submittal of April 27, 1998, Niagara Mohawk Power Corporation (NMPC, the licensee) requested that the facility operating license for Nine Mile Point, Unit 2 (NMP2), be amended in accordance with 10 CFR 50.90.

Section 2.1.2 of the technical specifications (TS) establishes the minimum critical power ratio (MCPR) safety limits for single and double recirculation loop operation. Section 6.0 of the TS references the latest revision of NRC-approved topical reports used to determine the core operating limits.

"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 core operating limit report, which is reissued 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 General Electric Nuclear Energy (GENE) instituted interim implementing procedures, which were developed as corrective actions to issues identified in GENE's Part 21 reporting and in the notice of noncompliance issued to GENE during the May 1996 NRC inspection. Amendment 25 to GESTAR II (NEDE-24011-P-A-), which is being reviewed by the staff, incorporates the corrective actions. The interim procedures require, in part, that the licensees perform a core-specific MCPR safety limit evaluation for each cycle, until Amendment 25 to GESTAR II is approved.

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## 2 EVALUATION

In its application of December 15, 1997, NMPC proposed the following changes to the TS:

- (1) The MCPR safety limit specified in TS Section 2.1.1 be changed from 1.07 to 1.09 for two recirculation loop operation and in Section 3.4.1 from 1.08 to 1.10 for single loop operation.
- (2) The footnote in Section 3.4.1.1 be deleted. The footnote states "The MCPR safety limit of 1.07 will be used through the first operating cycle."
- (3) The Bases Section 2.1.0 MCPR safety limit values be updated to the Cycle 7 values. In addition, the statements in the Basis Section 2.1.2 be deleted or modified and replaced with reference to both GESTAR II and the Supplemental Reload Licensing Report. The licensee also proposed that pages B2-3 and B2-4 be deleted since the uncertainty tables and the parameters used in the calculations of the MCPR safety limits from cycle to cycle and are given in the topical report, GESTAR II.

NMPC in Attachment B reaffirmed that the Cycle 7 MCPR safety limit was analyzed in accordance with the NRC approved methods described in the latest revision of GESTAR and the subsequent NRC/GE interim procedures documented in Amendment 25 to GESTAR, which is being reviewed by the staff. In the attachment, the licensee also stated that it will perform the cycle-specific MCPR safety limit calculations for future core reloads using cycle-specific core loading pattern and power distribution until Amendment 25 to GESTAR is approved.

In response to the March 24, 1998 NRC/NMPC telephone conference, the licensee submitted a supplement dated April 17, 1998 to the amendment, which implemented a footnote on page 2-1 of Section 2.1.2 restricting the MCPR safety limit values to Cycle 7.

The staff previously reviewed the R-factor calculation method for the GE11 fuel product line. The proposed cycle-specific MCPR safety limit analysis is based 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, 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 staff finds this approach acceptable.

NMPC did not submit an amendment request for the current Cycle 6 to implement the corrective actions described in LER 96-06. Therefore, the current TS 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 TS specify a MCPR safety limit value of 1.07 for two loop operation and 1.08 for single loop operation.

Attachment D to the amendment request contains GE's evaluation, which discusses the basis for the NMP2 cycle-specific MCPR safety limit evaluation, for Cycle 6 and Cycle 7, including the GE 11 core-specific input parameters, the corresponding assumptions, and a comparative discussion of 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 ( see Table 1.0 on page 4 of 5 in the attachment to the amendment) 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 current Cycle 6.

On the basis of our review, the SRXB staff finds the proposed changes to Sections 2.1.2 and 3.4.1 of the NMP2 TS 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 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 the future cycles. Consequently, the MCPR safety limit values are limited to the Cycle 7 reload as stated in the footnote in Section 2.1.2 of the NMP2 TS.

The footnote in Section 3.4.1.1 is obsolete since it referred to Cycle 1 and thus may be deleted. In addition, the proposed modifications to the TS Basis are acceptable because the changes remove redundant information that is available in the licensing topical GESTAR II.

### 3 CONCLUSIONS

The staff reviewed NMPC's request to amend the NMP2 TS for the Cycle 7 reload. This amendment is restricted to Cycle 7 reload only. On the basis of the review, the staff approved the proposed MCPR safety limit changes as well as the corresponding revision of the TS bases and concluded 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;
- (3) The issuance of the amendment will not be inimical to the common defense and security or to the health and safety to the public.



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