April 10, 1998

Mr. Donald A. Reid
Senior Vice President, Operations
Vermont Yankee Nuclear Power Corporation
185 Old Ferry Road
Brattleboro, VT 05301

SUBJECT: ISSUANCE OF AMENDMENT NO. 159 TO FACILITY OPERATING LICENSE NO. DPR-28, VERMONT YANKEE NUCLEAR POWER STATION (TAC NO. MA0262)

Dear Mr. Reid:

The Commission has issued the enclosed Amendment No. 159 to Facility Operating License DPR-28 for the Vermont Yankee Nuclear Power Station, in response to your application dated December 11, 1997, as supplemented on March 3, 1998. The information provided on March 3, 1998, did not change the original proposed no significant hazards consideration.

The amendment revises the values for the safety limit minimum critical power ratio for Cycle 20 operation.

A copy of the related Safety Evaluation is also enclosed. Notice of Issuance will be included in the Commission's biweekly Federal Register notice.

Sincerely,

Richard P. Croteau, Project Manager
Project Directorate I-3
Division of Reactor Projects - I/II
Office of Nuclear Reactor Regulation

Docket No. 50-271

Enclosures: 1. Amendment No.159 to License No. DPR-28
2. Safety Evaluation

cc w/ encls: See next page

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DATED: April 10, 1998

AMENDMENT NO. 159 TO FACILITY OPERATING LICENSE NO. DPR-28 - VERMONT YANKEE NUCLEAR POWER STATION

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

VERMONT YANKEE NUCLEAR POWER CORPORATION

DOCKET NO. 50-271

VERMONT YANKEE NUCLEAR POWER STATION

AMENDMENT TO FACILITY OPERATING LICENSE

Amendment No. 159
License No. DPR-28

1. The Nuclear Regulatory Commission (the Commission) has found that:

   A. The application for amendment filed by the Vermont Yankee Nuclear Power Corporation (the licensee) dated December 11, 1997, as supplemented by letter dated March 3, 1998, complies with the standards and requirements of the Atomic Energy Act of 1954, as amended (the Act), and the Commission's rules and regulations;

   B. The facility will operate in conformity with the application, the provisions of the Act, and the rules and regulations of the Commission;

   C. There is reasonable assurance: (i) that the activities authorized by this amendment can be conducted without endangering the health and safety of the public, and (ii) that such activities will be conducted in compliance with the Commission's regulations;

   D. The issuance of this amendment will not be inimical to the common defense and security or to the health and safety of the public; and

   E. The issuance of this amendment is in accordance with 10 CFR Part 51 of the Commission's regulations and all applicable requirements have been satisfied.

2. Accordingly, the license is amended by changes to the Technical Specifications as indicated in the attachment to this license amendment, and paragraph 3.B of Facility Operating License No. DPR-28 is hereby amended to read as follows:

   (B) Technical Specifications

   The Technical Specifications contained in Appendix A, as revised through Amendment No. 159, are hereby incorporated in the license. The licensee shall operate the facility in accordance with the Technical Specifications.

3. This license amendment is effective as of its date of issuance to be implemented within 30 days.

FOR THE NUCLEAR REGULATORY COMMISSION

Cecil O. Thomas

Cecil O Thomas, Director
Project Directorate I-3
Division of Reactor Projects - I/II
Office of Nuclear Reactor Regulation

Attachment: Changes to the Technical Specifications

Date of Issuance: April 10, 1998

ATTACHMENT TO LICENSE AMENDMENT NO. 159

FACILITY OPERATING LICENSE NO. DPR-28

DOCKET NO. 50-271

Replace the following pages of Appendix A Technical Specifications with the attached pages. The revised pages are identified by amendment number and contain vertical lines indicating the areas of change.

Remove	Insert
6	6

1.1 SAFETY LIMIT

1.1 FUEL CLADDING INTEGRITY

Applicability:

Applies to the interrelated variable associated with fuel thermal behavior.

Objective:

To establish limits below which the integrity of the fuel cladding is preserved.

Specification:

A. Bundle Safety Limit (Reactor Pressure >800 psia and Core Flow >10% of Rated)

When the reactor pressure is >800 psia and the core flow is greater than 10% of rated:

1. For the Cycle 20 core loading, the existence of a Minimum Critical Power Ratio (MCPR) of less than 1.11 (1.13 for Single Loop Operation) shall constitute violation of the Fuel Cladding Integrity Safety Limit (FCISL). Core loadings subsequent to Cycle 20 will require recalculation of the MCPR.

2.1 LIMITING SAFETY SYSTEM SETTING

2.1 FUEL CLADDING INTEGRITY

Applicability:

Applies to trip setting of the instruments and devices which are provided to prevent the nuclear system safety limits from being exceeded.

Objective:

To define the level of the process variable at which automatic protective action is initiated.

Specification:

A. Trip Settings

The limiting safety system trip settings shall be as specified below:

1. Neutron Flux Trip Settings

a. APRM Flux Scram Trip Setting (Run Mode)

When the mode switch is in the RUN position, the APRM flux scram trip setting shall be as shown on Figure 2.1.1 and shall be:

$$S \leq 0.66(W-\Delta W)+54\%$$

where:

S = setting in percent of rated thermal power (1593 MWt)

W = percent rated two loop drive flow where 100% rated drive flow is that flow equivalent to 48×10^6 lbs/hr core flow

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

SAFETY EVALUATION BY THE OFFICE OF NUCLEAR REACTOR REGULATION

RELATED TO AMENDMENT NO. 159 TO FACILITY OPERATING LICENSE NO. DPR-28

VERMONT YANKEE NUCLEAR POWER CORPORATION

VERMONT YANKEE NUCLEAR POWER STATION

DOCKET NO. 50-271

1.0 INTRODUCTION

By letter dated December 11, 1997, as supplemented by letter dated March 3, 1998, the Vermont Yankee Nuclear Power Corporation (VYNPC or the licensee) submitted a request to amend the Vermont Yankee Nuclear Power Station Technical Specifications (TSs). The proposed amendment would revise the TSs to correctly specify the values for the safety limit minimum critical power ratio (SLMCPR) for Cycle 20 operation.

Section 1.1 of the technical specification (TS) establishes the SLMCPR for single or double recirculation loops in operation. Section 6.0 of the TS references NRC-approved topical reports used to determine the thermal limits. "General Electric Standard Application for Reactor Fuel "(NEDE-24011-P-A-13), GESTAR II delineates the approved analytical methodologies and requirements for determining the SLMCPR and the operating limit minimum critical power ratio (OLMCPR). The operating limit MCPR and the cycle specific thermal limit parameters are specified in the Core Operating Limit Report (COLR), which is reissued every reload.

The licensing basis document, GESTAR II delineates, 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 SLMCPR will be confirmed for each operating cycle or a plant specific analysis will be performed; and (3) 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 (e.g., 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 (NOV) issued to GENE during the May 1996 NRC inspection. Amendment 25 to GESTAR II, which is under staff review, incorporates the corrective actions and the interim procedures which require, in part, that the licensees perform core-specific SLMCPR evaluation during each reload.

For the part length GE13 fuel, GENE, the fuel vendor, determined the generic equilibrium SLMCPR to be 1.09. However, for the cycle-specific SLMCPR analysis, Vermont Yankee Cycle 20 yielded bounding and higher SLMCPR in comparison to the GE13 equilibrium core SLMCPR. Consequently, in this amendment, VYNPC proposes to revise Section 1.1.A of the TS and to adapt the cycle specific MCPR safety limit.

The information provided on March 3, 1998, had no effect on the original proposed no significant hazards consideration determination.

2.0 EVALUATION

VYNPC proposed changes to the technical specifications and the corresponding evaluations are provided below.

Proposed Change - specification 1.1 - Reactor Core Safety Limits (SLs)

VYNPC proposes to change the SLMCPR specified in the TS 1.1.A from 1.10 to 1.11 for two recirculation loops in operation and from 1.12 to 1.13 for a single loop in operation.

Attachment five to the amendment request contains the GENE evaluation which discusses the basis for the Vermont Yankee cycle-specific SLMCPR, including the mixed (GE9 and GE13) core-specific input parameters, the corresponding assumptions and a comparative discussion of why the cycle-specific SLMCPR calculations yield higher values than the generic equilibrium core GE 13 SLMCPR.

VYNPC stated that the core-specific safety limits were evaluated in accordance with the NRC approved methodology specified in the topical report, "General Electric Standard Application for Reactor Fuel "(NEDE-24011-P-A-13, dated August 1996), and supplemented by "Proposed Amendment 25 to GE Licensing Topical report NEDE-24011-P-A- (GESTAR II) on cycle-specific safety limit MCPR."

The staff reviewed the R-factor calculation method for the GE13 fuel product line, and Amendment 25 to the topical report GESTAR II, which is under staff review. The proposed cycle-specific SLMCPR analysis is based on the NRC approved methodologies specified in GESTAR II (NEDE-24011-P-A-11, Sections 1.1.5 and 1.2.5, which references NEDO-10985-A, January 1977), for two loop operations. Because the R-factor methodology referenced in NEDE-24011-P-A-11 is not applicable to the part length GE13 fuel, a revised R-factor methodology described in NEDC-32505P, "R-Factor Calculation Method for GE11, GE12 and GE13 Fuel," November 1995 was used. The revised R-factor calculation method uses the same NRC approved equation stated in GESTAR (NEDE-24011-P-A) except that it substitutes rod integrated powers for the lattice peaking factors to account for the effects of the part length rod design.

The Vermont Yankee Cycle 20 core-specific SLMCPR was derived using cycle-specific fuel and core parameters such as 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 SLMCPR calculations developed by GE indicate that the core-specific safety limit is based on flatter radial power distribution than the generic GE13 calculations. Vermont Yankee core also has higher core enrichment for Cycle 20, and the analysis covered a different range of cycle exposures. The flatter radial power distribution, the higher core enrichment and the different range of cycle exposures, all contributed to the higher core-specific SLMCPR.

The licensee experienced leaking fuel for the current operating Cycle 19 and VYNPC locally suppressed the power in the vicinity of the leaking bundle in order to minimize degradation of leaking fuel assembly. Power suppression could potentially affect the end of cycle fuel depletion, which may alter the preliminary reference core loading and the key assumptions used in the Cycle 20 SLMCPR. By letter dated March 3, 1998, the licensee indicated that they had concluded that there was no impact on the SLMCPR values for cycle 20 operation.

Based on the review, the staff finds the proposed changes to Section 1.1.A of the Vermont Yankee technical specification acceptable, because the SLMCPRs: (1) are based on core-specific inputs and analysis; (2) were obtained using NRC-approved methods and procedures; and (3) provide higher margins of safety to ensure that 99% of the rods in the core will not experience the boiling transition during normal, or anticipated operational occurrence. Since the SLMCPRs were derived using cycle-specific inputs and parameters, this amendment applies only to Cycle 20 reload.

3.0 STATE CONSULTATION

In accordance with the Commission's regulations, the Vermont 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 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 7000). 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.

5.0 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.

Principal Contributor: Z. Abdullahi

Date: April 10, 1998