

April 8, 1977

Docket No.: 50-271

Yankee Atomic Electric Company
ATTN: Mr. Robert H. Groce
Licensing Engineer
20 Turnpike Road
Westboro, Massachusetts 01581

Gentlemen:

The Commission has issued the enclosed Amendment No. 34 to Facility Operating License No. DPR-28 for the Vermont Yankee Nuclear Power Station. This amendment consists of changes to the Technical Specifications in response to your application for amendment dated December 3, 1976, as supplemented March 17, 1977.

This amendment replaces the existing operating Minimum Critical Power Ratio (MCPR) limit for 8x8 fuel with an operating MCPR limit dependent on fuel exposure.

Copies of the Safety Evaluation and the Federal Register Notice are also enclosed.

Sincerely,

Original signed by



Robert W. Reid, Chief
Operating Reactors Branch #4
Division of Operating Reactors

Enclosures:

1. Amendment No. 34
2. Safety Evaluation
3. Federal Register Notice

cc w/enclosures: See next page

OFFICE >	ORB#4: DOR	ORB#4: DOR	OELED	C-ORB#4: DOR		
SURNAME >	RIngram	JSiegel:dn	A. Mitchell	RWReid		
DATE >	4/8/77	4/8/77	4/8/77	4/8/77		

Yankee Atomic Electric Company

cc w/enclosure(s):

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Yankee Atomic Electric
Company

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Region I Office
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cc w/enclosures and cy of VY's
filing dtd.: 12/3/76 & 3/17/77
Public Service Board
State of Vermont
120 State Street
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UNITED STATES
NUCLEAR REGULATORY COMMISSION
WASHINGTON, D. C. 20555

VERMONT YANKEE NUCLEAR POWER CORPORATION

DOCKET NO. 50-271

VERMONT YANKEE NUCLEAR POWER STATION

AMENDMENT TO FACILITY OPERATING LICENSE

Amendment No. 34
License No. DPR-28

1. The Nuclear Regulatory Commission (the Commission) has found that:
 - A. The application for amendment by Vermont Yankee Nuclear Power Corporation (the licensee) dated December 3, 1976, as supplemented March 17, 1977, complies with the standards and requirements of the Atomic Energy Act of 1954, as amended (the Act), and the Commission's rules and regulations set forth in 10 CFR Chapter I;
 - 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 3.8 of Facility Operating License No. DPR-28 is hereby amended to read as follows:

B. Technical Specifications

The Technical Specifications contained in Appendices A and B, as revised through Amendment No. 34, 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 the date of its issuance.

FOR THE NUCLEAR REGULATORY COMMISSION

Gerald B. Zurety for
Robert W. Reid, Chief
Operating Reactors Branch #4
Division of Operating Reactors

Attachment:
Changes to the Technical
Specifications

Date of Issuance: April 8, 1977

ATTACHMENT TO LICENSE AMENDMENT NO. 34

FACILITY OPERATING LICENSE NO. DPR-28

DOCKET NO. 50-271

Revise Appendix A Technical Specifications as follows:

Remove Pages

180c

180i

1801

Insert Pages

180c

180i

1801

The changed areas on the revised pages are shown by marginal lines.

C. Minimum Critical Power Ratio (MCPR)

During steady state power operation, the Operating MCPR Limit shall be ≥ 1.20 for 7x7 fuel, and ≥ 1.20 for 8x8 fuel from the beginning of Cycle 4 to a Cycle 4 exposure of 5486 MWD/T and then ≥ 1.21 for 8x8 fuel only until the end of Cycle 4, at rated power and flow. For core flows other than rated the Operating MCPR Limit shall be the above value multiplied by K_f , where K_f is given by Figure 3.11-2. If at any time during steady-state operation it is determined by normal surveillance that the limiting value for MCPR is being exceeded, action shall be initiated within 15 minutes to restore operation to within the prescribed limits. If the steady state MCPR is not returned to within the prescribed limits within two (2) hours, the reactor shall be brought to the cold shutdown condition within 36 hours. Surveillance and corresponding action shall continue until reactor operation is within the prescribed limits.

D. Reporting Requirements

If any of the limiting values identified in Specs 3.11A, B or C are exceeded, a reportable occurrence report shall be submitted. If the corrective action is taken, as described, a thirty-day written report will meet the requirements of this specification.

3.11 (Continued)

References 6 and 7 support a fuel exposure dependent MCPR limit. The operating MCPR limit of specification 3.11C insures that the limiting transient will not reduce the CPR below the Safety Limit MCPR. The operating MCPR limit is also greater than the initial MCPR assumed in the ECCS analysis.

Prior to the analysis of abnormal operational transients an initial fuel bundle MCPR was determined. This parameter is based on the bundle flow calculated by a GE multi-channel steady state flow distribution model as described in Section 4.4 of NEDO-20360⁽²⁾ and on core parameters shown in Table 4-5 thru 4-7 (pages 4-8 and 4-9) of NEDO-20940⁽¹⁾.

The evaluation of a given transient begins with the system initial parameters shown in Table 6-1 (page 6-12) of NEDO-20940⁽¹⁾ that are input to a GE core dynamic behavior transient computer program described in NEDO-10802⁽³⁾. Also, the void reactivity coefficients that were input to the transient calculational procedure are based on a new method of calculation termed NEV which provides a better agreement between the calculated and plant instrument power distributions. The outputs of this program along with the initial MCPR form the input for further analyses of the thermal hydraulic SCAT code described in NEDE-20566⁽⁴⁾. The principal result of this evaluation is the reduction in MCPR caused by the transient.

3.11 FUEL RODS (Continued)

D. Reporting Requirements

The LCO's associated with monitoring the fuel rod operating conditions are required to be met at all times, i.e., there is no allowable time in which the plant can knowingly exceed the limiting values of MAPLHGR, LHGR, and MCPR. It is a requirement, as stated in Specification 3.11.A, B, and C that if at any time during steady state power operation, it is determined that the limiting values for MAPLHGR, LHGR, or MCPR are exceeded, action is then initiated within fifteen minutes to restore operation to within the prescribed limits. Each event involving steady state operation beyond a specified limit shall be reported as a reportable occurrence. However, if the corrective action is taken as described, a thirty day written report will meet the requirement of this specification.

E. References

1. "Fuel Densification Effects on General Electric Boiling Water Reactor Fuel," Supplements 6, 7, and 8, NEDM-10735, August, 1973.
2. Supplement 1 to Technical Report on Densifications of General Electric Reactor Fuels, December 14, 1974 (USA Regulatory Staff).
3. Communication: V. A. Moore to I. S. Mitchell, "Modified GE Model for Fuel Densification," Docket 50-321, March 27, 1974.
4. Vermont Yankee Nuclear Power Station Loss of Coolant Analyses Conformance with Appendix K to 10CFR50, May 1975.
5. "General Electric BWR Thermal Analysis Basis (GETAB): Data, Correlation and Design Application," NEDO-10958, November, 1973.
6. Vermont Yankee letter to NRC dated December 3, 1976.
7. Vermont Yankee letter to NRC dated March 17, 1977.



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

SAFETY EVALUATION BY THE OFFICE OF NUCLEAR REACTOR REGULATION
SUPPORTING AMENDMENT NO. 34 TO FACILITY OPERATING LICENSE NO. DPR-28

VERMONT YANKEE NUCLEAR POWER CORPORATION

VERMONT YANKEE NUCLEAR POWER STATION

DOCKET NO. 50-271

INTRODUCTION

By letter dated December 3, 1976, Vermont Yankee Nuclear Power Corporation (VYNPC) proposed an amendment to their Technical Specifications which would change the operating Minimum Critical Power Ratio (MCPR) limit for 8X8 fuel to be exposure dependent. Additional information supporting this change was submitted by VYNPC letter dated March 17, 1977. This change would permit a 0.01 decrease in the operating MCPR limit (from 1.21 to 1.20) until a cycle exposure of 5486 MWD/MT (750 MWD/MT from end of cycle) at which time the operating MCPR limit would again be 1.21. At present the core has experienced about 4600 MWD/MT of fuel exposure and this change will facilitate power ascension to 100 percent power.

Evaluation

At a MCPR of 1.0 a fuel assembly, at some point, will experience boiling transition. Boiling transition represents an unstable heat transfer condition on the fuel clad surface and could result in fuel clad temperatures exceeding allowable limits. The operating MCPR limit is derived by adding the decrease in critical power ratio (Δ CPR) due to the most limiting operational transient to the Safety Limit MCPR. The Safety Limit MCPR for VYNPS is 1.06. The proposed change in operating MCPR limit is therefore equivalent to a change in Δ CPR from .15 to .14.

The current operating MCPR limit is based on an analysis of the Turbine Trip Without Bypass. This transient is the most limiting in that it results in a Δ CPR of .15 when evaluated at end-of-cycle (EOC) conditions. VYNPC, in support of the proposed change, has reanalyzed this transient for different times in core life as shown below.

	Δ CPR at respective Cycle 4 exposure (MWD/MT)		
<u>Transient</u>	<u>≤ 4736</u>	<u>5486</u>	<u>6236</u>
Turbine Trip Without Bypass	0.003	0.05	0.15

The results show that prior to the exposure period from 5486 MWD/MT to 6236 MWD/MT the Δ CPR resulting from this transient is considerably less than .14.

Since various transients will reduce the critical power ratio VYNPC was requested to show that no other abnormal operating transient would exceed the proposed Δ CPR value of 0.14 at any other time during Cycle 4 when the Turbine Trip Without Bypass was not limiting. VYNPC analyzed two other transients besides the limiting Turbine Trip Without Bypass for Cycle 4. These are the Loss of Feedwater Heater Transient and the Rod Withdrawal Error Transient. All other transients are bounded (in Δ CPR) by the above three transients. The table below indicates that no other transient, at any time during the cycle produces a Δ CPR value greater than 0.14.

<u>Transient</u>	Δ CPR at respective Cycle 4 exposures (MWD/MT)		
	<u><4736</u>	<u>5486</u>	<u>6236</u>
Loss of FW Heater	<0.11	<0.11	0.11
Rod Withdrawal Error	<u>\leq0.10</u>	<0.10	<0.10

In addition, the operational MCPR limit of 1.20 is greater than the assumed initial MCPR of 1.18 used in the evaluation of Emergency Core Cooling System (ECCS) performance.

Based on the above, we have determined that an operating MCPR limit of 1.20 to a Cycle 4 exposure of 5486 MWD/MT will preserve the required safety margin and is acceptable.

We have determined that the amendment does 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 amendment involves an action which is insignificant from the standpoint of environment impact and, pursuant to 10CFR51.5(d)(4), that an environmental impact statement, or negative declaration and environmental impact appraisal need not be prepared in connection with the issuance of this amendment.

Conclusion

We have concluded, based on the considerations discussed above, that: (1) because the change does not involve a significant increase in the probability or consequences of accidents previously considered and does not involve a significant decrease in a safety margin, the change does 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 this amendment will not be inimical to the common defense and security or to the health and safety of the public.

Dated: April 8, 1977

UNITED STATES NUCLEAR REGULATORY COMMISSION

DOCKET NO. 50-271

VERMONT YANKEE NUCLEAR POWER CORPORATION

NOTICE OF ISSUANCE OF AMENDMENT TO FACILITY
OPERATING LICENSE

The U. S. Nuclear Regulatory Commission (the Commission) has issued Amendment No. 34 to Facility Operating License No. DPR-28, issued to Vermont Yankee Nuclear Power Corporation (the licensee), which revised Technical Specifications for operation of the Vermont Yankee Nuclear Power Station (the facility) located near Vernon, Vermont. The amendment is effective as of its date of issuance.

This amendment replaces the existing operating Minimum Critical Power Ratio (MCPR) limit for 8x8 fuel with an operating MCPR limit dependent on fuel exposure.

The application for the amendment complies with the standards and requirements of the Atomic Energy Act of 1954, as amended (the Act), and the Commission's rules and regulations. The Commission has made appropriate findings as required by the Act and the Commission's rules and regulations in 10 CFR Chapter I, which are set forth in the license amendment. Prior public notice of this amendment was not required since the amendment does not involve a significant hazards consideration.

The Commission has determined that the issuance of this amendment will not result in any significant environmental impact and that pursuant to 10 CFR §51.5(d)(4) an environmental impact statement, or negative

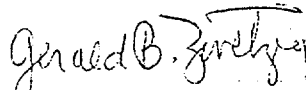
declaration and environmental impact appraisal need not be prepared in connection with issuance of this amendment.

For further details with respect to this action, see (1) the application for amendment dated December 3, 1976, as supplemented March 17, 1977, (2) Amendment No. 34 to License No. DPR-28, and (3) the Commission's related Safety Evaluation. All of these items are available for public inspection at the Commission's Public Document Room, 1717 H Street, N. W., Washington, D. C. and at the Brooks Memorial Library, 224 Main Street, Brattleboro, Vermont.

A copy of items (2) and (3) may be obtained upon request addressed to the U. S. Nuclear Regulatory Commission, Washington, D. C. 20555, Attention: Director, Division of Operating Reactors.

Dated at Bethesda, Maryland, this 8th day of April 1977.

FOR THE NUCLEAR REGULATORY COMMISSION



Gerald B. Zwetzig, Acting Chief
Operating Reactors Branch #4
Division of Operating Reactors