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

SAFETY EVALUATION BY THE OFFICE OF NUCLEAR REACTOR REGULATION

RELATED TO AMENDMENT NO. 108

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 May 23, 1988 with clarification submitted August 15, 1988 the Vermont Yankee Nuclear Power Corporation (the licensee) requested changes to the Vermont Yankee Radiological Technical Specifications (TS) as incorporated in Facility Operating License DPR-28. These changes:

1. Revise Limiting Conditions for Operation (LCO) 3.11A to allow the addition of two new tables of APLHGR limits for the two GE 8X8EB fuel types to be used in the next operating cycle.

2. Revise LCO 3.11B to include vendor recommended LHGR limiting values for the two GE 8X8EB fuel types to be used in the next operating cycle.

3. Revise Section 5.5E to specify the peak uncontrolled infinite lattice multiplication factor appropriate for the two GE 8X8EB fuel types as a means of assuring compliance with Section 5.5A and 5.5B.

2.0 EVALUATION

With regard to Part 1 of the proposed change: the APLHGR limits for the two new GE 8X8EB fuel types, as shown on Tables 3.11-1I and 3.11-1J, were calculated with the same methods used to calculate the limits used currently for other fuel types in the Technical Specification, Tables 3.11-1A through 3.11-1H.

The two GE 8X8EB fuel types proposed for use in Vermont Yankee have multiple lattices which are arranged axially. Appropriate MAPLHGR limits, which have been determined by approved thermal-mechanical and loss of coolant accident (LOCA) analyses calculations, will be applied to each of these regions. There was extensive interaction between the staff, GE and utilities in deciding on an acceptable format for presentation of this information, suitable for plant use and staff requirements for TS. The process computer contains, and acts on, full details of the MAPLHGR information. The agreed upon TS present axial lattice MAPLHGR as a function of burnup. A proprietary report, reviewed by the staff and available to the Vermont Yankee engineering staff, provides complete details of the lattice definitions and MAPLHGR limits (reference 3).

With regard to Part 2 of the proposed change:

The new fuel is the GE extended burnup fuel, GE 8X8EB. This fuel type has been approved in the Safety Evaluation Report for Amendment 10 to GESTAR II (Ref 1 and 2). The specific descriptions of this fuel have been submitted in reference 3. The fuel designation is BD224 and BD326B. The specific fuel description is acceptable.

The proposed LHGR limit for the GE8X8EB fuel is 14.4 kW/ft (rather than the 13.4 for other GE 8X8 fuel). This LHGR has been reviewed and accepted for this fuel in the GE extended burnup fuel review (Ref. 1). (See the referrals in Reference 1 to References 18 and 19. These references are responses to questions and presentations relating to the GE 8X8EB fuel which provide information on the 14.4 kW/ft LHGR.) This LHGR is acceptable for use of this fuel in the Vermont Yankee reactor core.

With regard to Part 3 of the proposed change: Section 5.5E was added to the Technical Specifications by Amendment 37, in order to provide a method of ensuring compliance with the effective multiplication factor safety limit of less than or equal to 0.95 for fuel storage stated in Section 5.5B of the Technical Specifications. The current 16 grams of U-235 per axial centimeter stated in Section 5.5E is not the best measure of the primary variable which affects the effective multiplication factor of the stored fuel.

In order to more directly control the reactivity worth of fuel assemblies that may contain varying amounts of poison, a more useful variable is the maximum, cold, infinite lattice multiplication factor K_∞. The approach of using a K_∞ design basis has been approved in other applications, and is used in the staff approved General Electric reload analysis approach (as given in GESTAR II, NEDE-24011-P-A-8, May 1986).

In the staff safety evaluation supporting License Amendment No. 104, dated May 20, 1988, the staff considered the use of a k_∞ basis for the Vermont Yankee spent fuel pool and in Amendment 104 authorized the storage of such fuel. The safety evaluation states that "the transfer to a fuel assembly K_∞ value of 1.31 is acceptable."

Part 3 of the proposed change, which substitutes a k_∞ limit of 1.31 for the axial enrichment design limit is, therefore, acceptable.

3.0 ENVIRONMENTAL CONSIDERATION

This amendment involves a change in the installation or use of a facility component located within the restricted area as defined in 10 CFR Part 20. The 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 published a proposed finding that the amendment involves no significant hazards consideration and there has been no public comment on such finding. 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.

4.0 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.

5.0 REFERENCES

1. Letter (and attachment) from C. Thomas, NRC, to J. Charnley, GE, dated May 28, 1985, "Acceptance for Referencing of Licensing Topical Report NEDE-24011-P-A-6, Amendment 10".

2. GESTAR II, NEDE-24011, Revision 8, "General Electric Standard Application for Reactor Fuel".

3. Letter (and attachment) from R.W. Capstick, VYNPC, to U.S.N.R.C Document Control Desk, dated August 15, 1988, "Response to NRC Request for Supporting Document - Vermont Yankee Proposed Change Number 144".

Principal Contributor: V. Rooney

Dated: September 9, 1988