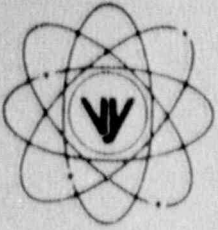


VERMONT YANKEE NUCLEAR POWER CORPORATION

PROPOSED CHANGE #155



Ferry Road, Brattleboro, VT 05301-7002

BVY 90-021

REPLY TO:
ENGINEERING OFFICE
580 MAIN STREET
BOLTON, MA 01740
(508) 779-6711

February 28, 1990

U.S. Nuclear Regulatory Commission
Washington, D.C. 20555

Attention: Document Control Desk

- References:
- a) License No. DPR-28 (Docket No. 50-271)
 - b) General Electric Company, "Control Blade Lifetime," SIL No. 157, Supplement 1, Category 2, dated March 1979
 - c) General Electric Topical Report, GE Marathon Control Rod Assembly NEDE 31758P, January 1990
 - d) Letter, USNRC to ASEA-ATOM, SER, "Acceptance for Referencing of Licensing Topical Report TR-UR-85-225 ASEA-ATOM Control Blades for U.S. BWRs," dated February 20, 1986
 - e) ASEA-ATOM Topical Report, TR-UR-85-225, dated October 1, 1985
 - f) General Electric Topical Report, "Safety Evaluation of the General Electric Advanced Longer Life Control Rod Assembly," NEDE-22290-A, dated August 1985

Dear Sir:

Subject: Proposed Technical Specification Change No. 155:
Utilization of Alternative Longer Life Control Blades

Pursuant to the Commission's Rules and Regulations as set forth in 10CFR50.59, Vermont Yankee Nuclear Power Corporation hereby proposes the following change to Appendix A of the Vermont Yankee plant operating license [Reference a)].

Proposed Change

Vermont Yankee proposes to replace page 188 of the Vermont Yankee Technical Specifications with the attached revised page 188. Specifically, the proposed change revises Section 5.2.B of the Technical Specifications to add hafnium as an optional absorber material in the control blades. This would allow the control blades in the reactor to contain either B₄C powder or hafnium, or a combination of the two, as the control material.

Reason for Change

The control blades, currently in use at Vermont Yankee, have a mechanical design limit [Reference b)] equivalent to a 34% B₁₀ depletion which results in early discharge of blades before they reach the nuclear design limit of 42% B₁₀

A001
1/1

U.S. Nuclear Regulatory Commission
February 28, 1990
Page 2

depletion. The nuclear design limit is based on a 10% reduction in the worth of the blade. The proposed change will allow Vermont Yankee to employ other control blade designs which are not subject to the mechanical design limitations of the current design.

Because Vermont Yankee does not want to exceed the 34% B₁₀ depletion discharge limit during an operating cycle, control blades which have the potential of exceeding this limit in a given cycle are discharged early. Since 1981, the burnout on discharged blades has averaged 30% B₁₀ depletion. This situation will become worse as Vermont Yankee lengthens its cycles to 18 months or more, i.e., an even earlier blade discharge. It is estimated that the current mechanical design limit and the 18-month cycle length will cause Vermont Yankee to waste 30%, or more, of the nuclear lifetime of the blades. If a material other than B₄C could be used, the number of blades being discharged could be reduced by 40%, or more. This would reduce on-site storage and handling as well as reduce the volume of radioactive waste being generated.

Basis for Change

Other control blade designs exist which combine hafnium with the B₄C. These designs significantly increase the control blade mechanical design limit. For example, hafnium is frequently employed in the top six inches and in the outer row of tubes. By substituting hafnium in the regions of high fluence, Intergranular Stress Corrosion Cracking (IGSCC) is no longer the determining factor impacting blade lifetime. Therefore, the nuclear lifetime of 42% B₁₀ depletion is the discharge limit.

Vermont Yankee intends to use only those control blades which have previously received NRC approval. Vermont Yankee currently is in the process of purchasing eight General Electric (GE) "Marathon" design control blades for installation during our fall 1990 refueling outage prior to Cycle 15. GE's topical report [Reference c)] justifies this design as a direct replacement for the current B₄C design. We understand that the NRC is reviewing this design. This proposed change is generic in nature so as to allow the use of any NRC-approved design by either GE, ASEA-ATOM (ABB), or another supplier which may obtain NRC approval. The use of any new control blade design would be contingent upon satisfactory results from the Vermont Yankee specific safety analysis. This approach is consistent with the NRC position, stated in Section 4 of the SER for the ABB control blades [Reference d)].

Safety Considerations

The proposed change does not constitute an unreviewed safety question as defined in 10CFR50.59(a)(2). The use of hafnium as an alternative control material does not change the neutronic or mechanical characteristics of the control blade. The vendors have shown that their designs have control blade worths and mechanical properties similar to the currently employed design [References c), e), and f)].

U.S. Nuclear Regulatory Commission
February 28, 1990
Page 3

For alternative control rod designs, the Limiting Conditions of Operation (LCOs) 3.3.A, 3.3.B and 3.3.C protect the integrity of the plant. These LCOs provide the minimum shutdown margin, require a shutdown margin demonstration, restrict the control rod drop accident impact, and specify the average and four-rod group scram times. The impact of utilizing a new control rod design on each of these LCOs as well as the impact on licensing using the approved methods listed in Specification 6.7.A.4, will be verified before installation. These changes have been reviewed by the Plant Operations Review Committee (PORC) and the Nuclear Safety Audit and Review Committee (NSARC).

Significant Hazards Consideration

10CFR50.92(c) states that a proposed amendment will not involve a significant hazards consideration if the proposed amendment does not: (i) involve a significant increase in the probability or consequences of an accident previously evaluated; or (ii) create the possibility of a new or different kind of accident from any accident previously evaluated; or (iii) involve a significant reduction in a margin of safety. The discussion below addresses these standards and demonstrates that operating the facility in accordance with the proposed change involves no significant hazards considerations:

1. The proposed change will not involve any significant increase in the probability or consequences of an accident because the substitution of hafnium for the B₄C powder does not significantly alter the neutronic, mechanical, or other functional characteristics of a control blade. Utilization of hafnium significantly increases the useful life of control blades. This will actually reduce the probability and/or consequences of some accidents involving the handling, on-site storage, and shipping of irradiated blades and blade parts.
2. The proposed change will not create the possibility of a new or different kind of accident because the substitution of other materials for the B₄C powder does not significantly alter the neutronic, mechanical, or other functional characteristics of a control blade. The facility is not being altered, only the restriction that all control material in the control blades must be B₄C powder.
3. The proposed change will not involve a significant reduction in safety margin because the substitution of hafnium for the B₄C powder does not significantly alter the neutronic, mechanical, or other functional characteristics of a control blade. The margin of safety provided by all the LCOs defined above remains unchanged.

VERMONT YANKEE NUCLEAR POWER CORPORATION

U.S. Nuclear Regulatory Commission
February 28, 1990
Page 4

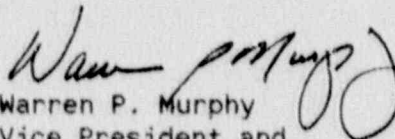
Schedule for Change

We request that your review and approval of this proposed change be completed by April 30, 1990, in order to facilitate our scheduling of the installation of the new control rods during our fall 1990 refueling outage prior to Cycle 15. This change will be incorporated into the Vermont Yankee Technical Specifications within 30 days following receipt of your approval.

We trust that the information above adequately supports our request; however, should you have any questions in this matter, please contact us.

Very truly yours,

VERMONT YANKEE NUCLEAR POWER CORPORATION

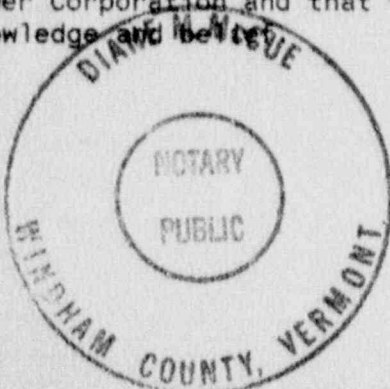

Warren P. Murphy
Vice President and
Manager of Operation

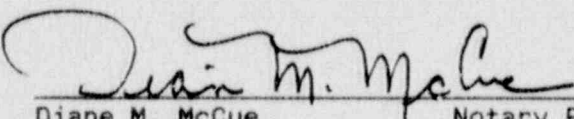
/dm

cc: USNRC Regional Administrator, Region I
USNRC Resident Inspector, VYNPS
USNRC Project Manager, VYNPS
Vermont Department of Public Service

STATE OF VERMONT)
)ss
WINDHAM COUNTY)

Then personally appeared before me, Warren P. Murphy, who, being duly sworn, did state that he is Vice President and Manager of Operations of Vermont Yankee Nuclear Power Corporation, that he is duly authorized to execute and file the foregoing document in the name and on the behalf of Vermont Yankee Nuclear Power Corporation and that the statements therein are true to the best of his knowledge and belief.




Diane M. McCue Notary Public
My Commission Expires February 10, 1991