

VERMONT YANKEE NUCLEAR POWER CORPORATION

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> November 14, 1997 BVY 97-152

United States Nuclear Regulatory Commission ATTN: Document Control Desk Washington, DC 20555

References:

- (a) License No. DPR-28 (Docket No. 50-271)
- (b) Letter, VYNPC to USi/RC, Reply to Inspection Report No. 50-271/97-201, BVY 97-138, dated October 27, 1997
- (c) Letter, USNRC to VYNPC, NRC Bulletin 96-03, NVY 96-86, dated May 6, 1996
- (d) Draft Generic Letter on Potential for Degradation of the ECCS and the Containment Spray System After a LOCA Because of Construction and Protective Coating Deficiencies and Foreign Material in the Containment, dated May 13, 1997
- (e) BWROG, Utility Resolution Guidance for ECCS Suction Strainer Blockage, NEDO-32686, dated November 20, 1996
- (f) Generic Letter 97-04, Assurance of Sufficient Net Positive Suction Head for Emergency Core Cooling Pumps, dated October 7, 1997
- Letter, VYNPC to USNRC, VY 180-day Response to Bulletin 96-03, BVY 96-135, dated October 31, 1996

Subject: Vermont Yankee Containment Initiatives

This letter outlines Vermont Yankee's plans regarding the resolution of several related issues dealing with the Containment and the preservation of Net Positive Suction Head (NPSH) margins for ECCS pumps, and it is in accordance with our commitment to provide an integrated status of our containment initiatives in response to URI 97-201-02 in Reference (b). All of the activities discussed below are planned to be completed prior to or during our next refueling outage, currently scheduled for Spring 1998.

Reduction of normal operating suppression pool temperature limit

From initial licensing of Vermont Yankee until the issuance of Amenoment 88, dated June 6, 1985, the normal operating suppression pool temperature limit was 90°F. Amendment 88 approved a change to increase the limit to 100°F. Internal investigations by the Vermont Yankee Service Water Task Force identified a discrepancy between the suppression pool temperature shown on FSAR Figure 14.6-7 and the text of Section 14.6.3.3.2, which referred to the change in initial suppression pool temperature. This discrepancy was entered into the Vermont Yankee Corrective Action program and it was concluded that continued operation with an administrative limit of 90°F was acceptable.

A technical evaluation was then initiated in support of either (1) removing the administrative limit, or (2) proposing a change to the Technical Specifications. The technical evaluation was performed using assumptions that are more consistent with current standards for performing such analysis than those used during the development of the original licensing basis. In particular, the new analysis uses the ANS standard for decay heat, with uncertainties, and it accounts for significantly more heat addition from the feedwater train than that assumed in the original analysis. The new analysis also revised the





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Vermont Yankee Nuclear Power Corporation Docket No. 50-271 BVY 97-152

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model for the RHR heat exchanger to provide additional margin for fouling and tube plugging. The new analysis is thus more conservative than the original licensing basis in that it assumes a higher amount of heat addition to the suppression pool and a lower heat removal rate via the RHR system operating in the containment cooling mode. Operator actions to throttle ECCS pump flow may be required to assure adequate NPSH margin for the most limiting case. However, these actions are within our current design basis. We have not, to date, credited containment pressures in excess of atmospheric in this evaluation. We are currently performing an evaluation to determine if partial credit for overpressure could reduce or eliminate the need for operator action and thereby improve overall plant safety. Sufficient analyses have been performed to validate that the administrative limit of 90°F is conservative and should replace the 100°F Technical Specification limit. A proposed Technical Specification amendment will be submitted by December 19, 1997 to modify the suppression pool normal operating limit. Operation will continue under the self-imposed administrative operating limit, pending approval of the change.

Replacement of the ECCS suction strainers

NRC Bulletin 58-03, Reference (c), requested BWR owners to implement appropriate measures to minimize the potential for clogging of the Emergency Core Cooling System (ECCS) suction strainers by debris generated during a loss of coolant accident (LOCA). The subject bulletin identifies the potential loss of ECCS suction following a LOCA due to inadequate NPSH resulting from accumulated debris on the ECCS suction stainers during the recirculation phase of the LOCA. In the bulletin, the NRC requested that corrective actions be implemented by the end of the first refueling outage starting after January 1, 1997.

The suction strainers for the Core Spray and Residual Heat Removal pumps will be replaced during the next refueling outage. The strainers will be significantly larger in terms of surface area than the currently installed strainers. The strainers are designed to meet the requirements of Reference (c) and Regulatory Guide 1.82, Revision 2. The design follows the recommendations of the BWROG Utility Resolution Guidance, Reference (e). Vermont Yankee will install the strainers in full compliance with Mark 1 containment design requirements and the NRC SER. Also, the strainer is designed to provide adequate NPSH margin without credit for containment pressures in excess of atmospheric. Therefore, no unreviewed safety questions are anticipated and the current plan is to install the new strainers under the provisions of 10CFR50.59.

The Vermont Yankee submittal, as committed to in Reference (g), for the new strainers will describe the strainer design basis and how the new design will meet the requirements of Reference (c) and Regulatory Guide 1.82, Revision 2. This will include hydraulic test results under VY Specific simulated debris loads. Final schedules for design and testing documentation have not been established with the strainer vendor. The current estimate for a submittal describing the design and test results is early in the first guarter of 1998.

To achieve optimal hydraulic performance the diameter of the replacement strainers had to be larger than the existing torus access hatch. Therefore, strainer installation will likely require opening a temporary hole in the torus shell. Also, the larger strainer size will require a re-evaluation of the Mark 1 containment loads to assure all design requirements are satisfied. For these reasons, Vermont Yankee will provide the Staff with a summary of the proposed torus modifications including an overview of the physical arrangement, design requirements, loads, hydrodynamic testing, and design margin. We request a meeting with the NRC Staff to discuss these issues prior to shutdown for the Spring 1998 refueling outage. Vermont Yankee Nuclear Power Corporation Docket No. 50-271 BVY 97-152

VERMONT YANKEE NUCLEAR POWER CORPORATION

Torus coating maintenance during the upcoming refueling outage

During the design phase for the replacement ECCS strainers, it was recognized that the postulated failure of coatings within containment could have a significant effect on the performance of the ECCS suction strainers, especially in light of the draft control letter, Reference (d). Vermont Yankee is a pre-Regulatory Guide 1.54 plant and therefore the coatings applied during construction were a good commercial grade for their intended use (radiation resistent, chemically resistent, good wear resistance), but were not gualified per current DBA criteria.

During the past several refueling outages, the coatings within the primary containment at Vermont Yankee have been inspected and locally repaired, as required. The primary purpose of this program is to assure that Torus structural margin is maintained. Due to the uncertainty in evaluating the amount of coatings failure that can be expected post-LOCA, Vermont Yankee decided to conservatively size the ECCS strainers based on the complete failure of the containment coatings. Vermont Yankee head loss tests for the new strainers will include debris combinations with high paint concentrations. Vermont Yankee has performed paint settling tests and paint transport calculations. Additional testing is scheduled to characterize the deposition of paint on the strainers with various pool velocities. The results of these tests will be included in our strainer submittal currently planned for delivery early in the first guarter of 1998.

Vermont Yankee currently plans to re-coat the Torus submerged area with a DBA-qualified coating during the 1998 refueling outage.

Flow measurement instrumentation for Core Spray and Residual Heat Removal

During the Design Inspection conducted by the NRC staff at Vermont Yankee from May 5 through June 13, 1997, it was identified that selected instrument loops within the Residual Heat Removal system utilized instruments that had a significant uncertainty tolerance (IFI 50-271/97-201-27).

The flow measurement instrumentation associated with the Core Spray and Residual Heat Removal systems will be replaced during the next refueling outage. The instrumentation will be upgraded to improve accuracy and to meet the requirements of Regulatory Guide 1.97, Category 1.

Summary

The central theme for the above actions is the preservation of NPSH margins for the ECCS pumps required for core and containment cooling. The goal is to integrate design, licensing, and operating strategies to assure that the appropriate procedural measures and plant modifications are made to maintain adequate NPSH margins following a LOCA under more stringent requirements for ECCS strainer debris loading. Part of the operating strategy may be to take credit for operator action to limit Core Spray and Residual Heat Removal flows to assure adequate NPSH margins. Although not anticipated to be required at this time, another strategy may be to credit containment pressure in excess of atmospheric pressure in the calculation of ECCS pump available NPSH. Vermont Yankee is participating in the BWROG Committee activities on Generic Letter 97-04, Reference (f), as a way of assuring that our approach to determining NPSH margins is consistent with accepted practice. The details of how Vermont Yankee plans to implement these strategies will be communicated to the Staff via our communications on the replacement of the ECCS strainers as committed to in Reference (g).

Vermont Yankee Nuclear Power Corporation Docket No. 50-271 BVY 97-152

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Should you have any questions or concerns regarding the information contained in this letter, please contact us.

Sincerely,

VERMONT YANKEE NUCLEAR POWER CORPORATION

Donald A. Reid Senior Vice President, Operations

cc USNRC Region 1 Administrator USNRC Resident Inspector - VYNPS USNRC Project Manager - VYNPS