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REPLY TO
ENGINEERING OFFICE
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July 17, 1991
BVY 91-69

U.S. Nuclear Regulatory Commission
Washington, DC 20555

Attention: Document Control Desk

References:

a) Licensee No. DPR-28 (Docket No. 50-271)
b) 10CFR 50.63, "Loss of All Alternative Current Power"
c) Letter, USNRC (Thadani) to NUMARC (Rasin), "Approval of NUMARC Documentation Station Blackout" dated 10/7/89
d) Letter, VYNPC to USNRC, BVY 89-36, "Response to Station Blackout Rule 10CFR 50.63," dated 4/12/89
e) NUMARC 87-00 Supplemental Questions and Answers, dated 12/27/89
f) NUMARC 87-00 Major Assumptions, dated 12/27/89
g) NUMARC Letter, "Station Blackout (SBO) Implementation: Request for Supplemental SBO Submittal to NRC," dated 1/4/90
h) LER 89-09 (VYV 89-135), dated 7/28/89
i) Letter, USNRC (Thadani) to NUMARC (Marion), dated 1/3/90
j) Letter, VYNPC to USNRC, BVY 90-038, "Supplement to Response to Station Blackout Rule 10CFR 50.63," dated 3/30/90
k) Letter, USNRC to VYNPC, NVY 91-98, "Vermont Yankee Station Blackout Analysis (TAC No. 68620), dated 6/5/91

Subject: Vermont Yankee Response to Station Blackout Rule Safety Evaluation Report

Dear Sir:

By letters dated March 30, 1990 and April 12, 1989 [References d) and j)], Vermont Yankee Nuclear Power Corporation (VYNPC) submitted information required by the Station Blackout (SBO) Rule as defined in 10CFR 50.63 and provided a plan and schedule for conformance to the SBO Rule.

By letter dated June 5, 1991, the U.S. Nuclear Regulatory Commission notified VYNPC that the review of the submittals for the SBO Rule had been completed [Reference k)]. This review found that, based on satisfactory resolution of the recommendations presented in the Safety Evaluation Report, Vermont Yankee conforms with the SBO Rule and the guidance of Regulatory Guide 1.155, NUMARC 87-00 and NUMARC 87-00 Supplemental Questions/Answers and Major Assumptions dated 12/27/89.

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Reference k) requires Vermont Yankee to submit within thirty days of its receipt, confirmation of the resolution of the recommendations presented in the Safety Evaluation Report (SER), and identify a schedule for their implementation, in accordance with 10CFR 50.63(c)(4).

Vermont Yankee previously provided [Reference d) and j)] to the NRC a commitment schedule for implementing equipment and associated procedure modifications necessary to meet the requirements of 10CFR 50.63(a). This implementation schedule was determined to be acceptable by the NRC per Reference k). The following information, including Attachment 1, is provided in response to Reference k).

As identified in References d) and j), Vermont Yankee will utilize an alternate ac power source (AAC), available within ten minutes of the onset of the SBO event, to meet the requirements of the Station Blackout Rule. Based on this AAC source, and using NUMARC 87-00 guidance, Vermont Yankee characterized itself as a P2 plant (Offsite Power Design Characteristic), I1/2 plant (Offsite Power System Grouping) and selected a target EDG reliability of 0.95, with the resulting documentation ensuring that Vermont Yankee can "cope" with the power from the AAC source for eight hours.

The NRC, based on the Technical Evaluation Report (TER) attached to Reference k), has identified that Vermont Yankee should be classified as a P3/I3 plant, which along with the proposed EDG reliability target of 0.95, requires Vermont Yankee to "cope" for a sixteen hour SBO duration.

Based on this change, and in consideration that all SBO documentation has been completed for an eight hour SBO coping duration, Vermont Yankee is currently reassessing the proposed target EDG reliability and performing a site-specific weather analysis, either of which could allow Vermont Yankee to reassess the proposed SBO duration. At the completion of this assessment, Vermont Yankee will submit to the NRC either the documentation required to propose a different SBO coping duration, or a schedule to complete the documentation required for a sixteen hour SBO coping duration.

Vermont Yankee will submit the results of the coping duration assessment, along with a schedule of implementation of modifications, if necessary, by October 1, 1991. Additionally, the modification to Vermont Yankee Procedure OT 3122, as identified in Attachment 1, will be implemented by the end of 1991.

Further clarification is also required with regard to the following items:

QA Program Commitment for the Vernon tie line

Reference k) states that the power line and transformer from the Vernon Station would be designed and maintained under the

Vermont Yankee QA Program, based on a teleconference on May 16, 1990. Vermont Yankee believes that the NRC may have misinterpreted the commitment in this area. As stated in Reference d), "... the QA program will apply to the modifications Vermont Yankee will implement on the Vermont Yankee site, including the tie line up to the Vernon Hydroelectric Station, but not including the Vernon Hydroelectric Station or future tie line maintenance." Therefore, although the modifications to the tie lines are to be designed and installed under the Vermont Yankee QA program, future maintenance of this tie line will be implemented under the Vermont Yankee maintenance program for non-nuclear safety systems.

Vernon Hydroelectric Station Minimum Output

During recent meetings with the Vernon Hydroelectric Station personnel, Vermont Yankee has determined that some statements in the FSAR and in References d) and j) regarding operation of the hydrostation require updating. Reference d) and the SER state that the normal operating mode for the hydrostation is to have at least 6000 kW of generation capacity always connected to the grid, either as spinning reserve or as running capacity. We have identified that the Vernon Hydro also operates in a mode called "minimum flow" in which the station may operate with only one generating unit on line. The on-line unit is usually a 4000 kW generator but on occasion could be a 2500 kW generator and may, at times, be only partially loaded. This mode of operation is used during periods of light load on the grid and low river flow conditions to maximize efficient operation of the hydrostation.

The automatically sequenced loads for either emergency bus are less than 600 kW. Other loads are added manually within one hour of the event, as required. As stated in the SER, the maximum load during a SBO event is approximately 2300 kW. Vernon Hydroelectric Station has the capability of increasing plant output to nearly full station output of 26,000 kW within minutes of a request to increase generation. In addition, it is connected to a 69 kV transmission system which is physically and electrically independent of the 115 kV and 345 kV systems which are Vermont Yankee's normal source of offsite power.

There is sufficient capacity from the Vernon hydro to supply all of the safe shutdown loads required for SBO; however, it is possible that at the initiation of a SBO event, this AAC source could be supplying less than the 2300 kW required for all shutdown loads. As required by NUMARC 87-00, we believe the additional capacity of this AAC source could be made available within ten minutes. Discussions are underway with New England Power Company, the owner of the Vernon Hydro Station, to determine the exact power output available and the

necessary sequence required to make additional capacity available to Vermont Yankee. Completion of this determination is scheduled for 10/1/91.

We trust that the information supplied above and in Attachment 1 is satisfactory for resolution of the recommendations presented in Reference k), and dependent on the assessment results on Vermont Yankee coping duration, will be sufficient for you to verify that Vermont Yankee is in conformance with the SBO Rule.

Very truly yours,

Warren P. Murphy
Senior Vice President, Operations

cc: USNRC Region I Administrator
USNRC Resident Inspector - VYNPS
USNRC Project Manager - VYNPS

Attachment 1

The following information is provided in response to the recommendations identified in the Safety Evaluation Report.

Recommendation: The Licensee should conduct a test in accordance with Appendix B, Paragraph B.12, of NUMARC 87-00, to demonstrate that the AAC source can power the SBO loads within 10 minutes of the onset of a SBO.

Response: As identified in Reference d), load capacity testing of the Vernon Hydro tie line is performed in accordance with VY Procedure OP 4142, "Vernon Tie Surveillance," which requires load testing once every five years based on the tie line being continuously "on-line." This load test was last performed in 1989 and is scheduled to be performed again in February, 1994. Vermont Yankee believes this existing testing interval is sufficient to ensure that the tie line meets the requirements of the SBO Rule. Additionally, although demonstration that the AAC source can power the SBO loads within ten minutes is not possible without actually creating a SBO event (i.e., isolate all power to an emergency bus concurrently rather than the procedural steps used now), this ability has been demonstrated during operator training on the plant simulator.

Recommendation: (1) The Licensee should provide ventilation calculations for the HPCI, RCIC or Main Steam Tunnel areas, or verify that the procedures for coping with a SBO clearly do not depend on the availability of the equipment in these areas, (2) for those areas with no ventilation, the Licensee should verify the operability of the equipment needed to cope with an SBO, (3) for those areas needing ventilation, the licensee should verify that the HVAC loads are included as loads on the AAC source, and (4) the licensee should verify that the addition of the control room ventilation as an AAC source load will not result in an overload on the AAC source. The calculations and affirmations developed in accordance with these recommendations should be included with the other documentation supporting the licensee's response to the SBO Rule.

Response: (1) As identified in Vermont Yankee submittals for the SBO Rule, HPCI/RCIC/Main Steam Tunnel are not considered dominant areas of concern due to the availability of low pressure systems powered from the AAC power source. An evaluation of the availability of HPCI/RCIC is provided, for an eight hour SBO duration, in the SBO supporting documentation including ventilation calculations, but no ventilation calculation has been performed for the main steam tunnel. Main steam tunnel temperature would have to increase 70 degrees from the normal operating tunnel temperature, with the heat load coming entirely from insulated steam piping (i.e., no equipment such as pumps). This heat rise is greater than that calculated for the HPCI room, which not only has the steam piping but a large heat load from the pump/turbine assembly. Therefore, it was concluded that in the unlikely event that both HPCI/RCIC were isolated due to tunnel temperatures, it would be late in the SBO coping duration, and, if not already

depressurized and on low pressure systems, the operators would follow their EOPs and ensure that inventory was maintained.

Based on the recommendation identified in Reference k), Vermont Yankee will modify OT 3122, "Loss of Normal Power Procedure," to identify the possibility of isolation of HPCI/RCIC in the event of loss of ventilation in the main steam tunnel. Vermont Yankee believes that this modification should address the NRC concern that the operators are not solely depending on this equipment, independent of the coping duration.

(2) A review has been completed on areas with no ventilation during the SBO event (for an eight hour duration), and is included in the SBO documentation. It should be noted that the only areas in the Reactor Building with safe shutdown equipment and major heat sources are the ECCS corner rooms, which have ventilation available. Additionally, although the design basis analysis in the FSAR is based on only two hours of HPCI/RCIC operation, the major forcing function of the reactor building post-LOCA heat-up was the torus temperature response, and therefore extended operation of either HPCI or RCIC is not expected to have any major effect on the reactor building temperatures. However, any change to the coping duration would require appropriate changes to the existing documentation.

(3) Vermont Yankee has verified that all HVAC loads required for the eight hour SBO duration are included on the AAC power source. However, any changes to the coping duration would require evaluation and possible changes to the HVAC requirements.

(4) Vermont Yankee FSAR Figure 8.5-2, Revision 8, identifies Control Room HVAC for DG-1-1B but not for DG-1-1A. A review of the DG loading calculations identifies that the Control Room HVAC load for DG-1-1A was put under Miscellaneous Loads. Figure 8.5-2 will be clarified during the 1992 FSAR update to identify the control room HVAC requirements for DG-1-1A. However, existing documentation demonstrates that these loads do not result in an overload of the AAC source, independent of the coping duration.

Recommendation: The recommendation of Section 2.3.4 of this SE pertaining to HPCI and RCIC area ventilation should be implemented.

Response: As identified in the response to the previous recommendation, Vermont Yankee procedures will be modified to ensure that the operators do not depend entirely on HPCI/RCIC operation during a SBO event. This will ensure that reactor coolant inventory would be available throughout the SBO event.

Recommendation: The Licensee should provide a full description including the nature of the required modifications to meet the SBO Rule.

Response: The modifications proposed to meet the SBO Rule consists of design changes implemented by three separate design change packages.

The first design change is documented in Engineering Design Change Request (EDCR) 90-410. This design change is scheduled to be implemented during the 1992 refueling outage. The purpose of this design change is to make the control power source, of the 4 kV circuit breaker 3V4, diverse from the control power associated with breakers 3V and 4V. These three circuit breakers are the circuit breakers associated with the tie to Vernon Hydroelectric Station. The objectives of the design is to eliminate possible common mode failures between the SBO event and establishing the alternate AC source within 10 minutes (assuming a failure of dc power may have contributed to the SBO). The details of the design change are included in the EDCR package.

The second design change is being implemented as part of Plant Design Change Request (PDCR) 90-010. This design change is also scheduled for implementation during the 1992 refueling outage. PDCR 90-010 will modify the load shed circuitry for certain control room air conditioning loads to facilitate restoration of these loads under loss of offsite power conditions. The details of this design change are included in the PDCR package.

The design for the modifications to the Vernon tie line will be covered by EDCR 90-412. This design change will modify the overhead portions of the tie line to meet the requirements of the SBO rule and to interface with the new configuration of the hydro-electric station after the station is upgraded. The objective of the EDCR is to provide a tie line to the hydroelectric station which meets the requirements of an AAC source. The tie line shall;

1) be physically and electrically independent of the other sources of offsite power (345 kV and 115 kV).

2) have the capacity to power all the loss of offsite power loads of one 4 kV emergency bus.

3) be protected from weather related events that may initiate a loss of offsite power event.

At this time the design details of tie line modification have not been finalized. Options being considered for protecting the line from weather are "hardening" the overhead line, burying the line in underground duct or using submarine cable installed in the river. In addition to the line protection design, a new transformer has to be selected to replace the existing 2.4 kV to 4.16 kV transformer. The new transformer will be 13.8 kV to 4.16 kV to match the new generation voltage. Preliminary plans call for locating the new transformer on Vermont Yankee property.

The modifications for the hydroelectric station are still in the licensing stage. The permit application was filed in February, 1991 and a permit is expected in September 1991. Equipment delivery for the new station equipment is expected between March 1993 and September 1993. Work associated with the hydro station modifications is scheduled to begin in 1993 and should be completed by the end of 1994. The connection of Vermont Yankee to the new tie line should occur in, approximately, late 1993.

Recommendation: It is the staff's position that an EDG reliability program should be developed in accordance with the guidance of RG 1.155, Section 1.2. Confirmation that such a program is in place or will be implemented should be included in the documentation that is to be maintained by the licensee.

Response: Confirmation of an EDG reliability program which assures that the target reliability established for the SBO Rule is maintained, and which meets the intent of RG 1.155, Section 1.2, will be available at Vermont Yankee.