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REPLY TO
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BVY 94 - 33

United States Nuclear Regulatory Commission
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References:
a. License No. DPR-28 (Docket No. 50-271)
b. Letter VYNPC to USNRC, BVY 93-94, dated September 2, 1993
c. Letter USNRC to VYNPC, NVY 93-109, dated July 27, 1993
d. NUMARC 87-00, Guidelines and Technical Bases for NUMARC Initiatives Addressing Station Blackout at Light Water Reactors
e. Letter VYNPC to USNRC, BVY 91-88, dated September 30, 1991

Attachment: a. Wind Speed Probability Relationship for Vermont Yankee at 10 Meters

Subject: Additional Information in Support of Vermont Yankee Compliance with the Station Blackout Rule

On July 22, 1993, VYNPC representatives met with USNRC staff to discuss the status of Vermont Yankee's Station Blackout plan and schedule, Reference (c). One of the items requested by NRC staff members at that meeting was additional information regarding the design of the AAC source and how it meets the requirements for weather protection. By letter dated September 2, 1993, Reference (b), Vermont Yankee provided to the NRC additional information on its AAC source.

On February 10, 1994, the NRC telephoned the Vermont Yankee Licensing Engineer and YNSD engineers to further discuss the AAC source. NRC technical reviewers indicated that additional specific structural design criteria for the Vernon switchyard as well as probabilistic wind occurrence for the location would be required to determine the acceptability of Vernon Station as an AAC source for a station blackout event. This issue was described by the NRC reviewers as the only remaining concern with regard to Vermont Yankee achieving full compliance with 10CFR50.63, the Station Blackout Rule. The intent of this letter is to provide this requested information.

Vernon Switchyard Design Criteria

As shown in Attachment (a) to Reference (b), the switchyard at the Vernon Hydro Station is composed of two sections; the original 69 kV section built primarily of carbon steel around 1920, and the newer 13.2 kV section built primarily of aluminum around 1970. Both structures are lattice framed. The design of the combined switchyard presently falls under the jurisdiction of the New England Power Service Company (NEPSCo).

Information obtained from NEPSCo has determined that the governing code applied to the design of the switchyard structures and components is the National Electrical Safety Code

A050

(NESC). The NESC has designated the Vernon area as a "Heavy" loading district based upon the prevalence of high wind velocity and thickness of ice which accumulates on wires. In accordance with the requirements of the NESC, wind loading alone is applied to the cables and conductors interfacing the structures.

Information obtained from drawings at the hydro station, and discussions with substation structural engineers at NEPSCo are the sources for the design criteria relative to switchyard structures and attached components. This information indicates that the design of the cables and conductors for both structures incorporated a radial thickness of ice equal to one half (1/2) inch. In addition, the design of both structures incorporated an extreme wind speed equal to ninety (90) miles per hour.

Wind Speed Annual Probability of Exceedance

A site specific analysis of annual fastest mile wind speed probabilities was performed to satisfy severe weather (SW) and extremely severe weather (ESW) requirements, Reference (e). Attachment (a) to this letter is a plot of this relationship for the Vermont Yankee and Vernon Hydro sites. As can be seen in the attachment, the annual probability of exceeding wind speeds of 75 miles per hour is dominated by hurricane winds. At 90 miles per hour, the annual probability of exceedance is approximately 4 E -3. It should be noted that the calculated probability of a tornado is equal to 9.8 E -5. Therefore, since hurricane wind loading probabilities are considerably higher, Tornado loads are not considered in the design of the switchyard structures and components.

Compliance to Station Blackout Rule

Reference (b) outlines Vermont Yankee's compliance with the station blackout rule; in particular, the acceptability of the AAC source. In view of the recent discussion with the NRC, we wish to supplement the description of the Vernon Hydro station switchyard to demonstrate conformance with the criteria of an AAC source as outlined in Appendix B of NUMARC 87-00, Reference (d).

The NRC 's most recent concerns apply to criterion B.3. This criterion states, "Components and subsystems shall be protected against the effects of likely weather-related events that may initiate the loss of off-site power event. Protection may be provided by enclosing AAC components within structures that conform with the Uniform Building Code, and burying exposed electrical cable run between buildings (i.e. connections between the AAC power source and the shutdown buses)."

The Vernon switchyard is supplied by multiple sources. First, the 69 kV transmission system, which is not directly connected to Vermont Yankee's offsite power sources, has five separate overhead lines into the switchyard. Two lines (A1 and B2) run southeast into Massachusetts, two lines (C3 and D4) run southwest to Massachusetts, and one line (G33) runs north to Bellows Falls, Vermont. Secondly, the Vernon Hydro station has two overhead lines plus one underground line into the switchyard. The existing underground line constitutes the preferred generation supply from the hydro station at this time. NEPSCo plans call for all lines from the hydro station to the switchyard eventually to be run underground, possibly as early as 1995.

As stated above, the switchyard has been designed to withstand the effects of wind and ice loading for a "heavy" loading district as defined in the NESC, and for extreme winds of 90 miles per hour. These requirements exceed those of the Uniform Building Code (UBC) as specified in Reference (d), Appendix B, Section B.3.

Appendix I to Reference (d) provides responses to questions raised at the NUMARC 87-00 seminars. Two questions and responses pertaining to alternate AC power criteria follow:

> 113. Q. "Under criterion B.3, what types of wind velocities should the AAC structure be able to withstand?" A. "The structure must meet the Uniform Building Code for your area which factors in wind velocities, snow loadings, etc."
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> 115. Q. "What is a likely weather-related event referred to in Criterion B.3?" A. These are the weather events considered in formulating the Uniform Building Code for your area. Therefore, if you meet the building code, you have designed for the likely weather-related events."

The guidelines provided in Reference (d) for an AAC source permit the use of a single diesel or turbine generator enclosed within a structure meeting the UBC. The Vernon Hydro Station, with multiple units, has demonstrated a reliability far in excess of an auxiliary generator (99.9% compared to 95%). In addition, the design wind speed requirements of the Vernon Hydro switchyard structure exceed those of the UBC.

Finally, the cable from the Vernon switchyard to the Vermont Yankee shutdown buses has been buried as described in Reference (b). This cable is protected from any weather-induced failures.

Based upon the above, plus the description provided in Reference (b), Vermont Yankee firmly believes that the requirements of an AAC source are met by the Vernon Hydro station and switchyard.

We trust that this letter is responsive to your request for additional information, and resolves all remaining concerns relative to Vermont Yankee's compliance with the Station Blackout Rule, 10CFR50.63. However, should you have any further questions, please contact this office.

Sincerely,

Vermont Yankee Nuclear Power Corporation

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Wind Speed - Probability Relationship for Vermont Yankee at 10 - Meters