VERMONT YANKEE NUCLEAR POWER CORPORATION



Ferry Road, Brattleboro, VT 05301-7002

July 31, 1992 BVY 92 - 94

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

References:

- License No. DPR-28 (Docket No. 50-271) a.
- Letter, USNRC (Thadani) to NUMARC (Rasin), "Approval of NUMARC b. Documentation Station Blackout", dated October 7, 1988 Letter, VYNPC to USNRC, BV.' 89-36, dated April 12, 1989
- С.
- NUMARC 87-00 "Supplemental Questions and Answers", dated d. December 27, 1989
- NUMARC 87-00 "Major Assumptions", dated December 27, 1989 e.
- NUMARC letter, "Station Blackout (SBO) Implementation: Request for f. Supplemental SBO Submittal to NRC", dated January 4, 1990
- Letter, USNRC (Thadani) to NUMARC (Marion), dated January 3, 1990 g.
- h.
- Letter, VYNPC to USNRC, BVY 90-38, dated March 30, 1990 Letter, VYNPC to USNRC, BVY 91-21, dated February 28, 1991 ì. .
- Letter, USNRC to VYNPC, NVY 91-98, dated June 5, 1991
- Letter, VYNPC to USNRC, BVY 91-69, dated July 17, 1991 k.
- Letter, VYNPC to USNRC, BVY 91-88, dated October 1, 1991 1.
- Letter, USNRC to VYNPC, NVY 92-16, dated February 21, 1992 m.

Subject:

10CFR50.63 Station Blackout (SBO) - Response to NRC Request for Additional Information

Dear Sir:

By letter dated February 21, 1992 [Reference (m)], NRC transmitted to Vermont Y, nkee a list of questions concerning the availability of the Vernon Hydro Station. Answers to these questions are considered necessary for NRC to complete the SBO review for Vermont Yankee.

Attached please find Vermont Yankee's response to Reference (m). Should you have any further questions, please contact this office.

Very truly yours,

VERMONT YANKEE NUCLEAR POWER CORPORATION

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Leonard A. Tremblay, Jr. Senior Licensing Engineer

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

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Attachment to BVY 92-94

Question No. 1

What provisions are in place or will be put in place to alert the Vermont Yankee nuclear operators if at least 2.3 MW of Vernon Hydro is not available, or could not be made available (within 10 minutes) upon demand?

Response

The FERC operating license for the hydro station requires a minimum river flow of 1250 cfs. This 1250 cfs flow, if passed through the turbine-generator wheels, corresponds to an average electrical output of 3.5 MW available to Vermont Yankee. Since the maximum safe shutdown load requirement for Vermont Yankee is 2.3 MW, it is clear that the hydro station always has sufficient capacity to supply all loads required for a Station Blackout event under these conditions. New England Power has reconfirmed the operating directive requiring a minimum flow of 1250 cfs be directed through the water wheels, thus assuring 3.5 MW is available to Vermont Yankee.

Vermont Yankee and the Vernon Hydro station have a mutual understanding, recently confirmed with Vernon Hydro station management, that Vermont Yankee will be notified of an anticipated unavailability of the tie line that supplies Vermont Yankee from Vernon Hydro. It is a long-standing, customary practice for Vermont Yankee, Vernon Hydro station, and all other electrical suppliers on the grid to notify individuals that may be affected prior to any plonned switching, connection, or disconnection of electrical supply; changes in the availability of the tie line with Vermont Yankee would be no exception. In addition, Vermont Yankee operators monitor tie line voltage and Vernon Hydro total power output in the control room. These provide information regarding the loss of voltage on the tie line, and the loss of hydro station generator output for any reason. Even in the rare instance where the Vernon Hydro power output is zero, power can still be provided by the separate 69-kV grid through the Vernon Hydro tie line to Vermont Yankee.

The tie line between the Vernon Hydro station and Vermont Yankee is normally energized, and the breaker to control connection of the tie line to emergency buses is under Vermont Yankee control. Connection of Vernon Hydro power to Vermont Yankee emergency buses can be made directly from the Vermont Yankee control room.

Question No. 2

If a LOOP and subsequent SBO at the nuclear plant is due to an extensive grid failure which results in the separation of the hydro generation from the grid, what steps and how much time (realistically under these conditions) would be required by the nuclear plant operators and the operators at the hydro plant to re-energize the line to the nuclear plant (with required KW available), assuming (1) that the preexisting hydro plant load does not completely separate from the hydro generation (ie. the load equals the hydro generation), and (2) that the pre-existing load separates from the hydro generation?

Response

In addressing Station Blackout requirements, Vermont Yankee considered a loss of the 345-kV and 115-kV lines, which constitute the normal offsite power supply. The Vernon Hydro station connects to the 69-kV system, and is not considered a normal source of offsite power to Vermont Yankee. It is extremely unlikely for common mode failure of Vernon Hydro and Vermont Yankee's offsite and onsite power to occur. Vernon Hydro station generators are not normally connected the Vermont Yankee emergency buses; the equipment is of different manufacturer; the equipment is maintained and operated by a separate organization. Vernon Hydro is connected to a 69-kV transmission system which is not directly electrically connected to Vermont Yankee's offsite power sources, thus providing electrical independence and minimizing the potential for common cause failure due to electrical faults, switching problems, or other grid related losses of power. The hydro station is connected to its own switchyard which is physically separated from Vermont Yankee's switchyard (approximately 1 mile), and the transmission lines emanating from the station are routed on separate rights of way. The majority of the lines emanating from the hydro station are routed in completely different directions from the lines supplying offsite power to Vermont Yankee.

While the tie line from Vernon Hydro to Vermont Yankee is normally energized, Vermont Yankee does not constitute a normal (pre-existing) load for the hydro station. Since hydro station house loads are inconsequential, the only pre-existing loads are grid loads. In the highly unlikely event of a regional blackout, the hydro station would separate from the grid. Vernon Hydro station has the capability to black start, and provide power to Vermont Yankee within an hour. Vermont Yankee is considered a priority load in accordance with Vernon Hydro Station Operating Rules.

Question No. 3

After the AAC source is connected to the safety bus at the nuclear plant, how will the loads be sequenced on (manually or automatically, kWs versus time)? For this loading sequence, and assuming a LOOP and SBO as described above and minimum pre-existing hydro generation, what tests have been or will be made per 10 CFR 50.63(a)(2) (*sic*) to assure that there will be adequate voltage and power availability at the Vermont Yankee safety bus? Provide a description of the tests and any supporting analysis including results if available, or provide the descriptions and a schedule for implementation.

Response

As discussed in our submittal BVY 91-69, dated July 17, 1991, the automatically sequenced loads for either emergency bus are less than 600KW. The remaining loads will be manually sequenced on in accordance with Vermont Yankee's LNP Procedure No. OT-3122. Tests of the Vernon Hydro line are conducted in accordance with Vermont Yankee Procedure No. OP 4142, "Vernon Tie Surveillance." Plant mode, system operating configuration, and circuit breaker interlocks make it physically impossible to conduct these tests at the full 2.3 MW load anticipated during a station blackout. Vermont Yankee is evaluating hardware changes that would allow testing at full SBO load. However, there are no plans to perform increased load testing until the tie line is modified in conjunction with the Vernon Hydro station upgrade, at which time testing will be readdressed. (Also, tests required by 10 CFR 50.63(c)(2) relate to time, not capacity.)

Our preliminary load flow analysis shows, for conservatively assumed initial loads, that adequate voltage and power can be made available to the 4160-volt and 480-volt emergency buses. Due to the vintage of the hydro station generators' voltage regulators, we cannot at this time analytically predict what the voltage levels will be upon application of the largest load to the 4160-volt bus. However, engineering personnel from hydro operations and from central dispatching who are familiar with the operation and responsiveness of the hydro generators, are confident that these units can power the largest Vermont Yankee load. Additionally, as discussed in our submittal BVY 91-69, Vermont Yankee will be implementing a design change to upgrade the tie line from Vernon Hydro. This is scheduled to coincide with the hydro station upgrade. With this equipment in place, we will be able to analytically show adequate voltage and power availability for all Vermont Yankee loads.