VERMONT YANKEE
NUCLEAR POWER CORPORATION

RD 5, Box 169, Ferry Road, Brattleboro, VT 05301

FVY 84-47
REPLY TO:
ENGINEERING OFFICE
1671 WORCESTER ROAD
FRAMINGHAM, MASSACHUSETTS 01701
TELEPHONE 617-872-8100

May 18, 1984

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

Attention: Domenic B. Vassallo, Chief
Office of Nuclear Reactor Regulation
Operating Reactors Branch #2
Division of Licensing

References:
a) License No. DPR-28 (Docket No. 50/271)
b) NUREG/CR-2182, Volume I, Station Blackout at Brown's Ferry Unit One - Accident Sequence Analysis
c) GEK 9613 - HPCI System for Vermont Yankee
d) Letter, VYNPC to USNRC, dated 2/7/84; HPCI Automatic Suction Transfer
e) Letter, USNRC to VYNPC, dated 4/12/84

Dear Sir:

Subject: Supplemental Information Regarding HPCI Automatic Suction Transfer License Amendment Request

In response to the questions raised in your letter of April 12, 1984 (Reference e), the following responses are submitted.

Item 1: Identify the original design basis for implementing the automatic transfer of the HPCI suction from the CST to the suppression pool, on high water level in the pool, and discuss how this design basis requirement will continue to be met following the removal of the auto feature.

Response:

The original design for the HPCI automatic transfer was to automatically inject water into the reactor from the Condensate Storage Tank on a LOCA. The system flow diagrams have always shown the pump suction normally open to the CST, closed to the Torus. No safety study, accident analysis, procedure, or any other requirement has been identified which requires auto transfer of HPCI suction as a safety function, or even as necessary for any particular event sequence. Discussions with the NSS vendor have failed to identify any design requirement for this installation.

A001
1/0

It is concluded that the auto transfer of HPCI suction from CST to torus on high torus level is not a safety function, but was probably put in as an "operator aid." The level detection device is connected to safety related equipment and has the potential for negating a design safety function, i.e., normal suction from the CST. After removal of the automatic suction transfer, the manual transfer capability will still exist as will the high level alarm to alert the operators to the existence of a high level to allow them to evaluate whether the suction transfer is desirable.

Item 2: Discuss the consequences of not transferring suction to the pool because of either operator error or the prevailing water temperature in the pool is too high.

Response:

If, because of operator error, the manual transfer from CST to suppression pool did not occur, the torus would begin to fill above Technical Specification limit for suppression pool water level. These Technical Specification limits are based upon design basis LOCA. The maximum level is provided to limit the stress to the torus due to a blowdown of the vessel to the torus.

The HPCI system is designed for a small diameter line break and, as such, the reactor vessel would not be depressurizing rapidly into the torus. Therefore, this high limit for suppression pool level does not apply for the accident where the HPCI system is required. Accordingly, there would be no adverse consequences associated with failure to transfer suction to the pool.

The postulated consequences of a high water temperature in the suppression pool are based on concerns raised in Reference b) (Station Blackout at Brown's Ferry Unit One - Accident Sequency Analysis). This analysis has raised questions concerning the desirability of the automatic shift of the HPCI pump suction on high suppression pool water level. The basis for this concern is the possibility that following a station blackout, the combination of remote-manual operation of the primary relief valves to control primary pressure and the loss of suppression pool cooling will result in suppression pool temperature of about 160°F after approximately 3 hours. By this time, the suppression pool level would have increased enough to cause the HPCI pump suction to automatically transfer from CST to the torus. The temperature limit for the fluid being pumped by the HPCI system is 140°F since the lubricating oil for the HPCI turbine is cooled by the

water being pumped. Transfer of pump suction to the pool with a temperature above 140°F could threaten the viability of the HPCI system at a time it is needed for plant safety while the failure to transfer under this condition would have no adverse consequences. It should be noted that the CST is designed to provide adequate water for the HPCI system to perform its safety function.

Item 3 Identify other events, in addition to Station Blackout, that can cause increases in pool water temperature and prevent HPCI suction from the pool.

Response:

Any size LOCA will eventually cause an increase in suppression pool water temperature if normal torus cooling is not maintained. This failure to maintain torus cooling could also threaten the viability of the HPCI system for the same reasons stated in the response to Item 2.

Item 4 Identify any other system that could be damaged from an elevated water temperature in the pool and discuss provisions made to prevent their damage.

Response:

The RCIC system is another system in which the temperature limit for the lube oil for the RCIC pump is 160°F. This system could also become damaged if it were required to pump water that was >140°F. The RCIC system does not have an auto transfer feature on suppression pool high water level and as such reduces the chances of any failure as previously mentioned. The RCIC system is designed to automatically transfer from the CST to the torus on low CST level only.

Item 5 Discuss the trade-offs, in safety to the plant, from not removing the automatic transfer and allowing the pumps to operate with elevated pool temperatures. Additionally, identify the critical temperature that will damage the pumps and how this temperature was determined.

Response:

It is concluded that the HPCI automatic suction transfer from the CST to the torus on high torus water level is not a safety function, but was probably put in as an "operator aid."

VERMONT YANKEE NUCLEAR POWER CORPORATION

If the auto transfer on high torus water level remains functional and the pumps are required to pump water which is 160°F it could render the HPCI system inoperable at a time when the system is needed for plant safety. The manual capabilities of transferring from CST to torus on high torus water level will be available to the Control Room operators and the auto transfer on low CST water level will still be operable.

We trust that this information is satisfactory; however, if you have any questions or require any further information, please do not hesitate to contact us.

Very truly yours,

VERMONT YANKEE NUCLEAR POWER CORPORATION

Richard W. Bumbo for

Warren P. Murphy
Vice President and
Manager of Operations

WPM/dm