VERMONT YANKEE
NUCLEAR POWER CORPORATION

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BVY 90-034
REPLY TO
ENGINEERING OFFICE
580 MAIN STREET
BOLTON, MA 01740
(508) 779-6711

March 19, 1990

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

Attention: Document Control Desk

References: a) License No. DPR-28 (Docket No. 50-271)
b) Letter, USNRC to All Licensees of Operating Reactors, NVY 89-206, "Request for Action Related to Resolution of Unresolved Safety Issue A-47 (Generic Letter 89-19)," dated 9/20/89

Dear Sir:

Subject: Vermont Yankee Response to NRC Generic Letter 89-19: "Action Related to Resolution of Unresolved Safety Issue A-47"

By Generic Letter 89-19, dated September 20, 1989 [Reference b)], the Nuclear Regulatory Commission requested all licensee/applicants to review information provided in the Generic Letter and its Enclosure regarding automatic reactor vessel overfill protection. The specific recommendations are summarized as follows:

1. BWR plant designs should provide automatic reactor vessel overfill protection to mitigate main feedwater (MFW) overfeed events. The design should be sufficiently separate from the MFW control system to ensure that the MFW pump will trip on a reactor high-water-level signal when required, even if a loss of power, a loss of ventilation, or a fire in the control portion of the MFW control system should occur.

2. Plant procedures and technical specifications should include provisions to verify periodically the operability of the overfill protection and to assure that overfill protection is available to mitigate main feedwater overfeed events during reactor power operation.

3. The system design and setpoints should be selected with the objective of minimizing inadvertent trips of the main feedwater system during plant startup, normal operation, and protection system surveillance.

4. Reassess and modify, if needed, operating procedures and operator training to assure that the operators can mitigate reactor vessel overfill events that may occur via the condensate booster pumps during reduced system pressure operation.

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The purpose of this letter is to provide the response to the subject Generic Letter.

Vermont Yankee has reactor vessel overfill protection. A review of the system was performed relative to the specific recommendations of the Generic Letter. It is our opinion that the installed system meets the intent of the Generic Letter and that no modifications are required. The results of the review are documented in the enclosure.

We trust this letter and enclosure are responsive to the subject Generic Letter; however, should you have any questions or require additional information, please do not hesitate to contact us.

Very truly yours,

VERMONT YANKEE NUCLEAR POWER CORPORATION

Warren P. Murphy
Vice President and
Manager of Operations

/dm
cc: USNRC Regional Administrator, Region I
USNRC Resident Inspector, VYNPS
USNRC Project Manager, VYNPS

STATE OF VERMONT)
)ss
WINDHAM COUNTY)

Then personally appeared before me, Warren P. Murphy, who, being duly sworn, did state that he is Vice President and Manager of Operations of Vermont Yankee Nuclear Power Corporation, that he is duly authorized to execute and file the foregoing document in the name and on the behalf of Vermont Yankee Nuclear Power Corporation and that the statements therein are true to the best of his knowledge and belief.

DIANE M. McCUE
NOTARY PUBLIC
WINDHAM COUNTY, VERMONT

Diane M. McCue Notary Public
My Commission Expires February 10, 1991

ENCLOSURE

VERMONT YANKEE RESPONSE TO NRC GENERIC LETTER NO. 89-19

RECOMMENDATION #1

BWR plant designs should provide automatic reactor vessel overfill protection to mitigate main feedwater overfeed events. The design should be sufficiently separate from the MFW control system to ensure that the MFW pump will trip on a reactor high-water-level signal when required, even if a loss of power, a loss of ventilation, or a fire in the control portion of the MFW control system should occur.

Response

Vermont Yankee feedwater pump control circuitry already has an automatic trip on reactor high level. The circuit also prevents closure of the feed pump breakers if a high level signal is present. The design of the circuitry is as follows:

- two-out-of-two reactor vessel high water level trip;
- high level signals derived from both divisions of the Emergency Core Cooling System (ECCS);
- same signals that provide high level trip of Reactor Core Isolation Cooling (RCIC) and High Pressure Coolant Injection (HPCI) turbines;
- safety related up to the relay interfacing with the Feedwater pump breaker control circuits; and
- all power supplies are originating from safety related DC sources.

The system is separate from the Feedwater Control System. The specific characteristics identified in Generic Letter 89-19 are addressed as follows:

- Power

  The circuitry from the overfill protection sensors up to the relays interfacing with the feedwater pump control circuity, is powered from supplies originating from safety related DC sources. Feedwater system trip relays are also powered from a 125 VAC source. The Feedwater Level Control System is powered from the Vital AC system. A loss of power to the Feedwater Level Control System will therefore not affect the ovefill protection circuitry.

- Ventilation

  Although there is equipment from both the Feedwater Level Control System and overfill protection circuitry in areas that share common ventilation systems, the nature of the equipment is such that loss of ventilation systems would not be expected to affect the overfill protection circuitry.

The transmitters, analog electronics and cabling for the overfill protection circuitry located in the Reactor Building are enviromentally qualified for harsh environments that would result from design basis accidents. The temperature transient resulting from a postulated loss of ventilation would not be as severe. No loss of function would therefore occur as a result of reactor building ventilation failure.

The common overfill protection and Feedwater control circuitry and cabling located in the control room would not be expected to experience temperature transients resulting from a loss of ventilation which would affect the circuit function. This arrangement is similar to other designs for addressing safety related equipment where these redundant components show a common ventilation system in the control room. If failure of the control room ventilation were to occur, actions to provide temporary ventilation would be taken long before the relays and cabling would be affected.

o Fire

The Feedwater Level Control System and the overfill protection circuitry do not share common circuitry. The level signals for the overfill protection circuitry are derived from different transmitters than the level control system. There is, however, some commonality in that there are transmitters on the same instrument racks. Cables are routed in different cable trays, however the trays are routed in the same bank of trays. The relays for the overfill protection circuitry are in the same control room cabinet as electronics related to the Feedwater Level Control System but located in a separate bay.

Since separate transmitters, cables and bays of cabinets are utilized, there is some physical separation between the Feedwater Level Control System and the overfill protection circuitry. Shorting and burning of any specific transmitter would be confined to that transmitter and not impact other equipment on that rack (there are no combustibles between transmitters to propagate a fire). With regard to cable trays, due to low level signals, it would be highly unlikely there would be sufficient energy to ignite cables in the trays.

In the event of a major fire in the control room cabinet or reactor building instrument rack area, however, damage to both systems could occur. The potential for this is not considered to be significant. The two areas are critical plant areas and due to the nature of key safety related equipment in both, any significant fire would result in immediate plant shutdown. Appendix R analyses show the plant can be safely shut down if this should occur. In addition, both areas are monitored by fire detection systems and it would be expected that a fire in either area would be detected and extinguished before damage to both the overfill protection circuitry and the Feedwater Level Control System could occur.

Based upon the above, the installed overfill protection circuitry meets the design requirements as described in the Generic Letter and no action is required relative to this recommendation.

RECOMMENDATION #2

Plant procedures and technical specifications should include provisions to verify periodically the operability of the overfill protection and to assure that overfill protection is available to mitigate main feedwater overfeed events during reactor power operation.

Response

As previously described, the high water level signals are derived from the Emergency Core Cooling Systems (ECCS). These systems are safety related and governed by technical specifications. The functional testing, calibration and instrument checks applicable to the ECCS which are required by technical specifications, encompass the safety related portion of the overfill protection circuitry. As such, testing and operability requirements for the transmitters, analog electronics and relays are covered under the existing technical specifications and functional test/calibration procedures.

The only component which is not safety related and not specifically governed by technical specifications are the relays interfacing with the feedwater pump breakers control circuits. These relays are visually verified to pick-up in conjunction with the ECCS functional testing. These relays are classified as non safety related due to its association with the non safety related feedwater pump breaker control circuits. These relays are a 125 volt DC HFA, normally deenergized auxiliary relay which has historically been highly reliable and is the same type of relay used in many safety related applications at Vermont Yankee.

No action is required relative to this recommendation.

RECOMMENDATION #3

The system design and setpoints should be selected with the objective of minimizing inadvertent trips of the main feedwater system during plant startup, normal operation, and protection system surveillance.

Response

Trip of the main feedwater system requires completion of a two-out-of-two initiating logic on reactor vessel high water level signals originating from separate instrument loops. This arrangement is utilized to minimize inadvertent trips.

The overfill protection circuitry has been in place since 1973 and has not caused any inadvertent trips of the main feedwater system in any mode of operation.

Based upon the above, the installed overfill protection circuitry meets the design requirements as described in the Generic Letter and no action is required relative to this recommendation.

RECOMMENDATION #2

Plant procedures and technical specifications should include provisions to verify periodically the operability of the overfill protection and to assure that overfill protection is available to mitigate main feedwater overfeed events during reactor power operation.

Response

As previously described, the high water level signals are derived from the Emergency Core Cooling Systems (ECCS). These systems are safety related and governed by technical specifications. The functional testing, calibration and instrument checks applicable to the ECCS which are required by technical specifications, encompass the safety related portion of the overfill protection circuitry. As such, testing and operability requirements for the transmitters, analog electronics and relays are covered under the existing technical specifications and functional test/calibration procedures.

The only component which is not safety related and not specifically governed by technical specifications are the relays interfacing with the feedwater pump breakers control circuits. These relays are visually verified to pick-up in conjunction with the ECCS functional testing. These relays are classified as non safety related due to its association with the non safety related feedwater pump breaker control circuits. These relays are a 125 volt DC HFA, normally deenergized, auxiliary relay which has historically been highly reliable and is the same type of relay used in many safety related applications at Vermont Yankee.

No action is required relative to this recommendation.

RECOMMENDATION #3

The system design and setpoints should be selected with the objective of minimizing inadvertent trips of the main feedwater system during plant startup, normal operation, and protection system surveillance.

Response

Trip of the main feedwater system requires completion of a two-out-of-two initiating logic on reactor vessel high water level signals originating from separate instrument loops. This arrangement is utilized to minimize inadvertent trips.

The overfill protection circuitry has been in place since 1973 and has not caused any inadvertent trips of the main feedwater system in any mode of operation.

The setpoints at which the circuitry actuates are the same as those that cause a high level trip of the Reactor Core Isolation Cooling (RCIC) and High Pressure Coolant Injection (HPCI) turbines. This setpoint of $\leq$177 inches is governed by technical specifications and has not resulted in inadvertent trips of the feedwater system.

No action is required relative to this recommendation.

RECOMMENDATION #4

Reassess and modify, if needed, operating procedures and operator training to assure that the operators can mitigate reactor vessel overfill events that may occur via the condensate booster pumps during reduced system pressure operation.

Response

Existing Operating Procedure OP 2172, Feedwater System, specifically notes that when reactor pressure is low, the condensate system supplies water directly to the vessel through idle feedwater pumps. In addition, Emergency Procedure OT 3114, Reactor High Level, addresses immediate and follow-up operator actions when an unexpected or unexplained increase in reactor level occurs.

No change to operating procedures or training is therefore required since the existing procedures already recognize that the condensate system can contribute directly to vessel level and appropriate procedures and training are in place for mitigation of an overfill event.

/dm