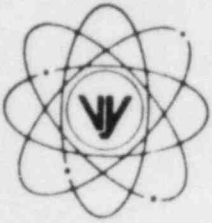


# VERMONT YANKEE NUCLEAR POWER CORPORATION



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

June 9, 1983

REPLY TO:  
ENGINEERING OFFICE

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FVY 83-54  
2.C2.1

United States Nuclear Regulatory Commission  
Washington, D. C. 20555

Attention: Office of Nuclear Reactor Regulation  
Mr. D. G. Eisenhut, Director  
Division of Licensing

References: (a) License No. DPR-28 (Docket No. 50-271)  
(b) Letter, USNRC to VYNPC, dated April 11, 1983  
(c) Letter, VYNPC to USNRC, dated February 26, 1982  
(d) Letter, VYNPC to USNRC, dated September 4, 1981

Subject: Environmental Qualification of Safety-Related Electrical  
Equipment

Dear Sir:

Your letter, Reference (b), transmitted the Safety Evaluation and Technical Evaluation Report (TER) for the environmental qualification of safety-related electrical equipment at the Vermont Yankee plant and requested that we provide additional information for items in NRC Categories I.B, II.A, and IV in the TER.

Justification for continued operation is provided in Enclosure 1 to this letter for items which have not been addressed in our previous submittal, Reference (c).

Based on the information presented above, and previously submitted information, we conclude that continued operation of the Vermont Yankee plant is justified.

We trust that this information is satisfactory; however, should you have any questions please contact us.

Very truly yours,

VERMONT YANKEE NUCLEAR POWER CORPORATION

J. B. Sinclair  
Licensing Engineer

JBS/ds

Enclosure

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JUSTIFICATION FOR CONTINUED OPERATION

CATEGORY I.B - EQUIPMENT QUALIFIED PENDING MODIFICATION

Item 79

The work sheet for solenoid valve 23-50A was removed in our letter, Reference (d), because the solenoid valve does not have to function in a harsh environment and is not required for mitigation of the HPCI HELB.

Items 100, 102, and 103

This solenoid valve has been replaced with a qualified unit. The certificate of conformance has been received from the manufacturer relating the installed unit to the tested unit. (RV-2-71A-D, FCV-2-39, SB-2A, B, 3A, B, 4A, B, 5).

CATEGORY II.A - EQUIPMENT QUALIFICATION NOT ESTABLISHED

Items 1 and 2

The connections to these limit switches, AOV-2-80A, B, C, D, - 86A, B, C, D, have been verified sealed to assure that no steam enters the unit via this connection. This addresses the concern expressed in the TER.

Item 5

For a line break in the steam tunnel, the break is quickly isolated by the flow trip which is not located in the steam tunnel. The temperature switches sense the temperature rise and initiate timers which trip the HPCI and RCIC steam supply valves after timing out in 30 minutes. The switches operate as temperature rises. The switches will operate properly as they have been tested to higher temperatures and totally immersed in water. An independent temperature device (RTD) at the same location as the switches actuates an alarm on increasing temperature, which by administrative procedure immediately causes operator action to determine the line break and initiate corrective action independent of and in parallel with the automatic action of the temperature switch.

Items 8, 9, 40, 42, 67, 69

Additional information is available which establishes similarity between the insulation system of these core spray and RHR motors and the tested motors. We conclude that this information, plus the traceability provided in the documentation submitted for the TER, satisfies the concerns in the TER relative to the motor insulation. Since these motors are not operated continuously during normal plant operation and are located in ventilated areas, the concern in the TER relative to the thermal aging of the motor lead splice materials will not be a factor, since the splices are to be replaced before aging of any significance can occur.

#### Item 10

Additional information is available which establishes similarity between the insulation system of this RHR Service Water Pump motor and the tested motorette. In addition, an analysis has been performed to compare actual motor duty to the qualified life data in the test report. This resolves the concerns in the TER relative to the motor insulation. With regard to the concern in the TER relative to thermal aging, the same justification applies as outlined in Item 8 above.

#### Items 11, 13, and 14

We have information from the manufacturer which shows that these Reliance motors are similar to those tested. This satisfies the concern in the TER.

#### Items 18 and 21

The concern of the TER was the establishment of similarity of the mounting and exposure to environment of these terminal blocks. This similarity has been verified. The test performed by Limitorque (Franklin Report F-C3441) exceeded the environment at VY and included boric acid spray which is not present at VY. In the Limitorque test, the enclosure was not hermetically sealed and, in fact, all but the uppermost portion of the switch compartment was submerged. At VY, the blocks are mounted within steel junction boxes which are not hermetically sealed. A hole is provided at the bottom of each box to prevent the accumulation of condensed water. It should be noted that all Item 21 terminal blocks are located in the Reactor Building and are not required to function in a steam environment.

#### Item 38

The only harsh environment for this power source (UPS-1A, B) is long-term post-LOCA recirculation dose. The total integrated radiation dose (40 years operating plus one year post-LOCA) is only  $5 \times 10^4 R$ , which is essentially a mild environment. For the design basis accident, the valves connected to the power supply operate at the start of the event, and thus complete their safety function before any damage can occur to the power supply.

#### Item 43

The M-G set supplies the vital instrument bus. In event this source should fail while operating in a harsh environment, the operator is alerted by alarm and can immediately re-energize the vital bus from another source located in a mild environment. The effects of loss of the vital instrument bus have been analyzed in response to I&E Bulletin 79-27.

#### Items 44 and 47

These motor control centers in the Reactor Building mainly serve motor-operated valves required for post-LOCA operation. The total integrated radiation dose is  $7 \times 10^5 R$  at Elevation 252 and  $5 \times 10^4 R$  at Elevation 280. It is our opinion that these radiation doses are below

the threshold for the initiation of damage to the materials involved for one year of post-LOCA operation. If failure should occur, the power source for the MCC is accessible in the switchgear room and limited access to the Reactor Building is available within one month for manual operations which may be required.

Item 45

Additional information is available which addresses subvendor test and analysis data and specifies the bases for radiation and thermal aging. This information resolves the concerns in the TER.

Item 46

As indicated in Reference (d), this power distribution panel has been deleted from our Master List. It is an integral part of MCC-9D, Item 47.

Items 54, 58, 59, and 60

The manufacturer of these cables has confirmed that the cables are similar to those tested. This satisfies the concern in the TER.

Items 55, 56, 57, 61, 62, and 63

Additional information is available relative to the testing of these cables which resolves the concerns in the TER. In addition, we have a letter from the manufacturer which states that the cables furnished meet the qualification of the tested cables.

Item 65

The TER does not cite the test documentation submitted (TER Reference 31) wherein the cable was tested for LOCA conditions and a certificate of conformance relates the cable supplied to the tested cables. In that the cables are used in the Reactor Building and not subjected to LOCA conditions, we conclude that the cables are well qualified for their use.

Item 68

These motor-operated valves have been removed from the Master List because they are not required for any accident. The recirculation loop crossconnect line isolation valve bypasses, MOV-2-66A, B, do not actuate under any accident conditions. MOV-10-32, the head spray isolation valve, is not required to operate since the piping has been disconnected.

Item 87

We have received additional information from the vendor which shows that the motors for MOV-10-34A, B with Class H insulation are equal to or superior to those tested to  $2.04 \times 10^8 R$ . The limit switch and torque switch are similar to those tested to  $2 \times 10^7 R$ . Since the total integrated radiation dose is  $2.1 \times 10^7 R$ , and the valves do not require intermittent operation after conditions have stabilized, the valves will complete their safety function before any damage will affect the torque switch or limit switch.

#### Items 88 and 118

The rationale for deleting this worksheet has been re-evaluated and a worksheet is required for these temperature switches. Both the HPCI and RCIC lines have redundant flow measurements to detect and isolate a large line break in the respective line. In event there is a steam line break or leak that is so small that it does not trip the flow measurement trip on that line, the temperature will rise until the switch trips at less than or equal to 200°F to isolate the leak. Although there may be high humidity at the switch location, the switches have been tested at high temperature and while totally immersed in water.

#### Item 90

The rationale for deleting this worksheet has been re-evaluated and a worksheet is required for these differential pressure switches (DPIS-16-19-32A, B). These switches are the same as those discussed in Item 94.

#### Item 91

The work sheet for valves MOV-10-57 and MOV-10-66 have been deleted because these valves are normally closed and close, if open, immediately on the accident signal before the environment in the Reactor Building becomes harsh. Subsequent failure of the valve operator will not make the valve change position.

The functions of MOV-10-89A, B, 38A, B, and 39A, B have been re-evaluated and a work sheet is required for the valves. Although they are signalled to close immediately on an accident signal, they will have to be opened a few hours after accident initiation. Continued operation is justified because the motors are qualified for a radiation dose of  $2 \times 10^7$ R and the total integrated radiation dose is  $2.8 \times 10^7$ R. Since the motors will complete their safety function in a few hours, the radiation dose will be below the qualified level for the motors and no damage will occur.

#### Item 94

The TER cites a lack of similarity between the model tested (288A) and the installed model (288). However, included in the submitted documentation was information from the vendor which identifies the difference as being the installation of a metal clip which does not affect environmental qualification. We believe this should satisfy the concern in the TER. The switch is PS-2-3-52D. Switch PS-2-3-52B has been replaced by an analog channel.

#### Item 95

The work sheets for these valves (MOV-14-11A, B, 12A, B, and 26A, B) have been deleted because the valves do not have to function in a harsh environment. These core spray valves receive a signal to operate upon accident initiation and perform their safety function before the environment in the Reactor Building becomes harsh. They do not require operation after their safety function is completed, so subsequent failure will not degrade their safety function or mislead the operator.



#### Item 96

The pressure switches (PS-2-3-52A and 53A, B) have been replaced by an analog channel which is in a nonharsh environment. The qualification of the remaining switch, PS-2-3-52C is not established; however, failure of the switch will not prevent the safety function.

#### Item 101

The rationale for deleting the worksheet for MOV-23-19 has been re-evaluated and a worksheet is required for this valve. The valve is located in the steam tunnel, normally closed, and shuts off HPCI flow into the core. For MSLB or RCIC line break, the valve is opened. The environment for valve operation is steam, but the temperature peaks and drops within 20 seconds. This environment is much less severe than the LOCA environment in which similar motors have been tested. The concern in the TER is not for the motor, but for the brake, which has not been tested for radiation. Since this transient occurs so quickly, the radiation dose accumulated in this non-LOCA condition is considered to be so low that no damage will occur to the brake.

#### Item 104

The work sheet for these valves (MOV-10-25A, B) has been deleted because they are not required to function in a harsh environment. They are normally open isolation valves in the LPCI lines, and receive an accident signal to open early in the accident sequence before the environment in the Reactor Building becomes harsh. After they have performed this safety function the valves may remain open because there is an upstream check valve in each line.

#### Items 106 and 108

The main concern in the TER for these solenoid valves (16-19-6A, B and 11A, B) is degradation of the coil insulation due to chemical spray solution entering the enclosure. Both of these items are located outside containment and not subject to sprays. The remaining TER concerns have been evaluated and do not affect satisfactory operation of these solenoid valves.

#### Item 107

These radiation detectors are located in the Reactor Building while their electronic circuitry is in the Main Control Room. Post-LOCA radiation is the only harsh environment, and the monitors only have to operate to provide isolation functions at 14 mr/hr and at 100 mr/hr. Once the isolation function occurs, the monitors no longer have to function. Since these detectors are designed to detect radiation, and the dose levels for completion of function are so low, their safety function will be completed before any damage can occur.

#### Items 109, 110, and 112

Similarity of the installed isolation valves in the CAD System to the tested units has been verified by the manufacturer (Target Rock). This addresses the concern in the TER.

Valves 75-A1, A2, B1, B2, C1, C2, D1, D2 (Atkomatic) have not been replaced. Continued operation with these valves was justified in Reference (c) of the cover letter.

Items 116 and 117

The worksheets for these motor control centers have been deleted because they do not have to function in a harsh environment to perform their safety function. The HPCI equipment can operate for mitigation of the RCIC HELB, and vice versa.

Items 122

This transmitter has been deleted from the Master List. Its function was to provide an indication of drywell pressure through measurement of torus pressure. This function is now provided by two qualified transmitters monitoring drywell pressure, Item 29.

CATEGORY IV - DOCUMENTATION NOT MADE AVAILABLE

Item 37

Because of our inability to obtain further detailed information on the materials in this analyzer, it has been replaced with two qualified analyzers. A vendor test report for the new analyzer is in our possession and has been reviewed to assure the test parameters exceed our specified qualification parameters.