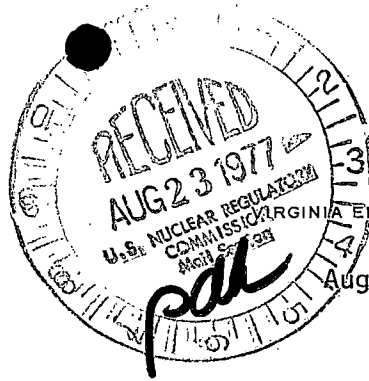


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U.S. NUCLEAR REGULATORY COMMISSION VIRGINIA ELECTRIC AND POWER COMPANY, RICHMOND, VIRGINIA 23261

August 20, 1977

Regulatory

File Cr

Mr. Edson G. Case, Acting Director  
Office of Nuclear Reactor Regulation  
Attn: Mr. Karl R. Goller, Assistant Director  
For Operating Reactors  
U. S. Nuclear Regulatory Commission  
Washington, D. C. 20555

Serial No. 362  
LQA/EAB:cwh  
Docket Nos: 50-280  
50-281  
License Nos: DPR-32  
DPR-37

Dear Mr. Case:

During our meeting with the NRC Staff on August 19, 1977, we discussed the operation of the recirculation spray pumps under postulated loss of coolant conditions based on the results of a most recent analysis using more conservative assumptions. We agreed to provide you with certain information concerning the available net positive suction head (NPSH) that will exist for these pumps and other engineered safety systems using those assumptions. At the conclusion of our meeting, you agreed to the continued operation of these two units through August 24, 1977 on the basis of our furnishing you this letter by noon today. Further, we agreed to furnish additional information on or before August 24, 1977 to justify continued operation beyond that date.

Attached is a copy of a letter we have obtained, and which you have requested, from the pump manufacturer, Bingham-Willamette which describes the operation of these pumps.

The most significant assumption in determining the available NPSH to the recirculation spray pumps is the distribution of energy released from the reactor coolant system between the containment atmosphere and water in the sump. The condition which results in the potential for less than 15 feet available NPSH is a sufficiently large opening in the reactor coolant system to allow the low head portion of the safety injection system to operate at full flow. The full flow transfers the energy as sensible heat directly to the sump. This causes rapid depressurization of the containment and elevation of the sump water temperature which results in less than the desired NPSH.

In the event of a small break in the reactor coolant system, the higher system pressure would prevent the low head portion of the safety injection system from operation. For this case the water supplied by the high head pumps, while more than adequate for core cooling, would not be sufficient to transfer the available energy to the sump as sensible heat. There would be a significant amount of steam and flashing water exiting from the break, resulting in an energy distribution used in previous analysis.

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Our analysis indicates that for a break equivalent to a six inch pipe or smaller, the reactor coolant system pressure will remain above the point necessary to prevent flow from the low head portion of the safety injection system.

We have considered the probability of the occurrence of a loss of coolant accident. The probability that any break size will be in excess of an equivalent six inch pipe and that the accident will occur within any three day period during the life of the reactor is sufficiently low to justify continued operation of the plant until August 24, 1977. This probability has been determined to be  $0.8 \times 10^{-6}$  for this period.

Information received from Bingham-Willamette, the recirculation spray pump manufacturer, in the attached letter, indicates that the pump will continue to operate to a minimum NPSH of seven feet. At this point the flow will decrease to 2000 gpm. When consideration is given to the static head of water and pipe losses at reduced flow, the minimum available NPSH for the outside spray pumps is 8.4 feet.

A review was made of the containment pressure transient, following a design basis LOCA, considering a reduction in recirculation spray flow which could result from a decrease in available NPSH to the pumps. All four recirculation spray pumps were assumed to be operable and the present site cooling water temperature was used. The results indicate a containment depressurization time of less than one hour with adequate cooling of the water in the sump to ensure required NPSH for the low head safety injection pumps in the recirculation mode.

Today, we have confirmed that all emergency core cooling and containment spray systems have been verified to be operable on both Units 1 and 2. As required by the technical specifications, periodic tests have been conducted recently with satisfactory results; it will not be necessary to remove any of them for further testing through August 24, 1977. Instructions have been issued to station operating personnel to verify proper alignment of all pumps and valves for these systems during each operating shift.

We will furnish you further information indicating our evaluation of the results of further computer analysis that is being carried out, and a proposal and schedule for a permanent fix on Wednesday, August 24, 1977, for your consideration and approval to permit continued operation beyond that date.

Very truly yours,



C. M. Stallings  
Vice President-Power Supply

Attachment

cc: Mr. James P. O'Reilly, Director  
Region II

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BINGWILL A PTL

8-19-77

ATTN: JACK NOBLE

STONE & WEBSTER

REF: VEPCO OUTSIDE PUMPS S/N NO. 230465/66

THE ABOVE PUMPS WILL OPERATE AT 3700 GPM AT 286.7 FT HEAD WITH 16 FT NPSH AS DEMONSTRATED BY OUR PERFORMANCE TEST. AS THE AVAILABLE NPSH DECREASES AND THE PUMPAGE TEMPERATURE INCREASES FROM 160 DEGREES F TO A TEMPERATURE OF 200 DEGREES F TO 260 DEGREES F THE PUMP CAPACITY WILL DECREASE BY THE SQUARE LAW TO APPROXIMATELY 2000 GPM AT 7 FT NPSH. AT LESS THAN 7 FT NPSH THE PUMP WILL BREAK SCTION. THE PUMP CAN RUN AT THIS CONDITION (LESS THAN 7 FT NPSH) UP TO 30 MINUTES WITHOUT MAJOR DAMAGE TO THE UNIT.

WE CAN RUN A NPSH-PERFORMANCE TEST OF THIS UNIT IF YOU SEND US THE FOLLOWING PARTS MOTOR, SEAL, CPLG, DISCHARGE HEAD AND BOWL UNIT. WE CAN RUN TEST APPROXIMATELY 1 TO 4 WKS AFTER WE RECEIVE THE ABOVE PARTS. THE PRICE FOR THE TEST WILL BE WIRED TO YOU NEXT WEEK.

THE PUMPS FOR DUQUESNE LIGHT S/N 230439/44 ARE HYDRAULIC IDENTICAL TO THE VEPCO PUMPS REFERENCED ABOVE.

ROBERT P KOMIN

PROJECT ENGR

BINGHAM-WILLAMETTE CO

PORTLAND, OREGON