50-280

UNITED STATES
NUCLEAR REGULATORY COMMISSION
WASHINGTON, D.C. 20555-0001

September 12, 1995

Mr. J.P. O'Hanlon
Senior Vice President - Nuclear
Virginia Electric and Power Company
5000 Dominion Blvd.
Glen Allen, Virginia 23060

SUBJECT: VIRGINIA ELECTRIC AND POWER COMPANY, (VEPCO), SURRY POWER STATION UNIT 1 ASME SECTION XI RELIEF REQUEST (TAC NO. M93565)

Dear Mr. O'Hanlon:

We have completed our review of the Virginia Electric and Power Company submittal dated September 11, 1995, concerning the leakage in the "A" residual heat removal (RHR) pump casing in the Surry Power Station, Unit 1. Pursuant to 10 CFR 50.55a(g)(5)(iv), you requested relief from the ASME Section XI (Code) pressure boundary leakage and flaw evaluation requirements to permit a determination of operability of the pump. The pump casing is cast ASTM A351, Grade CF-8A stainless steel. The leak rate has been measured at less than two drops per minute from a site that is approximately 0.5 inches in diameter on the suction side of the pump casing. The leak site appears to have occurred by a slow corrosion mechanism at a casting defect such as shrinkage, porosity, or sand inclusion. No linear indications are displayed. Growth of the defect by stress corrosion cracking is not anticipated due to the low stress in any mode of loading including seismic events, the low operating temperature, and the excellent resistance of this grade of stainless steel to primary water stress corrosion cracking.

In the above cited submittal, you stated that you had considered two repair options. The first was to maintain the plant in the current condition, isolate the pump and repair the leak. This was considered to be impractical, since isolation to the pump is insuffcent to assure an acceptable repair. The second option involved immediate depressurization of the reactor coolant system but postponement of the repair of the pump for approximately 10 days until the fuel has been off-loaded from the reactor vessel. This would allow the "A" train of the RHR system to be available for decay heat removal in the unlikely event that the "B" train of the RHR system degrades before decay heat removal is no longer required. You also assessed the risk associated with both options and found the second to be preferred from a risk perspective.

Two structural analyses of a representative cross section of the RHR pump were conducted by VEPCO to verify the ability of the pump to carry the design basis loading with the identified flaw. Limit load analysis was performed to determine the largest sized crack the pump can sustain without ductile rupture when subjected to the design basis loading, even though the defect did not show any evidence of linear flaws. The limiting flaw size determined by analysis was 12.00 inches compared to the flaw size of 0.50 inches. Although this is a cast material and, perhaps, has had its toughness reduced by thermal aging, sufficiently large margins to failure are available for the time period

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in question. The second analysis performed was to determine the largest unreinforced opening that the pump body could sustain before ductile tearing could occur. The analysis indicated that the opening would be 4.0 inches, significantly larger than the 0.50 inch flaw identified.

Initially, you had made a determination that RHR pump "A" was inoperable since it contained a through wall leak and, therefore, exceeded the flaw evaluation requirements of ASME Section XI. Subsequently, you examined Generic Letter 91-18, "Information to Licensees Regarding Two NRC Inspection Manual Sections on Resolution of Degraded and Nonconforming Conditions on Operability," for clarification on operability. Generic Letter 91-18 refers to Generic Letter 90-05, "Guidance for Performing Temporary Non-Code Repair on ASME Class 1, 2, and 3 Piping," for conducting the analysis to verify the ability of a component to carry the design basis loading with an identified flaw. You completed the structure analyses and verified that the RHR "A" train pump would maintain structural integrity under design basis loadings. Therefore, you concluded and the staff agrees that although the pump is degraded, it is appropiate to consider the pump operable from a functional point of view.

The NRC staff has reviewed the Virginia Electric Power Company submittal requesting relief from ASME Boiler and Pressure Vessel Code, Section XI requirements as impractical for the pump where the RHR system may be required to meet the shutdown cooling requirements. Imposing the requirements on the facility with the existing plant condition could result in an unacceptable repair because of insufficient isolation with the subsequent unavailability of the RHR pump for plant cooldown. Accordingly, the NRC staff finds that the Code requiements are impractical for these plant conditions and that relief is granted pursuant to 10 CFR 50.55a(g)(6)(i). Further, the NRC staff finds that such relief will not endanger life or property or the common defense and security and is otherwise in the public interest giving due consideration to the burden upon the licensee that could result if the requirements were imposed on the facility.

Based on the evaluation, the staff concurs that the RHR pump can be considered degraded but operable since integrity will be maintained and the leakage will not affect the hydraulic performance of the RHR pump until a code repair can be safely performed. Further, the staff concurs that risk will be minimized by implementation of your second proposed repair option.

This completes our efforts on this issue and we are, therefore, closing out TAC No. M93565.

Sincerely,

for

David B. Matthews, Director
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