VIRGINIA ELECTRIC AND POWER COMPANY
RICHMOND, VIRGINIA 23261

November 29, 1999

U.S. Nuclear Regulatory Commission
Attention: Document Control Desk
Washington, D.C. 20555

Serial No.: 99-333A
NL&OS/GDM: R0
Docket Nos.: 50-280, 281
License Nos.: DPR-32, 37

Gentlemen:

VIRGINIA ELECTRIC AND POWER COMPANY
SURRY POWER STATION UNITS 1 AND 2
GENERIC LETTER 95-07
RESPONSE TO REQUEST FOR ADDITIONAL INFORMATION

On August 17, 1995, the staff issued Generic Letter (GL) 95-07, "Pressure Locking and Thermal Binding of Safety Related Power-Operated Gate Valves," to request licensees to take actions to ensure safety-related power-operated gate valves that are susceptible to pressure locking or thermal binding are capable of performing their safety functions. Virginia Electric and Power Company (Virginia Power) responded to the GL in a letter dated February 7, 1996. Additional information was provided in letters dated July 3, 1996 and August 6, 1999 in response to subsequent NRC requests for additional information.

In a telephone conference call on August 26, 1999, the NRC requested a more detailed basis to establish that the low head safety injection (LHSI) pump containment sump isolation valves, 1(2)-SI-MOV-1(2)860A/B, would not be susceptible to pressure locking during a postulated design basis accident. Virginia Power's response to the NRC request is provided in the attachment.

If you have any further questions or require additional information, please contact us.

Very truly yours,

David A. Christian
Vice President - Nuclear Operations

Attachment

Commitments contained in this correspondence: None.

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PDR ADOCK 05000280

cc: U.S. Nuclear Regulatory Commission
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Mr. R. A. Musser
NRC Senior Resident Inspector
Surry Power Station

Attachment

Response to an NRC Request for Additional Information Regarding the Potential Hydraulic Pressure Locking of the LHSI Containment Sump Isolation Valves 1(2)-SI-MOV-1(2)860A/B

NRC Question:

During a postulated accident, the containment would be initially pressurized to a peak pressure and the bonnets of the low head safety injection (LHSI) pump containment sump isolation valves, 1(2)-SI-MOV-1(2)860A/B, could also be pressurized to containment peak pressure. When transferring to the recirculation phase of a postulated accident, containment pressure could be lower than the initial peak pressure but the pressure in the bonnets of 1(2)-SI-MOV-1(2)860A/B could still be at containment peak pressure. Discuss if the pressure in the bonnets of the valves could be higher than upstream and downstream pressure due to changes in containment pressure when the valves are required to open and, if applicable, if the valves will open during this pressure locking condition.

Response:

Virginia Electric and Power Company (Virginia Power) initially proposed in a previous response to the NRC, dated August 6, 1999 (Serial No. 99-333), that the bonnets of 1(2)–SI-MOV-1(2)860A/B could be pressurized to containment pressure. Therefore, the bonnet cavity could be at a slightly higher pressure than the upstream and downstream piping when transferring to the recirculation phase of a postulated accident. An engineering calculation was prepared that documents that valves 1(2)-SI-MOV-1(2)860A/B have sufficient operator capability to open during this scenario. Upon further discussion with Mr. S. Tingen of the NRC, it was determined that the NRC's acceptance criterion for operator margin was approximately 40%, based on higher than predicted pullout forces recorded during pressure locking testing performed at the Idaho National Engineering and Environmental Laboratory (INEEL). The calculated margins for these valves do not approach the 40% criterion.

As a result of requiring 40% margin, Virginia Power re-evaluated the susceptibility for the low pressure (45 psig) application of hydraulic pressure locking phenomena for these valves during the postulated scenario. An engineering calculation was prepared after discussion and correspondence with the valve vendor. The stresses in the disc hub due to the seat reaction/disc wedging (note valve disc is 1.2 inches thick) were calculated using a line loaded annular plate analysis from the text titled, Formulas for Stress and Strain, by Roark and Young. Then an annular plate analysis of the disc hub stresses as a result of a uniform applied load of 45 psig was performed. A comparison of the two loading cases concludes that the seat loading induced disc hub stresses are

sufficiently greater than the uniform pressure loading induced stresses. Therefore, a uniform pressure loading of 45 psig applied to the upstream disc will not cause the disc to unseat.

Since the disc cannot be lifted off its seat by the imposition of 45 psig on the disc upstream surface, the only way that pressure can be increased in the bonnet is if there is a leak path across the seating surface. If this condition existed, the bonnet could be pressurized as the containment pressure increases, but the pressure would be relieved as the containment pressure decreases. The containment pressurization time is short compared to the depressurization time, therefore the time for fluid to leak into the bonnet is shorter than the time available to leak out.

In conclusion, the postulated scenario of a low pressure application of hydraulic pressure locking of these valves is not credible.