VIRGINIA ELECTRIC AND POWER COMPANY
RICHMOND, VIRGINIA 23261

November 4, 2005

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

Serial No. 05-759A
NL&OS/ETS R0
Docket No. 50-338
License No. NPF-4

VIRGINIA ELECTRIC AND POWER COMPANY (DOMINION)
NORTH ANNA POWER STATION UNIT 1
REQUEST FOR ADDITIONAL INFORMATION FOR
PROPOSED EMERGENCY TECHNICAL SPECIFICATION CHANGE
ONE TIME EXTENSION OF THE COMPLETION TIME FOR
THE LOW HEAD SAFETY INJECTION (LHSI) TRAIN A

In a November 3, 2005 letter (Serial No. 05-759), Dominion requested an emergency amendment of the Facility Operating License, in the form of a change to the Technical Specifications to Facility Operating License Number NPF-4 for North Anna Power Station Unit 1. The proposed change would provide a one-time 7-day Completion Time to repair a weld leak that was discovered on the Low Head Safety Injection pump suction piping. In a November 4, 2005 telephone conference call, the NRC staff requested additional information to support the review of the proposed amendment.

North Anna Unit 1 entered Condition A of TS 3.5.2 at 0330 hours on November 2, 2005 due to identifying a leak in a weld on the suction piping of the A train Low Head Safety Injection System. The current Completion Time for this Condition is 72 hours. If granted, the extended Completion Time will expire upon returning the 'A' train of the Unit 1 LHSI system to operable status or on November 9, 2005 at 0330 hours, which ever occurs first.

If you have any further questions or require additional information, please contact Mr. Thomas Shaub at (804) 273-2763.

Very truly yours,

Jack M. Davis
Site Vice President - North Anna Power Station

Attachment

Commitments made in this letter:

Additional examinations will be conducted on the LHSI system to further explore the extent of this condition and provide additional assurance of freedom from future leakage.

cc: U.S. Nuclear Regulatory Commission
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Subject:
Request for Additional Information for Proposed Emergency Technical Specification Change One Time Extension of the Completion Time for the Low Head Safety Injection (LHSI) Train A

COMMONWEALTH OF VIRGINIA)
)
COUNTY OF HENRICO)

The foregoing document was acknowledged before me, in and for the County and Commonwealth aforesaid, today by Jack M. Davis who is Site Vice President – North Anna Power Station of Virginia Electric and Power Company. He has affirmed before me that he is duly authorized to execute and file the foregoing document in behalf of that Company, and that the statements in the document are true to the best of his knowledge and belief.

Acknowledged before me this 4TH day of November, 2005.

My Commission Expires: May 31, 2006.

Vicki L. Hull
Notary Public

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Attachment 1

Response to Request for Additional information
Discussion of Emergency Technical Specification Change

Virginia Electric and Power Company (Dominion)
North Anna Power Station Unit 1

**Request For Additional Information for
Proposed Emergency Technical Specification Change
One Time Extension of the Completion Time For
the Low Head Safety Injection (LHSI) Train A**

NRC Question 1

What assurance does Dominion have that the 'B' train of Low Head Safety Injection System is not included in the pattern of degradation?

Dominion Response:

Upon discovery of the leaks on the "A" LHSI pump suction line from the RWST, 100% visual examination of the "A" and "B" LHSI the suction and discharge lines was performed. Additionally, evaluation of the previous ultrasonic examinations (UT) of a sample of 10 additional welds, and an additional 10 UT examinations conducted in accordance with the ISI program (14.6% of the 137 suction line welds or 6.6% of the total population of suction and discharge welds) was performed. Based on these examinations, which found no other indications of cracking, the condition is considered to be limited in scope, as discussed below.

A previous incident of cracking at weld 28 on line 12"-SI-215-153A-Q2 (train "A" Low Head Safety Injection suction) in mid 2004 was determined to be most probably caused by stress corrosion cracking (SCC). UT inspection of that weld with Performance Demonstration Initiative (PDI) qualified manual techniques revealed two inside diameter (ID) connected circumferential flaws about 0.75 inches long and separated by about 4". One of these was deemed to be through wall by virtue of the fact it was at the leak. The other was characterized to be about 0.214 inches through wall. Both flaws were ID connected and appeared longer on the ID than the OD. Subsequent repair efforts essentially destroyed these indications so that no evidence of them was found in material forwarded to the failure analysis lab. However, some weld material and base metal was recovered and examined. The heat affected zone of the base material showed heavy carbide precipitation along the grain boundaries (ditched per ASTM A262 Practice "A") indicating the heat-affected zone (HAZ) was most likely sensitized. It was concluded the cracking observed in the plant was most probably the result of SCC. Liquid penetrant examination of the outside diameter (OD) surface of weld 28 revealed three very short (less then 0.25 inches) indications, which did not appear to be associated with any kind of attack from the OD.

Relative to the current leakage event, the UT of weld 90 on line 10"-SI-214-153A-Q2 (train "A" LHSI pump suction) with PDI qualified manual detection and sizing procedures confirms the presence of a through-wall flaw in the leak location. The flaw appears to run about 1.25 inches in the circumferential direction at the ID, is apparent as a pinhole at the OD, and is located near or in the heat affected zone of the weld. Two other short indications about 1.75 inches and 1 inch long with depth extents of 0.04 inch and 0.03 inch, respectively, were also found in or near the root of the weld. The UT of weld 89

discovered a part through wall flaw with depth extent of about 0.23 inch and about 1.0" ID length located near or in the HAZ of the weld. Two other short indications, about 0.75 inch and 1.25 inch long, with depth extents of 0.04 inch and 0.08 inch, respectively were also found in or near the root of the weld. In all cases above (i.e., 28, weld 90, and weld 89) the flaws with significant through wall extent produce crack tip signals as would be expected of SCC type indications. However, the manual techniques of the UT used would not be conducive to detection or characterization of branching. The UT examiner noted that the four shallow indications might be the result of ID root condition as opposed to actual cracking. When they were liquid penetrant inspected from the OD, both welds exhibited numerous (about 30 total) rounded and linear indications ranging in size from 0.1 inch to as much as 6 inches, with the vast majority being less than 0.5 inch. The majority of these appear associated with the weld HAZ.

NRC Question 2

What actions were done to assess the extent of condition and re-occurrence?

Dominion response:

The NDE performed on the leaking SI suction piping to date, in conjunction with testing of the leak in 2004, and regular ISI exams this interval suggest this cracking condition is limited in extent and randomly located, probably related to the existence of sensitized HAZs, and possibly ID weld anomalies. The condition does not appear to be widespread or serious. However, additional exams will be conducted to further explore the extent of this condition and provide additional assurance of freedom from future leakage. The laboratory failure analyses planned for welds 89 and 90, which have been removed intact, should provide additional insight into the cause of this cracking and help further define or refine the extent of additional condition examinations.

Based on the current NDE effort and past work on weld 28 in July 2004, it appears welds 89 and 90 each have one crack presumed to be caused by SCC with significant through wall extent. Other indications exist which are likely root geometry or some other weld anomaly given their limited depth extents. However, these indications could be very shallow or incipient SCC, also. The appearance of numerous indications on the OD of the welds in or very near the HAZ may indicate some evidence of environmental attack or cracking from the outside of the pipe. We have seen this kind of attack before in locations where the material was sensitized and the OD surface was wetted for extended periods of time. In the past, as in the current case, this attack appears to be very shallow. In all cases flaw evaluation in accordance with ASME Section XI indicates that the existing flaws do not represent any challenge to the structural integrity of the piping.

The flaws identified in the welds were reviewed to assess their structural integrity. It was determined that the degraded section of the pipe at the weld can be bounded by a

through wall flaw of 1.25 inches long and 25% part through the thickness flaw over the entire circumference.

The bounding flaw was analyzed by both net section plasticity using limit load analysis and also by fracture mechanics analysis. The flawed section was subjected simultaneously to pressure, dead weight, thermal and seismic (OBE and DBE) loading. The results showed that the crack will remain stable and ductile rupture or brittle fracture is unlikely to occur. There is a safety factor of at least equal to 2.77 in normal operating loading condition including OBE and safety factor of at least 1.39 in DBE loading.