VIRGINIA ELECTRIC AND POWER COMPANY
RICHMOND, VIRGINIA 23261

May 20, 1997

United States Nuclear Regulatory Commission
Attention: Document Control Desk
Washington, D.C. 20555

Serial No. 97-187
NL&OS/GDM R2'
Docket Nos. 50-280
License Nos. DPR-32

Gentlemen:

VIRGINIA ELECTRIC AND POWER COMPANY
SURRY POWER STATION UNIT 1
ASME SECTION XI RELIEF REQUEST

Surry Power Station Unit 1 is presently in the first period of the third ten year inservice inspection interval. Examinations are conducted to the requirements of the 1989 Edition of ASME Section XI. Pursuant to 10 CFR 50.55a(g)(5), relief is requested from certain requirements of the ASME Section XI Code associated with Code required repairs.

Specifically, indication of leakage (i.e., stains) was observed on a 3" vent line connected to a 24" service water discharge line from a recirculation spray heat exchanger. A temporary non-Code repair was made, and a structural analysis was performed for the vent line, as well as for the other vent lines serving the same function, in accordance with Generic Letter 90-05. Relief is requested from performing a pipe replacement, as required by Section IWA-4200 of the Code, from the time the flaw was identified (February 25, 1997) until the next refueling outage (which commenced March 7, 1997.) The basis for the relief request is provided in the enclosure.

This relief request has been approved by the Station Nuclear Safety and Operating Committee.

If you have any additional questions concerning this request, please contact us.

Very truly yours,

R F Saunders

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R. F. Saunders
Vice President - Nuclear Engineering Services

Enclosure 280072

Commitments contained in this letter: None

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

ENCLOSURE

ASME SECTION XI RELIEF REQUEST NO. 12
SURRY POWER STATION UNIT 1

Surry Power Station Unit 1
Third Ten Year Interval

Relief Request 12

I. Identification of Component:

Line No.	Drawing No.	Class
3"-WS-36-10	11448-CBM-071A-3, Sheet 3	3

The above line is a vent line from a 24" service water discharge line from recirculation spray heat exchanger 1-RS-E-1D. The piping is ASTM Spec. A53-Gr. A, extra strong, (.300"), maximum temperature is 100°F, and maximum pressure is 20 psig. The piping is considered to be in a moderate energy system as discussed in NRC Generic Letter 90-05, "Guidance for Performing Temporary Non-Code Repair of ASME Code Class 1, 2, and 3 Piping."

II. Code Requirements:

The 1989 Edition of ASME Section XI IWA-5250 (a) requires that the sources of leakage detected during the conduct of a system pressure test be located and evaluated by the Owner for corrective measures. The 1989 Edition of ASME Section XI IWA-5250 (a)(3) requires that repair or replacement of components shall be performed in accordance with IWA-4000 or IWA 7000, respectively.

III. Code Requirements From Which Relief Is Requested:

Relief is requested from performing the Code required replacement of the above identified piping until the next refueling outage. IWA-4200 of the Code would require immediate replacement of the piping.

IV. Basis for Relief:

This relief request is submitted in accordance with NRC Generic Letter 90-05. The following information and justification are provided in accordance with the guidelines of Parts B and C of Enclosure 1 to Generic Letter 90-05.

The intent of this request is to obtain relief for the period of operation from the identification of a through-wall flaw (February 25, 1997) until the unit was shut down for the next scheduled refueling outage, which commenced on March 7, 1997. Replacement of the affected piping was accomplished during the scheduled refueling outage.

The above line had external evidence of through-wall leakage, i.e., stains. Virginia Electric and Power Company decided to proceed under the assumption

that the line contains through-wall flaws. Although this evidence of leakage was not detected during the conduct of a system pressure test (it was discovered during normal plant operations), it is being treated as such.

Upon determination that a potential through-wall leak existed in 3"-WS-36-10, an ultrasonic examination of the pipe was conducted. The results indicated that the wall thickness was reduced. A temporary soft patch was applied to the piping and held in place with hose clamps. Seven associated vent lines (4 inlet and 3 outlet) were also ultrasonically examined for thickness and visually examined for evidence of leakage. No additional lines had identified leakage; however, all lines had experienced reduced wall thickness globally as determined by ultrasonic thickness measurements.

A summary of the flaw evaluation performed on the discharge lines is provided as Attachment 1 and provides qualification for the continued operation of the automatic vent lines 3"-WS-33-10, 3"-WS-34-10, 3"-WS-35-10 and 3"-WS-36-10.

A summary of the flaw evaluation performed on the inlet lines is provided as Attachment 2, and provides qualification for the continued operation of the automatic vent lines 3"-WS-26-10, 3"-WS-28-10, 3"-WS-30-10 and 3"-WS-32-10.

V. Implementation Schedule:

Replacement of the affected piping, i.e., 3"-WS-33-10, 3"-WS-34-10, 3"-WS-35-10, 3"-WS-36-10, 3"-WS-26-10, 3"-WS-28-10, 3"-WS-30-10 and 3"-WS-32-10 was completed during the Spring Unit 1 refueling outage that commenced on Friday, March 7, 1997.

ATTACHMENT 1

STRUCTURAL INTEGRITY ASSESSMENT OF THE 3" SERVICE WATER (OUTLET) AUTOMATIC VENT LINES (3"-WS-33, 34, 35, 36-10)

SURRY UNIT 1

STRUCTURAL INTEGRITY ASSESSMENT OF THE 3" SERVICE WATER AUTOMATIC VENT LINES (3"-WS-33, 34, 35, 36-10) SURRY UNIT 1

An engineering analysis of the structural integrity of the flaws identified in the 3" service water (outlet) automatic vent lines has been completed. This evaluation was initiated by rust spots found on 3"-WS-36-10 during an inspection of these vent lines. While no leakage was observed during the inspection, the measured flaws raised concern about the structural integrity of the piping system under the normal operating and seismic conditions. To conservatively evaluate the structural integrity, the flaws were postulated as a through-wall crack ½" in length, circumferentially-oriented at the leak location. The minimum measured pipe wall thickness of 0.035" was also used. The following analyses were performed to verify the structural integrity of these lines:

(1) Area Reinforcement Analysis

A pressure design analysis of the piping was performed at the minimum measured wall thickness of 0.035" to verify that the base metal around the hole provides adequate reinforcing such that ductile tearing would not occur. The analysis shows that adequate reinforcing of the base metal exists around the hole to resist a ductile rupture at the design pressure of 25 psig.

(2) Limit Load Analysis

A limit load analysis of the postulated flaw section was performed with a material flow stress of 39 ksi representing the mid-point of the ultimate strength and yield point stress for the A53, Grade A carbon steel material at the design temperature of 110^0 F. The flawed section was subjected to deadweight, thermal and seismic DBE loading conditions at the vent line locations.

The results of the analysis indicate that there is at least a margin of 59 against a net section plasticity, and a ductile rupture will not occur at the location.

(3) Fracture Mechanics Evaluation

Although neither of the measured flaws exhibited leakage during inspection, a through-wall crack ½" in length, circumferentially-oriented at the leak location was postulated. The flawed section was subjected to a design pressure of 25 psig in addition to the enveloped loads from the deadweight, thermal and seismic DBE loading conditions. For the purpose of this evaluation, a K_{IC} generic allowable stress intensity factor of 35 ksi$\sqrt{in}$ was used for the material.

The results of the analysis indicate that the calculated stress intensity factor will remain below the K_{IC} allowable with a margin of safety of 11.

This evaluation provides qualification for automatic vent lines 3"-WS-33, 34, 35, 36-10 given the postulated flaw for the specified loading condition.

ATTACHMENT 2

STRUCTURAL INTEGRITY ASSESSMENT OF THE 3" SERVICE WATER (INLET) AUTOMATIC VENT LINES (3"-WS-26, 28, 30, 32-10)

SURRY UNIT 1

STRUCTURAL INTEGRITY ASSESSMENT OF THE 3" SERVICE WATER (INLET) AUTOMATIC VENT LINES (3"-WS-26, 28, 30, 32-10) SURRY UNIT 1

An engineering analysis of the structural integrity of the 3" service water (inlet) automatic vent lines 3"-WS-26, 28, 30, 32-10 has been completed consistent with the approach described in Attachment 1 above. This evaluation was prepared in support of the augmented inspection initiated for the potential pin-hole leaks evaluated in Attachment 1 as specified by NRC GL 90-05. The minimum thickness for the inlet piping was found to be 0.154". No indication of leakage was observed during the inspection; however, the observed wall thinning raised concern about the structural integrity of the piping system under the normal operating and seismic conditions. Since no leakage was found, the structural integrity of the piping system was evaluated using the wall thinning approach. However, no predicted wall thickness projected to the next inservice examination was performed as specified by NRC GL 90-05 because the Unit only remained on line for three additional days after the wall thickness measurements were taken.

The results of this evaluation indicate that the piping can retain the given pressure under the specified loading conditions.