

April 26, 2000

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

SUBJECT: SURRY POWER STATION UNITS 1 AND 2 - REQUEST FOR APPROVAL OF
TEMPORARY NON-CODE REPAIR OF SERVICE WATER SYSTEM (SWS)
PIPING (TAC NOS. MA7190 AND MA7191)

Dear Mr. O'Hanlon:

The purpose of this letter is to grant the relief you requested for Surry, Units 1 and 2, to allow a temporary non-Code repair on a section of component cooling heat exchanger discharge piping until a permanent Code repair is made during the Fall 2001 Surry Unit 1 refueling outage.

In your letter dated November 19, 1999, as supplemented December 10, 1999, you stated that a through-wall leak was discovered on a 30-inch component cooling heat exchanger discharge pipe associated with the SWS common to Surry, Units 1 and 2. You requested relief, pursuant to Title 10 of the *Code of Federal Regulations* (10 CFR) Section 50.55a(g)(6)(i), from certain American Society of Mechanical Engineers (ASME) Section XI Code requirements associated with a temporary repair of an ASME Class 3 pipe, including the requirement for a weld repair of the pipe. In particular you requested approval to make a substantial non-Code repair to the pipe and to operate beyond the Surry Unit 1 Spring 2000 refueling outage until the Surry Unit 1 Fall 2001 refueling outage, at which time a permanent Code repair would be implemented. Your justification for operating beyond the Spring 2000 outage was based on the complexity of the repair and the extensive planning needed to accomplish it. In addition, you committed to install a more substantial temporary non-Code repair during the Spring outage, and provided details of the repair and your safety evaluation of it.

When the pipe leak was first discovered, you made a temporary non-Code repair that was approved by the NRC in our letter dated March 17, 2000. That approval granted relief to operate until the next (Spring 2000) refueling outage. The current relief addresses a more substantial non-Code repair and operation for one additional cycle before implementing a Code repair.

Pursuant to 10 CFR 50.55a(g)(6)(i), the staff has evaluated the basis for VEPCO's request for temporary relief of ASME Code Section XI requirements to permanently repair a through-wall leaking flaw found on the Surry Unit 1 SWS "D" component cooling heat exchanger ASME Class 3 discharge pipe. In accordance with the requirements of GL 90-05, the NRC staff has previously determined that the temporary non-Code repair implemented by VEPCO is

acceptable. The staff has also evaluated the basis for VEPCO's request to implement a more substantial temporary non-Code repair, in addition to the temporary repair, and to extend the relief to the Fall 2001 refueling outage. The staff finds this request acceptable and grants this relief. The proposed temporary non-Code repairs and augmented inspections will provide an acceptable level of quality and safety until the required Code repair is implemented during the Surry Unit 1 Fall 2001 refueling outage. The staff's evaluation and conclusions are enclosed.

The staff has completed its evaluation of this matter; therefore, we are closing TAC Nos. MA7190 and MA7191.

Sincerely,

/RA/

Richard L. Emch, Jr., Chief, Section 1
Project Directorate II
Division of Licensing Project Management
Office of Nuclear Reactor Regulation

Docket Nos. 50-280 and 50-281

Enclosure: As stated

cc w/encl: See next page

acceptable. The staff has also evaluated the basis for VEPCO's request to implement a more substantial temporary non-Code repair, in addition to the temporary repair, and to extend the relief to the Fall 2001 refueling outage. The staff finds this request acceptable and grants this relief. The proposed temporary non-Code repairs and augmented inspections will provide an acceptable level of quality and safety until the required Code repair is implemented during the Surry Unit 1 Fall 2001 refueling outage. The staff's evaluation and conclusions are enclosed.

The staff has completed its evaluation of this matter; therefore, we are closing TAC Nos. MA7190 and MA7191.

Sincerely,

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Richard L. Emch, Jr., Chief, Section 1
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SAFETY EVALUATION BY THE OFFICE OF NUCLEAR REGULATION
RELIEF REQUEST BY VIRGINIA ELECTRIC AND POWER COMPANY
FROM ASME SECTION XI CODE REPAIR REQUIREMENTS
AT SURRY POWER STATION, UNITS 1 AND 2
DOCKET NOS. 50-280 AND 50-281

1.0 INTRODUCTION

1.1 Background

By letter dated October 22, 1999, (Reference 1), Virginia Electric and Power Company (VEPCO) informed the NRC that a through-wall leak was discovered on the 30-inch diameter discharge pipe of a Surry Unit 1 component cooling heat exchanger (CCHX), which forms part of the service water system (SWS) common to Surry Units 1 and 2. The pipe material is carbon steel of welded construction with a nominal thickness of 0.5 inches, and is classified as American Society of Mechanical Engineers (ASME) Code Class 3. The inside surface of the pipe is coated with coal tar epoxy and the outside surface is coated with an anti-sweating coating. The design pressure and temperature are 25 psig and 110°F, respectively. The normal and maximum operating pressures are approximately 5 psig and 20 psig, respectively. This piping is therefore classified as moderate energy, per Standard Review Plan Section 3.6.2.

Based on its examination, VEPCO concluded that the through-wall flaw originated from inside the pipe and proceeded to the exterior surface. The failure mechanism for the flaw was general corrosion caused by failure of the internal coal tar epoxy. Considerable exterior surface corrosion also occurred as a result of moisture being trapped behind the anti-sweating coating.

1.2 ASME Section XI Code Requirements and Temporary Non-Code Repair

In Reference 1, VEPCO requested relief from Code repair requirements stated in sections IWA-4000 and IWD-4000 of the ASME Boiler and Pressure Vessel Code, Section XI. Performing a permanent Code repair at that time was considered impractical since the affected piping could not be isolated. A Code repair would have required the shutdown of Surry Unit 1, and would have resulted in an unnecessary plant transient and adverse economic hardship. In accordance with NRC Generic Letter (GL) 90-05 (Reference 2), VEPCO installed a non-Code repair of the leak, on a temporary basis, until the current Surry Unit 1 refueling outage.

1.3 Extended Temporary Non-Code Repair

In Reference 1, VEPCO also stated its intention to submit a subsequent relief request to permit the continued use of the temporary non-Code repair until the Surry Unit 1 Fall 2001 refueling outage, one cycle past the current refueling outage.

By letter dated November 19, 1999 (Reference 3), VEPCO requested the extended use of the currently installed non-Code repair. Although the extension exceeds the time requirement specified in GL 90-05, VEPCO justified this extension on the basis that to implement the permanent Code repair, the Unit 1 SWS discharge tunnel must be de-watered and a temporary SWS line (a jumper) installed from the CCHX discharge line to the Unit 2 discharge tunnel. This is scheduled for the Fall 2001 Unit 1 refueling outage, and requires significant planning and preparation. This jumper is an above-ground, non-missile protected line, and its installation may also require a license amendment due to a potential unreviewed safety question. Such an amendment requires adequate time for preparation and transmittal, as well as NRC review and approval.

To provide assurance that the temporary non-Code pipe repair will remain adequate through the additional operating cycle until the Fall 2001 Unit 1 refueling outage, VEPCO proposed the installation of a more substantial temporary non-Code repair, in addition to the current non-Code repair. VEPCO discussed this proposal with the NRC staff during a conference call on December 1, 1999, and submitted staff-requested supplemental information in a letter dated December 10, 1999 (Reference 4).

2.0 EVALUATION

2.1 Flaw Analysis

The through-wall flaw area measured 3 inches in circumferential length and 1.25 inches in the axial direction. The actual flaw was evaluated based on the "through-wall" flaw approach, in accordance with the guidance provided in GL 90-05. Based on ultrasonic thickness readings, a representative wall thickness of 0.106 inches was used in the analysis. The evaluation indicated that the flaw would not preclude the service water pipe from performing its intended function and structural integrity would be maintained. The staff finds the evaluation reasonable and acceptable.

2.2 Temporary Non-Code Repair

A temporary non-Code repair that eliminates the leakage has been installed in accordance with Title 10 of the *Code of Federal Regulations* (10 CFR) Section 50.55a(g)(6)(i) and the provisions of GL 90-05. This repair consists of a patch made of rubber gasket material, backed by a 1/8-inch steel backing plate, 4 inches in width (axial direction) by 8 inches in length (circumferential direction), which covers the crack and stops the leakage. Two circumferential steel bands approximately 1/2-inch in width and 1/32-inch thick are used to hold the patch in place. In accordance with GL 90-05, this temporary repair was previously found acceptable until the current Surry Unit 1 refueling outage (NRC letter dated March 17, 2000). The repair was inspected visually on a weekly basis and ultrasonically examined on a quarterly basis until the more substantial temporary non-code pipe repair was installed.

2.3 Augmented Inspections

In accordance with the provisions in GL 90-05 to inspect at least five other locations in moderate energy piping susceptible to wall thinning, VEPCO performed ultrasonic thickness inspections at seven similar locations on the SWS. These were the discharge piping on the remaining three CCHXs, the inlet piping on two CCHXs, and the discharge piping of two emergency service water pumps. The nominal wall thickness of all these lines is 0.5 inches. The minimum allowable wall thickness, considering stresses due to all loading conditions, was 0.1 inches for all lines inspected. The measured wall thicknesses ranged from 0.524 to 0.281 inches, thus indicating adequate margin with respect to the minimum allowable wall thickness. Therefore, the staff finds this acceptable.

2.4 Extended Temporary Non-Code Repair

The staff agrees that an immediate Code repair would require a lengthy plant outage to plan the repair activities, dewater the system, and repair the piping to meet Code requirements. This would be a significant burden for the licensee.

A more substantial non-Code repair has been installed. This repair consists of a ½-inch thick, 40-inch diameter by 4-inch long cylindrical tube that encloses the entire pipe segment where the flaw and the temporary patch are located. The tube is fillet-welded at one edge to the rim of an existing flange on the vertical SWS pipe; the other edge is fillet-welded to a circular baseplate that is sealed and bolted to the concrete floor, beneath the flange, by 16½-inch diameter stainless steel bolts. The baseplate consists of a 1-inch-thick 56-inch outside diameter circular plate, with a 34-inch inside diameter hole at the center. Both the tube and the baseplate were fabricated from ASTM A-36 carbon steel stock in two 180-degree segments, which were butt-welded radially during installation. The internal surface of the enclosure is coated for corrosion prevention, except in the immediate vicinity of the welds.

The enclosure has been evaluated for design loading conditions including deadweight, design pressure and temperature, and design basis seismic loading. Although the design code of record for the SWS pipe is ANSI B31.1, 1967, the tube and the welds were evaluated using ASME Section III NF methodology. The baseplate was analyzed in accordance with ASME Section III, Appendix XI. The evaluation showed that the enclosure has the capability to maintain the pressure boundary without loss of structural integrity under the licensing basis design loading conditions.

Fabrication, installation, and weld inspection will be performed in accordance with existing approved procedures used in VEPCO's on-site nuclear grade work.

As part of the request, VEPCO committed to verify the structural integrity and leaktightness of the extended non-Code repair by performing ASME Section XI visual VT-2 weekly inspections for leakage, and quarterly visual VT-1 weld and visual VT-3 structural inspections.

The evaluation of the more substantial non-Code repair was based on acceptable Code methodology and determined that structural integrity will be maintained. In addition, fabrication, installation, and weld inspection will be done using approved procedures. Also, leaktightness

and structural integrity will be verified with Code visual inspections, some weekly and some quarterly. For the above reasons, the proposed alternative and extended relief until the Fall 2001 refueling outage is acceptable to the staff.

3.0 CONCLUSION

Pursuant to 10 CFR 50.55a(g)(6)(i), the staff has evaluated the basis for VEPCO's request for temporary relief of ASME Code Section XI requirements to permanently repair a through-wall leaking flaw found on the Surry Unit 1 SWS "D" CCHX ASME Class 3 discharge pipe. In accordance with the requirements of GL 90-05, the staff has previously found the temporary non-Code repair implemented by VEPCO acceptable. The staff has also evaluated the basis for VEPCO's request to implement a more substantial temporary non-Code repair, in addition to the temporary repair, and to extend the relief to the Fall 2001 refueling outage. The licensee's proposed alternative is found acceptable, pursuant to 10 CFR 50.55a(g)(6)(i), based on determinations that the proposal provides reasonable assurance of structural integrity, and compliance with the Code would be impractical and cannot be performed to the extent required by the Code at Surry Units 1 and 2. The staff grants the relief.

4.0 REFERENCES

1. Letter of October 22, 1999, from L. N. Hartz, VEPCO, to the NRC Document Control Desk, with Attachment.
2. NRC Generic Letter 90-05 "Guidance for Performing Temporary Non-Code Repair of ASME Code Class 1, 2, and 3 Piping," June 15, 1990.
3. Letter of November 19, 1999, from L. N. Hartz, VEPCO, to the NRC Document Control Desk, with Attachment.
4. Letter of December 10, 1999, from L. N. Hartz, VEPCO, to the NRC Document Control Desk.

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Date: April 26, 2000

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