March 21, 2001

Mr. David A. Christian
Senior Vice President - Nuclear
Virginia Electric and Power Company
5000 Dominion Blvd.
Glen Allen, Virginia 23060

SUBJECT: NORTH ANNA POWER STATION UNIT 2 RE: ASME SECTION XI INSERVICE INSPECTION (ISI) PROGRAM RELIEF REQUEST SPT-18 (TAC NO. MB0361)

Dear Mr. Christian:

This letter authorizes the use of an alternative pursuant to Title 10 of the *Code of Federal Regulations* (10 CFR) Section 50.55a(a) for North Anna Power Station, Unit 2.

By letter dated October 25, 2000, Virginia Electric and Power Company proposed relief request SPT-18 to authorize the use of an alternative to perform examinations on a portion of the reactor head vent piping in accordance with the requirements of the American Society of Mechanical Engineers (ASME) Boiler and Pressure Vessel Code, Section XI.

Our evaluation and conclusion are contained in the enclosed Safety Evaluation. The staff has concluded that complying with the requirements of Section XI of the ASME Code would result in hardship or unusual difficulty without a compensating increase in the level of quality and safety. In addition, your proposed alternative requirements provide reasonable assurance of structural integrity. The alternative you requested is authorized pursuant to 10 CFR 50.55a(a)(3)(ii) for the second 10-year ISI interval.

The staff has completed its evaluation of this request; therefore, we are closing TAC No. MB0361.

Sincerely,

/RA/

Maitri Banerjee, Acting Chief, Section 1
Project Directorate II
Division of Licensing Project Management
Office of Nuclear Reactor Regulation

Docket No. 50-339

Enclosure: As stated

cc w/encl: See next page

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Virginia Electric and Power Company

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SAFETY EVALUATION BY THE OFFICE OF NUCLEAR REACTOR REGULATION

REQUEST FOR RELIEF SPT-18

SECOND 10-YEAR INTERVAL INSERVICE INSPECTION

NORTH ANNA POWER STATION, UNIT 2

VIRGINIA ELECTRIC AND POWER COMPANY

DOCKET NO. 50-339

1.0 INTRODUCTION

Inservice inspection (ISI) of the American Society of Mechanical Engineers (ASME) Code Class 1, Class 2, and Class 3 components is to be performed in accordance with Section XI of the ASME Boiler and Pressure Vessel Code and applicable edition and addenda as required by Title 10 of the *Code of Federal Regulations* (10 CFR) Section 50.55a(g), except where specific written relief has been granted by the Commission pursuant to 10 CFR 50.55a(g)(6)(i). 10 CFR 50.55a(a)(3) states in part that alternatives to the requirements of paragraph (g) may be used, when authorized by the NRC, if the licensee demonstrates that: (i) the proposed alternatives would provide an acceptable level of quality and safety, or (ii) compliance with the specified requirements would result in hardship or unusual difficulty without a compensating increase in the level of quality and safety.

Pursuant to 10 CFR 50.55a(g)(4), ASME Code Class 1, 2, and 3 components (including supports) shall meet the requirements, except the design and access provisions and the pre-service examination requirements, set forth in the ASME Code, Section XI, "Rules for Inservice Inspection (ISI) of Nuclear Power Plant Components," to the extent practical within the limitations of design, geometry, and materials of construction of the components. The regulations require that inservice examination of components and system pressure tests conducted during the first 10-year interval and subsequent intervals comply with the requirements in the latest edition and addenda of Section XI of the ASME Code incorporated by reference in 10 CFR 50.55a(b) 12 months prior to the start of the 120-month inspection interval, subject to the limitations and modifications listed therein. The Code of record for the second 10-year ISI interval for North Anna Power Station, Unit 2 is the 1986 Edition of Section XI of the ASME Code. The components (including supports) may meet the requirements set forth in subsequent editions and addenda of the ASME Code incorporated by reference in 10 CFR 50.55a(b) subject to the limitations and modifications listed therein and subject to Commission approval.

The staff has reviewed the information submitted by Virginia Electric and Power Company (VEPCO's) letter dated October 25, 2000, requesting relief from certain Code-required

inspection criteria. VEPCO's proposed alternative to the Code requirements is discussed in Relief Request SPT-18, for the second 10-year ISI interval at North Anna Power Station, Unit 2.

2.0 DISCUSSION

2.1 Code Requirements for Which Relief Is Requested

The 1986 Edition of ASME Section XI, Examination Category B-P, Items B15.51 and B15.71, require system hydrostatic testing and associated VT-2 visual examination.

2.2 Licensee's Basis for Relief Request

> These piping segments are equipped with valves that provide for double isolation of the reactor coolant system (RCS) pressure boundary. The valves are generally maintained closed during normal operation and the piping outboard of the first isolation valve is, therefore, not normally pressurized. The non-isolable, upstream portions of the RCS piping (lines 1"-RC-642-1502-Q1 and 1"-RC-643-1502-Q1) will be pressurized using RCS pressure and visually examined, as required.
>
> Opening the inboard isolation valves during the inspection of the upstream piping would pressurize lines 1"-RC-644-1502-Q2 and 1"-RC-645-1502-Q2. However, opening these valves has the potential for releasing reactor coolant into the reactor vessel refueling cavity. When previously stroking the inboard valves while the Reactor Coolant System was pressurized, the downstream valve tended to lift due to the motive force of the steam. In contrast, as long as the inboard and outboard valves remain closed under RCS pressure, they are an effective isolation boundary.
>
> These valves should not be stroked for reasons of routine operation while the Reactor Coolant System is pressurized.
>
> The lines could be pressurized from the end of the discharge piping (1"-RC-646-1502) that leads to the refueling cavity using a pressure test pump. However, the burden of performing this hydrostatic test is not justified by a corresponding increase in safety.
>
> Only a small portion of the ASME classified vent line will be excluded from hydrostatic testing. Each pipe section between the isolation valves is approximately 1.5 feet in length. Also, a stress analysis review was performed on the two pipe sections. The review revealed that these lines are subject to stresses well below the applicable code allowable stresses. The lines have adequate flexibility to accommodate large differential displacement. A review of the support loads showed that these loads are small and within the design loads for the supports.

ASME Section XI Code, paragraph IWA-4400, provides the requirements for hydrostatic pressure testing of piping and components after repairs by welding to the pressure boundary. IWA-4400(b)(5) excludes component connections, piping, and associated valves that are 1 inch nominal pipe size and smaller from the hydrostatic test. Consequently, hydrostatic testing and the associated visual examination of these $\leq$ 1 inch diameter RCS pipes and valve bodies once each 10-year interval is unwarranted considering that a repair weld on the same connections is exempted by the ASME XI Code.

2.3 Licensee's Proposed Alternative to Code

As an alternative to the code required hydrostatic test of the subject Class 1 reactor vessel vent piping, the following is proposed:

1. The reactor vessel vent piping will be visually examined for leakage and any evidence of past leakage with the isolation valves in the normally closed position. This inspection will be performed each refueling outage during the ASME XI Class 1 System Leakage Test (IWB-5221).

2. The reactor vessel vent piping will also be examined with the isolation valves in the normally closed position during the 10-year ISI pressure test (IWB-5222 and Code Case N-498-1). This examination will be performed with the RCS at nominal operating pressure and at near operating temperature after satisfying the required 4-hour hold time.

In addition, during modes 1 through 4 the RCS will be monitored for leakage at the following frequency pursuant to TS requirements:

1. Every 72 hours, during steady state operation, the reactor coolant system leak rate will be monitored to assure the limit of one gallon per minute unidentified leakage is maintained.

2. Every 12 hours the containment atmosphere particulate radioactivity will be monitored.

The proposed alternative stated above will ensure that the overall level of plant quality and safety will not be compromised.

3.0 EVALUATION

The Code requires that all Class 1 components within the RCS boundary undergo a system hydrostatic test once per inspection interval. VEPCO has proposed an alternative to the hydrostatic test requirements for the subject line segments. The line segments are socket welded 1 inch pipe. The line configuration provides double isolation of the RCS as indicated in attached Figure SPT-18-1. Under normal plant operating conditions, the subject line segments would see RCS temperatures and pressures only if leakage through the first normally closed valve occurs. For VEPCO to perform the Code-required test, it would be necessary to open the first valve at normal system operating pressure, thereby eliminating the double isolation of the RCS boundary. Pressurization by this method would cause significant safety concerns for the

personnel performing the examination due to the close proximity to the primary RCS piping. The test could be done by pressurizing from the end of the discharge piping (1"-RC-646-1502) that leads to the refueling cavity using a pressure test pump. However, the burden of performing the test this way is not justified by a corresponding increase in safety because the possibilities of having a leakage failure in both valves or in the inboard valve plus the line section are small. Therefore, performing the Code-required testing on these isolated line segments results in a hardship for the licensee.

The subject isolation valves are closed during normal operation, and the outboard valve is not pressurized. Performing the Code-required test would identify any leakage in the 1.5-foot sections of the pipe or in the outboard valves. However, a stress analysis performed by VEPCO shows that these lines are subjected to stresses well below the applicable Code-allowable stress. The possibilities of having a leakage failure in both valves or in the inboard valve plus the line section are small. Thus, performing the Code-required test would not provide a significant increase in safety.

The proposed alternative by VEPCO will examine the isolation valves in the normally closed positions for leaks and evidence of past leakage during the system leakage test each refueling outage. In addition, the RCS head vent connections will be visually examined with the isolation valves in the normally closed positions during the 10-year ISI pressure test. VEPCO's proposed alternative will provide reasonable assurance that leakage integrity of the subject line segments is maintained. Accordingly, imposition of the Code requirement on VEPCO would result in a hardship without a compensating increase in quality and safety.

4.0 CONCLUSION

Based on the discussion above, the staff concludes that compliance with the Code requirement on the subject reactor head vent piping between the inboard and outboard isolation valves would result in a hardship or unusual difficulty without a compensating increase in the level of quality and safety. The staff further concludes that the licensee's proposed alternative will provide reasonable assurance of structural integrity of the subject line segments. Therefore, pursuant to 10 CFR 50.55a(a)(3)(ii), the staff authorizes the proposed alternative for the second 10-year ISI interval.

Principal Contributor: B. Fu

Date: March 21, 2001