

June 27, 1986

Docket Nos. 50-280  
and 50-281

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Mr. W. L. Stewart  
Vice President - Nuclear Operations  
Virginia Electric and Power Company  
Post Office Box 26666  
Richmond, Virginia 23261

Dear Mr. Stewart:

Subject: Request for Relief from ASME Section XI Requirements Regarding  
Inservice Inspection of Steam Generators and Pressurizer Nozzles

By letter dated April 24, 1986, pursuant to 10 CFR 50.55a, paragraph g(5), you requested relief from certain ASME Boiler and Pressure Vessel Code (ASME Code) Section XI requirements with regard to volumetric examination requirements of the nozzle inner radii for the steam generators and pressurizer nozzles.

We have reviewed your request. Based on our review, we have concluded that the relief may be granted as requested. However, this relief is effective only for the second ten-year inspection interval. The enclosed Safety Evaluation provides the details and conclusions of our review.

For the relief that has been granted, we have determined that the ASME Code Section XI requirements are impractical and that the relief request is authorized by law and will not endanger life or property or the common defense and security and is otherwise in the public interest, giving due consideration to the burden upon the licensee that could result if the requirements were imposed on the facility.

The request for relief complies with the standards and requirements of the Atomic Energy Act of 1954, as amended (the Act), and the Commission's rules and regulations. The Commission has made appropriate findings as required by the Act and the Commission's rules and regulations in 10 CFR Chapter I.

Sincerely,

/s/

Daniel G. McDonald, Acting Director  
PWR Project Directorate #2  
Division of PWR Licensing-A  
Office of Nuclear Reactor Regulation

Enclosure:  
Safety Evaluation Report

cc: See next page

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Surry Power Station

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ENCLOSURE

SAFETY EVALUATION REPORT  
ON REQUEST FOR RELIEF FROM INSERVICE INSPECTION REQUIREMENTS

VIRGINIA ELECTRIC AND POWER COMPANY  
SURRY POWER STATION UNITS 1 AND 2  
DOCKET NOS. 50-280 & 50-281

BACKGROUND

By letter dated April 24, 1986, Virginia Electric and Power Company (the licensee) requested relief from certain inservice examination requirements of the 1980 Edition through Winter 1980 Addenda of Section XI of the ASME Code at Surry Power Station Units 1 and 2. This report provides an evaluation of the licensee's inservice inspection (ISI) relief request, supporting information, and alternative examinations or tests, as well as the staff's bases for granting or denying the request pursuant to 10 CFR 50.55a(g). The relief granted remains in effect for the second ten-year inspection interval. The relief is not "permanent" because the staff requires a licensee to submit new ISI programs for every ten-year inspection interval. Furthermore, new Code editions with different requirements will be incorporated by reference in future issues of 10 CFR 50.55a(b), and the ISI technology advances will improve the examination capabilities of future inspections. The relief request is evaluated below.

EVALUATION OF RELIEF REQUEST

Inside Radius Sections of Category B-D & C-B Nozzles on Steam Generators and Pressurizer

Code Requirement

The Code requires that the nozzle inside radius section of Category B-D and C-B nozzles on the steam generator and pressurizer must be examined volumetrically in accordance with subsections IWB-2500 and IWC-2500 during each inspection interval. Categories B-D and C-B include nozzles with full penetration welds to the vessel shell (or head) and integrally cast nozzles, but exclude manways and handholes either welded to or integrally cast in the vessel. If the examinations are conducted from inside the component and the nozzle weld is examined by straight beam ultrasonic method from the nozzle bore, the remaining examinations required to be conducted from the shell may be performed at or near the end of each inspection interval.

Code Relief Request

Relief is requested from the volumetric examination requirements of the nozzle inner radii for the steam generator and pressurizer nozzles.

Licensee Basis for Relief

Relief from examining the Code required volume is requested based upon the following criteria:

- (1) Nozzles in the pressurizer and steam generators contain inherent geometric constraints and clad inner surfaces which limit the ability to perform meaningful volumetric (UT) examinations of the inner radii areas. The pressurizer surge line nozzle I.D. is physically restricted by the sparger, the thermal sleeve, and heater bank interferences. The steam generator main steam nozzles are physically restricted by the flow limiting devices.
- (2) Presently, there is no comprehensive inspection technique, or guidance for such in the ASME Code, which would provide a conclusive assessment of the Code required volumetric inspections of these inner radii, particularly since no preservice results are available for review.
- (3) Radiography (RT) is not a viable inspection technique due to the same inherent geometric constraints and accessibility limitations that restrict the effectiveness of the ultrasonic inspection method. In addition, high radiation levels on primary system nozzles would expose radiographic film, causing it to "fog" beyond acceptable standards.

#### Licensee Proposed Alternative Test

- (1) All five (5) pressurizer upper head nozzles shall be visually examined from the I.D. using direct or remote techniques when accessible prior to the end of the inspection interval. Two nozzles are scheduled for such inspection this refueling outage.
- (2) The lower pressurizer nozzle shall be visually examined from the O.D. after this refueling when the unit has restarted and reached normal operating pressure and temperature.
- (3) Category B-D, primary inlet and outlet nozzles on one steam generator shall be visually examined from the I.D., using manual or remote techniques during this outage. The other two steam generators will be examined sequentially during upcoming inspection periods, prior to the end of the inspection interval.
- (4) The steam generator feedwater nozzle thermal sleeve restricts access to the inside radius area of the nozzle. A visual inspection of the accessible areas of the inside radius will be performed during this outage for one steam generator and prior to the end of the inspection interval for the other two steam generators.
- (5) The flow limiting device installed in the steam generator main steam nozzle restricts access to the nozzle inside radius area. One main steam nozzle shall be visually inspected from the O.D. after this refueling when the unit has restarted and reaches normal operating pressure and temperature. The remaining two main steam nozzles will be inspected as above prior to the end of the inspection interval.

### Staff Evaluation and Conclusions

Volumetric examination of the nozzle inside radius sections from the internal surface is difficult because of geometric constraints. Also, the radiation exposure to the inspector is a factor.

Meaningful volumetric examination of the nozzle inside radius sections from the external surface is difficult with existing inspection equipment. Typical nozzle configurations involve different radii of curvature on the inside and outside surfaces in the transition region where the inside radius section is to be examined. Changes in section thickness are also typical in this region. These geometric factors result in unreliable interpretation of examination data. Current radiographic methods are also of little use in detecting fine surface cracks on the inside radius of nozzles.

The licensee proposes a combination of visual examinations from the I.D. and O.D. of the nozzles. Furthermore, the Code-required system leakage and hydrostatic tests will provide assurance of the integrity of the nozzles.

Based on the staff's evaluation and the licensee's discussion above, Code requirements are impractical. It is further concluded that the alternative examinations discussed above will provide necessary added assurance of the nozzles' structural reliability. Therefore, relief from the volumetric examination requirements of the nozzle inner radii for the steam generator and pressurizer nozzles may be granted as requested.

### Principal Contributor

S. Lee