

March 29, 1995

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

SUBJECT: ISSUANCE OF EXEMPTIONS FROM THE REQUIREMENTS OF 10 CFR PART 50,
APPENDIX J ASSOCIATED WITH TYPE A TESTING REQUIREMENTS - NORTH ANNA
POWER STATION, UNIT NO. 2 (NA-2) (TAC NO. M91778)

Dear Mr. O'Hanlon:

By letter dated March 2, 1995, you requested two one-time exemptions regarding
Type A testing as required by 10 CFR Part 50, Appendix J.

The NRC staff has reviewed the information in support of your exemptions
request. On the basis of the submitted information and as discussed in the
enclosed exemptions, the NRC staff has concluded that: (1) the performance of
a Type A test during the 1995 steam generator replacement refueling outage is
not necessary to achieve the underlying purpose of Appendix J, i.e. an
essentially leak tight containment; and (2) the performance of a Type A test
associated with the steam generator modifications and components which are
part of the primary reactor containment boundary is not necessary to achieve
the underlying purpose of Appendix J, Section IV.A.

We find that granting the exemptions from the requirements of 10 CFR Part 50,
Appendix J, Section III.D.1.(a) and Section IV.A, is authorized by law, will
not present an undue risk to public health and safety, is consistent with the
common defense and security, and meets the special circumstances described in
10 CFR 50.12(a)(2)(ii). Accordingly, your request for a scheduler exemption
to delay performance of the Type A test until the 1996 refueling outage is
granted. Also, your request for an exemption from the requirement for a
Type A test associated with the NA-2 steam generator replacement is granted.

A copy of the Exemptions is enclosed. The Exemptions have been forwarded to
the Office of the Federal Register for publication.

Sincerely,

(Original Signed By)

David B. Matthews, Director
Project Directorate II-2
Division of Reactor Projects - I/II
Office of Nuclear Reactor Regulation

Docket No. 50-339

Enclosure: Exemptions

*Previously concurred

cc w/encl: See next page Doc. Name: C:\NOANNA\NA91778.EXE

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Memorandum Dated March 29, 1995

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North Anna Power Station
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UNITED STATES OF AMERICA
NUCLEAR REGULATORY COMMISSION

In the Matter of)	
)	
VIRGINIA ELECTRIC AND POWER COMPANY)	Docket No. 50-339
)	
(North Anna Power Station Unit No. 2))	
)	

EXEMPTIONS

I.

Virginia Electric and Power Company (the licensee) is the holder of Facility Operating License No. NPF-7, which authorizes operation of North Anna Power Station, Unit 2 (the facility or NA-2), at a steady-state reactor power level not in excess of 2893 megawatts thermal. The facility is a pressurized water reactor located at the licensee's site in Louisa County, Virginia. The license provides among other things, that it is subject to all rules, regulations, and Orders of the U.S. Nuclear Regulatory Commission (the Commission or NRC) now or hereafter in effect.

II.

Section III.D.1.(a) of Appendix J to 10 CFR Part 50 requires the performance of three Type A containment integrated leakage rate tests (ILRTs) of the primary containment, at approximately equal intervals during each 10-year service period. The third test of each set shall be conducted when the plant is shut down for the 10-year inservice inspection program.

Section IV.A of Appendix J to 10 CFR Part 50 requires that any modification, replacement of a component which is part of the primary reactor

containment boundary, or resealing a seal-welded door, performed after the preoperational leakage rate test shall be followed by either a Type A, Type B, or Type C test, as applicable for the area affected by the modification.

III.

By letter dated March 2, 1995, the licensee requested temporary relief from the requirement to perform a set of three Type A tests at approximately equal intervals during each 10-year service period of the primary containment. The requested exemption would permit a one-time interval extension of the third Type A test by approximately 16 months (from the March 1995 steam generator replacement outage, to the October 1996 refueling outage).

The licensee's March 2, 1995, letter also requested temporary relief from the requirements to perform a Type A test following a major modification or replacement of a component which is part of the primary reactor coolant boundary. Specifically, the post-modification exemption is requested from performing a Type A test due to the activities associated with the upcoming NA-2 steam generator replacement. The basis for the post-modification exemption request is that, in this case, the ASME Section XI inspection and testing requirements more than fulfill the intent of the requirements of Section IV.A of Appendix J.

The licensee's request cites the special circumstances of 10 CFR 50.12, paragraph (a)(2)(ii), as the basis for the exemption to Section III.D.1.a of Appendix J to 10 CFR Part 50. The licensee points out that the existing Type B and C testing programs are not being modified by this request and will continue to effectively detect containment leakage caused by the degradation of active containment isolation components as well as containment

penetrations. It has been the experience at NA-2 during the Type A tests conducted during the first 10-year inservice inspection interval (1984, 1989, and 1990), that considerable margin exists between the Type A tests and the Technical Specifications (TS) allowable leakage rate limit.

During operation, the NA-2 containment is maintained at a subatmospheric pressure (approximately 10.0 psia) which provides a good indication of the containment integrity. TS require the containment to be subatmospheric when in Modes 4, 3, 2, and 1. Containment air partial pressure is monitored in the control room to ensure TS compliance. If the containment air partial pressure increases above the established TS limit, the unit is required to shut down.

The licensee's request also cites the special circumstances of 10 CFR 50.12, paragraph (a)(2)(ii), as the basis for the exemption to Section IV.A of Appendix J to 10 CFR Part 50.

The NA-2 plant design incorporates a "closed system" for transferring steam from the steam generators inside of the primary containment to the main turbine-generators in the turbine building. The inside containment portion of this closed system consists of the main steam lines, the feedwater lines, and the secondary side of the steam generators. This closed system inside of containment forms a part of the primary reactor containment boundary.

The planned replacement of the NA-2 steam generators includes the following activities:

- Cutting and removing the main steam and feedwater lines from the steam generators.
- Cutting and removing the upper assemblies of the steam generators (steam domes).

- Cutting the reactor coolant piping and removing the steam generator lower assemblies (tube bundles).
- Installing the new steam generator lower assemblies and re-welding the reactor coolant piping.
- Re-installing the steam generator upper assemblies on the new lower assemblies.
- Re-installing and re-welding the main steam and feedwater lines.

The planned replacement of the NA-2 steam generators affects only this closed piping system inside containment. The steam generator replacement activities do not affect the containment structure or the actual containment liner.

Section IV.A to Appendix J, Special Testing Requirements for Containment Modifications, requires that any major modification or replacement of a component which is part of the primary reactor containment boundary shall be followed by either a Type A, Type B, or Type C test, as applicable for the area affected by the modification. The Type C testing requirements of Appendix J apply to leakage testing of containment isolation valves. The planned replacement does not affect any containment isolation valves and, therefore, the Type C testing requirements are not applicable. The Type B testing requirements of Appendix J apply to leakage testing of gasketed or sealed containment penetrations (e.g., electrical penetrations), air lock door seals, and other doors with resilient seals or gaskets. Although the secondary side of the steam generators have access manways with gaskets, the Type B testing requirements do not address the other areas of the containment boundary affected by the planned replacement, i.e., weld seams in the steam

generator and in the main steam and feedwater piping. Hence, because the affected areas cannot be tested by Type B or Type C testing, Section IV.A of Appendix J would require that a Type A test be performed prior to startup following the planned steam generator replacement.

However, the affected area of the primary containment boundary is also part of the pressure boundary of an ASME Class 2 component/piping system and, as such, the planned replacement of the steam generators is subject to the repair and replacement requirements of ASME Section XI. The ASME Section XI surface examination, volumetric examination, and system pressure test requirements are more stringent than the Type A testing requirements of Appendix J. The acceptance criteria for ASME Section XI system pressure testing of welded joints is "zero leakage." In addition, the test pressure for the system pressure test will be in excess of 20 times that of a Type A test (1356 psig vs. 44.1 psig).

Therefore, the ASME Section XI inspection and testing requirements more than fulfill the intent of the requirements of Section IV.A of Appendix J.

IV.

In the licensee's March 2, 1995, exemption request, the licensee stated that special circumstance 50.12(a)(2)(ii) is applicable to this situation, i.e., that application of the regulation is not necessary to achieve the underlying purpose of the rule.

Appendix J states that the leakage test requirements provide for periodic verification by tests of the leak tight integrity of the primary reactor containment. Appendix J further states that the purpose of the tests "is to assure that leakage through the primary reactor containment shall not exceed

the allowable leakage rate values as specified in the Technical Specifications or associated bases." Thus, the underlying purpose of the requirement to perform Type A containment leak rate tests at intervals during the 10-year service period is to ensure that any potential leakage pathways through the containment boundary are identified within a time span that prevents significant degradation from continuing or becoming unknown.

The NRC staff has reviewed the basis and supporting information provided by the licensee in the exemption request from the requirements of Section III.D.1(a) of Appendix J. The NRC staff has noted that the licensee's record of ensuring a leak-tight containment has verified containment integrity and, as noted previously, considerable margin exists between the Type A test results and the TS allowable leakage rate. The Type A tests performed in 1984, 1989, and 1990 have all successfully verified containment integrity. All "as-found" Type A test results since 1984 have been confirmatory of the Type B and C tests which will continue to be performed. The licensee will perform the general containment inspection although it is only required by Appendix J (Section V.A.) to be performed in conjunction with Type A tests. The NRC staff considers that these inspections, though limited in scope, provide an important added level of confidence in the continued integrity of the containment boundary.

The NA-2 containment is of the subatmospheric design. During operation, the containment is maintained at a subatmospheric pressure (approximately 10 psia) which provides for constant monitoring of the containment integrity and further obviates the need for Type A testing at this time. If the containment

air partial pressure exceeds the established TS limit, the unit must be shut down.

The NRC staff has also made use of the information in a draft staff report, NUREG-1493, which provides the technical justification for the present Appendix J rulemaking effort which also includes a 10-year test interval for Type A tests. The integrated leakage rate test, or Type A test, measures overall containment leakage. However, operating experience with all types of containments used in this country demonstrates that essentially all containment leakage can be detected by local leakage rate tests (Type B and C). According to results given in NUREG-1493, out of 180 ILRT reports covering 110 individual reactors and approximately 770 years of operating history, only 5 ILRT failures were found which local leakage rate testing could not detect. This is 3% of all failures. This study agrees well with previous NRC staff studies which show that Type B and C testing can detect a very large percentage of containment leaks.

The Nuclear Management and Resources Council (NUMARC), now the Nuclear Energy Institute (NEI), collected and provided the NRC staff with summaries of data to assist in the Appendix J rulemaking effort. NUMARC collected results of 144 ILRTs from 33 units; 23 ILRTs exceeded $1.0L_a$. Of these, only nine were not due to Type B or C leakage penalties. The NEI data also added another perspective. The NEI data show that in about one-third of the cases exceeding allowable leakage, the as-found leakage was less than $2L_a$; in one case the leakage was found to be approximately $2L_a$; in one case the as-found leakage was less than $3L_a$; one case approached $10L_a$; and in one case the leakage was found to be approximately $21L_a$. For about half of the failed ILRTs the as-

found leakage was not quantified. These data show that, for those ILRTs for which the leakage was quantified, the leakage values are small in comparison to the leakage value at which the risk to the public starts to increase over the value of risk corresponding to L_a (approximately $200L_a$, as discussed in NUREG-1493). Therefore, based on those considerations, it is unlikely that an extension of one cycle for the performance of the Appendix J, Type A test at NA-2 would result in significant degradation of the overall containment integrity. As a result, the special circumstances of 10 CFR 50.12(a)(2)(ii) are present in that the application of the regulation in these particular circumstances is not needed to achieve the underlying purpose of the rule.

Based on generic and plant specific data, the NRC staff finds the basis for the licensee's proposed exemption to allow a one-time exemption to permit a schedular extension of one cycle for the performance of the Appendix Type A test, provided that the general containment inspection is performed, to be acceptable.

Section IV.A of Appendix J would normally require that a Type A test be performed prior to startup following a containment modification such as the planned steam generator replacement. However, in this case, the affected area of the primary containment boundary is also part of the pressure boundary of a ASME Class 2 component/piping system and, as such, the planned replacement of the steam generators is subject to the repair and replacement requirements of ASME Section XI. The ASME Section XI surface examination, volumetric examination, and system pressure testing requirements are more stringent than

the Type A testing requirements of Appendix J. The objective of the Type A test required by Section IV.A is to assure the leak-tight integrity of the containment area affected by the modification. The ASME Section XI inspection and testing requirements more than fulfill the intent of the requirements of Section IV.A of Appendix J. As a result, the application of the regulation in these particular circumstances is not needed to achieve the underlying purpose of the rule. Therefore, the NRC staff finds the basis for the licensee's proposed exemption to allow a one-time exemption from Type A testing for the primary coolant boundary due to the forthcoming NA steam generator replacement to be acceptable.

Pursuant to 10 CFR 51.32, the Commission has determined that granting these Exemptions will not have a significant impact on the environment (60 FR 15945).

The exemption from Section III.D.1.(a) of Appendix J to 10 CFR Part 50 is effective upon issuance and shall expire at the completion of the NA-2 1996 refueling outage.

The exemption from Section IV.A of Appendix J to 10 CFR Part 50 is effective upon issuance and shall expire at the completion of the NA-2 1995 steam generator replacement refueling outage.

FOR THE NUCLEAR REGULATORY COMMISSION

(Original Signed By)

Steven A. Varga, Director
 Division of Reactor Projects - I/II
 Office of Nuclear Reactor Regulation

Dated at Rockville, Maryland,
 this 29 day of March 1995

*Previously concurred

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