VIRGINIA ELECTRIC AND POWER COMPANY
RICHMOND, VIRGINIA 23261

March 2, 1995

U.S. Nuclear Regulatory Commission
Attention: Document Control Desk
Washington, D.C. 20555

Serial No. 95-098
NL&P/JBL R1
Docket Nos. 50-338
50-339
License Nos. NPR-4
NPR-7

Gentlemen:

VIRGINIA ELECTRIC AND POWER COMPANY
NORTH ANNA POWER STATION UNITS 1 AND 2
10 CFR PART 50, APPENDIX J EXEMPTION REQUESTS
PROPOSED TECHNICAL SPECIFICATIONS CHANGE
ASSOCIATED WITH TYPE A TESTING REQUIREMENTS

Pursuant to 10 CFR 50.12 and 50.90, Virginia Electric and Power Company requests one-time exemptions from the requirements of Sections III.D.1(a) and IV.A of Appendix J to 10 CFR Part 50 for North Anna Unit 2 and amendments, in the form of a change to the Technical Specifications, to Facility Operating Licenses Nos. NPR-4 and NPR-7 for North Anna Units 1 and 2, respectively. Technical Specifications Surveillance Requirement 4.6.1.2.a requires containment leakage rate tests be conducted in accordance with the requirements specified in Appendix J to 10 CFR 50. Section III.D.1(a) of Appendix J requires that "a set of three Type A tests shall be performed, at approximately equal intervals during each 10-year service period. The third test of each set shall be conducted when the plant is shutdown for the 10-year plant inservice inspections." Section IV.A of Appendix J requires that "any major 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."

Based on these requirements North Anna Unit 2 has a Type A test scheduled for the end of June 1995 following the planned replacement of the unit's steam generators. To reduce the overall outage scope and cost and to eliminate unnecessary post-modification testing, Virginia Electric and Power Company is requesting one-time exemptions from the schedular and post-modification requirements of Sections III.D.1(a) and IV.A of Appendix J to 10 CFR 50, respectively. Further, an administrative change to the North Anna Units 1 and 2 Technical Specifications is requested to address exemptions to the Type A testing requirements of Appendix J. This proposed change would provide conformity of the station Technical Specifications with the NRC rules and regulations, as exempted. The exemption from Section III.D.1(a) would provide a one-time interval extension for the Type A test for Unit 2 from the currently scheduled 56 months to approximately 72 months. The exemption from Section IV.A

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would eliminate the requirement to perform the unnecessary post-modification Type A test following replacement of the Unit 2 steam generators.

These one-time exemptions from the current Appendix J testing requirements should permit Virginia Electric and Power Company to take advantage of the anticipated performance-based testing criteria included in the proposed Appendix J rulemaking and provide a savings of greater than $1,390,000 by delaying the scheduled Type A test to the next refueling outage. This action is being submitted as part of our Cost Beneficial Licensing Actions (CBLA) program and complies with the NRC guidelines for consideration as a CBLA.

This request for exemption from 10 CFR 50 Appendix J requirements for Unit 2 and the proposed Technical Specifications change for Units 1 and 2 have been reviewed and approved by the Station Nuclear Safety and Operating Committee and the Management Safety and Review Committee. It has been determined that the requested exemptions and proposed Technical Specification change do not pose an unreviewed safety question as defined by 10 CFR 50.59 nor do they pose a significant hazards consideration as defined by 10 CFR 50.92.

Until NRC approval of the requested exemptions is received, preparations must proceed toward conducting the Type A test following the North Anna Unit 2 steam generator replacement. In order to receive the full benefit of cost savings, relief must be granted in time to avoid cancellation charges for contracts and equipment rentals. Therefore, to avoid unnecessary costs and to allow for changes in outage planning, Virginia Electric and Power Company requests approval of the exemptions for North Anna Unit 2 by March 25, 1995 (the scheduled shutdown date for the North Anna Unit 2 steam generator replacement outage). NRC approval of the proposed Technical Specifications change for North Anna Units 1 and 2 is requested prior to unit startup following the Unit 2 steam generator replacement.

If you have any questions or need additional information to process this request, please contact us.

Very truly yours,

James P. O'Hanlon

James P. O'Hanlon
Senior Vice President - Nuclear

Attachments

1. Discussion and Justification for 10 CFR 50, Appendix J Exemption Requests and Proposed Technical Specifications Change for Appendix J Testing Requirements
2. Proposed Technical Specifications Change for Appendix J Testing Requirements for North Anna Units 1 and 2

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COMMONWEALTH OF VIRGINIA)
)
COUNTY OF HENRICO)

The foregoing document was acknowledged before me, in and for the County and Commonwealth aforesaid, today by J. P. O'Hanlon, who is Senior Vice President - Nuclear, of Virginia Electric and Power Company. He is duly authorized to execute and file the foregoing document in behalf of that Company, and the statements in the document are true to the best of his knowledge and belief.

Acknowledged before me this 2nd day of March, 1995.

My Commission Expires: May 31, 1998.

Vicki L. Hull
Notary Public

(SEAL)

ATTACHMENT 1

Discussion and Justification
10 CFR 50, Appendix J Exemption Requests and Proposed Technical Specifications Change for Appendix J Testing Requirements

Discussion and Justification for
10 CFR 50, Appendix J Exemption Requests and
Proposed Technical Specifications Change
for Appendix J Testing Requirements

INTRODUCTION

"Type A Tests" are defined in Section II.F of Appendix J to 10 CFR Part 50 as "tests intended to measure the primary reactor containment overall integrated leakage rate (1) after the containment has been completed and is ready for operation, and (2) at periodic intervals thereafter." The periodic retest intervals are further defined in Section III.D.1(a) of Appendix J, "Periodic Retest Schedule for Type A Tests," as:

> "A set of three Type A tests shall be performed at approximately equal intervals during each 10-year service period. The third test of each set shall be conducted when the plant is shutdown for the 10-year plant inservice inspections."

In addition, a special post-modification Type A test is required by Section IV.A of Appendix J, "Special Testing Requirements for Containment Modifications," which states that:

> "Any major 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."

An exemption is requested for North Anna Unit 2 from the portion of Section III.D.1(a) that requires Type A tests to be performed at approximately equal intervals during each 10-year service period. In addition, an exemption is requested for North Anna Unit 2 from the portion of Section IV.A that requires a Type A test to be performed following a major modification or replacement of a component which is part of the primary reactor containment boundary. Specifically, the post-modification exemption is requested from performing a Type A test due to the activities associated with the upcoming Unit 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 purpose of the containment leakage rate test requirements, as stated in the Introduction to Appendix J, 10 CFR Part 50, is to "assure that (a) leakage through the primary reactor containment and systems and components penetrating primary containment shall not exceed allowable leakage rate values as specified in the technical specifications or associated bases and (b) periodic surveillance of reactor containment penetrations and isolation valves is performed so that proper maintenance and repairs are made during the service life of the containment, and systems and components penetrating primary containment."

This exemption request concerns only part (a) of the stated purpose of Appendix J. Part (b) of the stated purpose applies to penetrations and isolation valves which are tested by Type B and C tests (Sections III.D.2 and III.D.3, respectively).

The proposed change to the North Anna Units 1 and 2 Technical Specifications would revise Surveillance Requirement 4.6.1.2.a to permit NRC-approved exemptions to the Type A test requirements. This proposed change would also facilitate future exemptions from the Type A testing requirements of Appendix J without an associated Technical Specifications change.

The combined effect of the proposed exemptions to Sections III.D.1(a) and IV.A and the proposed Technical Specifications change would allow a one-time extension of the interval between Type A tests. The one-time extension would permit the Type A test currently scheduled to be performed during the upcoming North Anna Unit 2 steam generator replacement outage to be deferred until the next refueling outage, currently scheduled for October 1996. This proposed one-time interval extension, as permitted by the exemptions from the Appendix J testing requirements, should also permit Virginia Electric and Power Company to take advantage of the anticipated performance-based testing criteria included in the NRC-proposed Appendix J rulemaking.

BACKGROUND INFORMATION

The NRC is currently examining those regulations which may be revised to reduce regulatory burden on licensees without a significant impact on safety. As part of this effort, the NRC is currently considering a proposed revision to 10 CFR 50, Appendix J, "Primary Reactor Containment Leakage Testing for Water-Cooled Power Reactors." The current NRC proposal for a revised Appendix J will relax the schedule requirements for Type A tests [a.k.a., containment integrated leak rate tests (ILRTs)] and change the schedule for Type B and C tests [a.k.a., local leak rate tests (LLRTs)] to a performance-based schedule.

According to SECY 94-036, this proposed rule change will not be approved until approximately August 1995. Therefore, licensees who have Type A tests scheduled during refueling outages prior to August 1995, will not be able to implement the revised rule to make use of the relaxed requirements during these refueling outages.

The North Anna Unit 2 steam generator replacement outage (Cycle 10/11 refueling outage) is scheduled to begin on March 25, 1995 with a Type A test scheduled at approximately the end of June 1995. Virginia Electric and Power Company is, therefore, requesting exemptions from the Type A testing requirements of Appendix J to allow a one-time extension of the Type A test interval and to eliminate the post-modification Type A test requirement for the steam generator replacement. The effect of these exemptions would be to permit deferral of the Type A test scheduled for the steam generator replacement outage until the next refueling outage currently scheduled for October 1996. This proposed one-time interval extension should permit Virginia Electric and Power Company to take advantage of the anticipated

performance-based testing criteria included in the NRC-proposed Appendix J rulemaking.

Although other changes to the Type A testing requirements and changes to Type B and C testing schedules are part of the proposed rule change, exemptions are not currently being sought from these requirements.

Description of Containment

The North Anna Unit 2 containment is a reinforced concrete shell in the form of a vertical right cylinder with a hemispherical dome and a flat base mat supported on rock. The inside surface of the structural concrete is lined with steel plate anchored to the concrete shell. The steel liner is 3/8-inch thick on the walls, 1/2-inch thick on the dome, and 1/4-inch thick on the base mat. The welded steel liner is designed and fabricated to prevent leakage through it if an accident occurs resulting in the loss of reactor coolant and release of radioactive material to the containment volume concurrent with an earthquake.

The containment side walls are approximately 127 feet high from the liner on the horizontal base to the bend line of the dome and has an approximate inside diameter of 126 feet. The radius of the dome is approximately 63 feet. The containment free volume is approximately 1,300,000 cubic feet. The reinforced concrete base is 10 feet thick, the side walls are 4.5 feet thick, and the dome is 2.5 feet thick. The bottom horizontal liner plate is covered with approximately 2 feet of concrete, the top of which forms the floor of containment.

The steel liner is attached to and supported by the reinforced concrete shell so that it becomes part of the entire structure under all loading conditions in such a manner as to insure leak tightness.

All penetrations made in the structure have been considered as potential leak sources and as such are designed with double barriers. The liner welds on the inside of containment have a test channel welded over the seam which is sealed and forms a portion of the containment pressure boundary. Further information on the containment design can be found in Chapters 3 and 6 of the North Anna Updated Final Safety Analysis Report (UFSAR).

The normal operating pressure for the containment is approximately 9.0 psia dry-air partial pressure, with about 1.0 psia additional water vapor partial pressure. The resultant total normal operating containment pressure is approximately 10 psia. Due to the subatmospheric operating pressure in the containment, any degradation of the containment pressure boundary can be detected by containment inleakage and rising air partial pressure. The containment design pressure is 59.7 psia (45 psig).

The purpose of the reactor containment is to mitigate the consequences of postulated accidents (e.g., a loss-of-coolant accident) by minimizing the release of radionuclides to the environment and, thus, to help assure the health and safety of the public. Integrated leak rate tests (Type A tests) are performed to verify the integrity of the containment system in its loss-of-coolant accident response configuration so that the release of fission products to the environment during accident conditions does not

exceed the limits of 10 CFR Part 100. The overall leakage rate performance of the North Anna Unit 2 containment for the first 10-year inservice inspection interval has been very good. Industry experience as well as our testing experience, indicates that the minor sources of leakage from the containment are through the containment penetrations. The containment penetrations for Unit 2 will be tested (Type B and C) during the steam generator replacement outage in accordance with the requirements of Appendix J and the Technical Specifications.

Type A Testing Performance

The purpose of Type A testing is to assure that leakage through the primary reactor containment and systems and components penetrating primary containment do not exceed allowable leakage rate values as required by Appendix J to 10 CFR 50. Sections II.I and II.K of Appendix J define the acceptable leakage limit (L_a) for Type A tests as the maximum allowable leakage rate at a calculated peak containment pressure (P_a) related to design basis accident conditions.

The acceptable leakage limit, L_a, and the calculated peak containment pressure, P_a, are specified in Technical Specification 3.6.1.2.a for North Anna Units 1 and 2. Specifically, the Technical Specifications limit the overall containment integrated leakage rate to less than or equal to L_a, which is 0.1 percent by weight of the containment air per 24 hours, at the calculated peak containment pressure P_a, which is greater than or equal to 44.1 psig (58.8 psia).

The North Anna Unit 2 Type A test history for the first 10-year inservice inspection interval provides justification for the proposed extension to the Type A test schedule. Three periodic Type A tests were performed during the first 10-year inservice inspection interval. As can be seen below, considerable margin exists between the Type A test results and the Technical Specification allowable leakage rate limit. These tests have demonstrated that North Anna Unit 2 has a low-leakage containment. The proposed test interval extension would not jeopardize the ability of the containment to maintain the leakage rate at or below the required leakage rate limit. The Type A tests performed in 1984, 1989, and 1990 successfully verified containment integrity. The following is a summary of the Type A tests for North Anna Unit 2.

1984 Type A Test

A containment integrated leakage rate test was completed in October 1984 with the following results: 1) a calculated leakage rate of 0.06923 weight percent per day based on an absolute method of total time analysis and a 95% upper confidence level (UCL), and 2) a calculated leakage rate of 0.037512 weight percent per day based on an absolute method of mass point analysis and a 95% UCL. This test successfully demonstrated the integrity of the containment.

1989 Type A Test

A containment integrated leakage rate test was completed in April 1989 with the following results: 1) a calculated "as found" leakage rate of 0.049 weight percent per day based on an absolute method of mass point analysis and a 95% UCL, and 2) a calculated "as left" leakage rate of 0.031 weight percent per day based on an absolute

method of mass point analysis and a 95% UCL. This test successfully verified the integrity of the containment by demonstrating the containment integrated leakage rate to be less than the 0.1 weight percent per day allowable limit.

1990 Type A Test

A containment integrated leakage rate test was completed in October 1990 with the following results: 1) a calculated "as found" leakage rate of 0.037 weight percent per day based on an absolute method of mass point analysis and a 95% UCL, and 2) a calculated "as left" leakage rate of 0.025 weight percent per day based on an absolute method of mass point analysis and a 95% UCL. This test successfully verified the integrity of the containment by demonstrating the containment integrated leakage rate to be less than 0.1 weight percent per day.

1995 Steam Generator Replacement Outage

The North Anna Unit 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 North Anna Unit 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
- Re-installing and re-welding the main steam and feedwater lines.

The planned replacement of the Unit 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 are 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.

A Type A test is neither practical nor warranted for the planned replacement of the steam generators. In this case, the objective of the test is to assure the leak-tight integrity of the area affected by the modification (i.e., the closed system inside containment formed by the secondary side of the steam generators and the main steam and feedwater piping). The ASME Section XI inspection and testing requirements more than fulfill the intent of the requirements of Section IV.A of Appendix J. Therefore, Virginia Electric and Power Company requests an exemption for North Anna Unit 2 from the requirements of Section IV.A of Appendix J for the upcoming steam generator replacement outage. The effect of this exemption request would be to eliminate the post-modification Type A test required for the modifications to the containment boundary specifically associated with the steam generator replacement.

SAFETY SIGNIFICANCE AND RISK ASSESSMENT

The purpose of containment leakage rate testing is to detect any leakage resulting from failures in the containment isolation boundaries before an accident occurs. Factors affecting leak tightness of containment may be categorized as: 1) active components which are leak rate tested by Type B and C tests and 2) passive components which constitute the containment structure and are tested during the Type A test.

Active Components

The major containment leakage paths include penetration seal leakage and containment isolation valve leakage.

Penetration seal leakage addressed by Type B tests include leakage through air lock door seals, doors with resilient seals or gaskets except for seal-welded doors, penetrations whose design incorporates resilient seals, gaskets, or sealant compounds, piping penetrations fitted with expansion bellows, and electrical

penetrations filled with flexible metal seal assemblies. Type B tests will not be affected by the proposed change in the Type A test schedule or the elimination of the Type A test required due to replacement of the steam generators.

Containment isolation valves provide either a potential or direct connection between the inside and outside atmospheres of the primary reactor containment under normal operation, and are required to close automatically upon receipt of a containment isolation signal. Leakage through these valves can be caused by leaking valve seats, isolation valve closure failure, or failure to return a penetration to its normally-closed condition following maintenance. For these initiating events, except post-maintenance errors, this type of leakage is detectable by Type C local leak rate testing. Following any maintenance on a containment isolation valve, an LLRT is performed followed by an independent valve alignment verification to ensure that leakage remains within acceptable levels. Type C tests will not be affected by the proposed change in the Type A test schedule or the elimination of the Type A test required due to replacement of the steam generators.

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 (e.g., valves), as well as sealing material within containment penetrations.

Industry experience indicates that 97% of the failures associated with Type A tests are found to be due to Type B and C tested penetrations (draft NUREG-1493, "Performance Based Containment Leak Test Program"). The local leak rate testing frequencies of these penetrations are not affected by this proposed change. Therefore, continued overall leak tightness of the active containment components can be assured by the existing Type B and C testing program. In addition, the North Anna Unit 2 containment is of the subatmospheric design. During operation, the containment is maintained at a subatmospheric pressure (approximately 10.0 psia) which provides for constant monitoring of the containment integrity. Any degradation would be identified by inleakage into the containment during normal operations. Technical Specifications require the containment to be subatmospheric whenever the unit is in Modes 1, 2, 3, or 4. Containment air partial pressure is monitored in the control room to ensure Technical Specification compliance. If the containment air partial pressure exceeds the established Technical Specification limit, the unit is required to be shut down.

Passive Components

Two mechanisms could adversely affect the passive structural capability of the containment. The first mechanism is a gradual deterioration of the structure due to pressure, temperature, radiation, chemical, or other such effects. Secondly, modifications could be made to the structure which, if not carefully controlled, could leave the structure with reduced capability.

Gradual Deterioration

10 CFR 50, Appendix J, Section V.A, requires a general inspection of accessible interior and exterior surfaces of the containment structures and components to be

performed prior to each Type A test to uncover any evidence of structural deterioration which may affect either the containment structural integrity or leak tightness. At North Anna Unit 2, there has been no evidence of structural deterioration that would impact structural integrity or leak tightness.

Absent actual accident conditions, structural deterioration is a gradual phenomenon requiring periods of time well in excess of the proposed interval extension. Other than design basis accident conditions, the only pressure challenge to containment is the ILRT itself.

Modifications

Modifications that would alter the passive containment structure are infrequent and would receive extensive review to ensure containment capabilities are not diminished. The North Anna design change and 10 CFR 50.59 programs have been demonstrated to be effective in providing a high quality oversight of such safety significant modifications. No such modifications have been made to the containment since the last Type A test in 1990.

As discussed above, a specific exemption is requested from the requirements of Section IV.A of Appendix J for the modifications to the containment boundary during the planned Unit 2 steam generator replacement. Sufficient inspections and testing are required by ASME Section XI to ensure the leaktight integrity of the systems and component affected by the steam generator replacement. With the specific exception of modifications to the containment boundary associated with steam generator replacement activities (as discussed in this exemption request), the post-modification requirements of Section IV.A of Appendix J remain applicable.

It is unlikely that any modification could be made to the containment through which the only method of detecting created leakage would be a Type A test. In any case, such a failure caused by a modification is likely to be noticeable by visual inspection of the affected area or detected by the containment subatmospheric pressure monitoring prior to unit startup.

Risk Impact Assessment

Since the design of the North Anna and Surry containment structures are essentially the same, the evaluation of postulated containment failure under severe accident conditions for the North Anna containment structures is derived from the evaluation performed for the Surry containment structures. For both North Anna and Surry, the containment structures represent the final barrier to the release of fission products following a severe accident. The containment does not prevent core damage but acts to reduce risk by mitigating the effects of core damage once it occurs.

Postulated containment failure under severe accident conditions is primarily due to phenomenological effects associated with severe accidents. The phenomenological effects were considered as part of the Surry Individual Plant Examination (IPE). The mean failure pressure for the Surry containment was determined based on expert elicitation to be about 127 psig. The failure location was found to be near the dome-wall intersection. The IPE analyses show that the length of time until the containment

reaches a conservative containment failure pressure criterion (93 psig) was between 18 and 28 hours. The only class of transients which pressurize the containment up to or beyond this failure pressure were long term station blackout sequences. These conclusions are deemed to be equally valid for the North Anna containment structures.

From a risk standpoint, the purpose of Appendix J leak testing is to detect any containment leakage resulting from failures in the containment isolation boundary before an accident occurs. Such leakage could be the result of leakage through containment penetrations, through air locks, or through containment structural faults. The Type B and C tests, which are unaffected by this proposed change, will continue to detect leakage through containment valves, penetrations, and air locks. The only potential failures that would not be detected by Type B and C testing are mechanical failures of the containment shell (i.e., degradation or modification to the containment shell). However, the North Anna Unit 2 containment is operated at a subatmospheric pressure and any degradation would be immediately identified prior to and during operation. Thus, the only potential effect of the proposed one-time change to the Type A test frequency is the probability that containment structural leakage would go undetected between tests.

The containment structure is passive. Under normal operating conditions, there is no significant environmental or operational stress present that could contribute to its degradation. A review of modifications for potential effects to the containment structure was performed as described in the preceding section. Passive failures resulting in significant containment structural leakage are, therefore, extremely unlikely to develop between Type A tests. No such failures have occurred at North Anna Unit 2.

Draft NUREG-1493 includes the results of a sensitivity study performed to explore the risk impact of several alternate leak rate testing schedules. "Alternative 4" from this study examines relaxing the ILRT frequency from 3 in 10 years to 1 in 10 years. The draft NUREG used the PRA performed for Surry as part of the Severe Accident Risk Assessment Program (NUREG-1150) to calculate that the risk to the public near Surry increases from 0.05% to 0.07% for Alternative 4. This alternative represents a slight increase to public risk for a 18 to 60 month increase in the average time that a potential leak goes undetected. In addition, the base PRA analysis assumed a 1 percent per day containment leak rate (10 times greater than currently allowed) while the sensitivity analysis raised this leak rate to 10 percent per day (100 times greater than currently allowed). Based on this information and the similarity of the North Anna and Surry containment structures, the one-time proposed delay of 16 months for the North Anna Unit 2 Type A test represents a small change to the 18 month average time that a leak would go undetected and, therefore, creates a negligible increase in public risk due to increased containment leakage.

The exemptions requested for North Anna Unit 2 are concluded to be bounded by the analyses of draft NUREG-1493 because 1) the Surry and North Anna containment designs are very similar and 2) the requested exemptions would result in a one-time change to the test interval from 4-1/2 to 6 years. Virginia Electric and Power Company asserts that there is sufficient information in the draft NUREG-1493 to conclude that the risk increase from the requested exemptions is low and that the value, in terms of enhanced public safety, of performing the ILRT during the upcoming steam generator replacement outage is extremely low.

REGULATORY BASIS FOR SPECIFIC EXEMPTION

Pursuant to 10 CFR 50.12(a)(2), the NRC will not consider granting an exemption to the requirements unless special circumstances are present. This exemption request meets the special circumstances of paragraphs (a)(2)(ii), (a)(2)(iii), and (a)(2)(vi) of 10 CFR 50.12. This exemption request, as discussed below, demonstrates that the underlying purpose of the regulation will continue to be achieved [(a)(2)(ii)], would result in undue hardship or other cost that are significant if the regulation is enforced [(a)(2)(iii)], and there are present material circumstances not considered when the regulation was adopted [(a)(2)(vi)]. The granting of the requested exemptions will not present an undue risk to the health and safety of the public and is consistent with the common defense and security.

10 CFR 50.12 Requirements

10 CFR 50.12 states that the Commission may grant an exemption from requirements contained in 10 CFR 50 provided that: (1) the exemption is authorized by law, (2) the exemption will not present an undue risk to the public health and safety, (3) the exemption is consistent with the common defense and security, and (4) special circumstances, as defined in 10 CFR 50.12(a)(2), are present.

1. The Requested Exemption is Authorized by Law

   No law exists which would preclude the activities covered by this exemption request.

2. The Requested Exemption Does Not Present an Undue Risk to the Public Health and Safety

   10 CFR 50, Appendix J states that the purpose of the regulation is to assure that leakage through primary containment and systems and components penetrating containment does not exceed allowable values, as specified in the Technical Specifications or associated bases, and that proper maintenance and repair are performed throughout the service life of the containment boundary components. The ILRT history for North Anna Unit 2 during the first 10-year inservice inspection interval indicates that the containment structure has not experienced degradation and that the observed leakage was identified by the LLRT program. Additionally, the pretest containment inspections have not identified significant deterioration of the containment liner. The NRC has performed a detailed study of ILRTs performed from 1987 to 1993. This study, documented in NUREG-1493, "Performance Based Containment Leak-Test Program," Draft Revision 3, March 31, 1994, determined that 97% of the leakage rates that exceed the acceptance criteria are identified by the LLRT programs. Therefore, as indicated in the NRC's study and as evidenced by our containment performance history, postponing the ILRT by one refueling cycle remains consistent with the intent of the regulation and will not present any undue risk to the public health and safety.

The historical Type A test results as set forth in the exemption request demonstrate that North Anna Unit 2 has a low leakage containment. Three Type A tests were performed at North Anna Unit 2 during the first 10-year inservice inspection interval. Each test has shown that containment is highly leaktight. Each of the Type A test results has been well below the acceptance limit of 0.1 weight percent per day.

Section IV.A of Appendix J would normally require that a Type A test be performed prior to startup following a containment modifications 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 are 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.

The North Anna Unit 2 containment is of the subatmospheric design. During operation the containment is maintained at a subatmospheric pressure (approximately 10.0 psia) which provides for constant monitoring of the containment integrity. Any minor degradation of the containment boundary would be identified by inleakage into the containment during power operations. In addition, Technical Specifications require the containment to be subatmospheric whenever the unit is in Modes 1, 2, 3, or 4. Containment air partial pressure is monitored in the control room to ensure Technical Specification compliance. If the containment air partial pressure exceeds established Technical Specification limit, the unit is required to shut down.

3. <u>The Requested Exemption Will Not Endanger the Common Defense and Security</u>

The common defense and security are not endangered by this exemption request.

4. <u>Special Circumstances are Present Which Necessitate the Request for an Exemption to the Regulations of 10 CFR 50, Appendix J</u>

10 CFR 50.12(a)(2) provides the special circumstances that must be present prior to the Commission granting an exemption. Pursuant to 10 CFR 50.12(a)(2), the following special circumstances are present:

<u>50.12(a)(2)(ii) Application of the Regulation is Not Necessary to Achieve the Underlying Purpose of the Rule</u>

The underlying purpose of 10 CFR 50, Appendix J is still achieved. Appendix J states that the leakage test requirements provide for periodic verification by

tests of the leak tight integrity of the primary reactor containment. The appendix 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.

10 CFR 50, Appendix J, Section III.D.1(a) states that a set of three periodic tests shall be performed at approximately equal intervals during each 10-year period and that the third test shall be conducted when the plant is shutdown for the 10-year plant inservice inspections. This exemption request would permit deferral of the Type A test for North Anna Unit 2 currently scheduled for the upcoming steam generator replacement outage until after the next cycle of operation. The methodology, acceptance criteria, and Technical Specification leakage limits for the performance of the Type A test will not change.

10 CFR 50, Appendix J, Section IV.A states that a Type A test must be performed following a major modification or replacement of a component which is part of the primary reactor containment boundary. This exemption is requested from performing a Type A test due to the activities associated with the upcoming Unit 2 steam generator replacement. As discussed in the exemption, the required Type A test is neither practical nor warranted for the planned replacement of the steam generators. The objective of the test is to assure the leak-tight integrity of the containment. In this case, the ASME Section XI inspection and testing requirements more than fulfills the intent of the requirements of Section IV.A of Appendix J.

The testing history, structural capability of the containment, and the risk assessment discussed previously establish that North Anna Unit 2 has had acceptable containment leakage rate test results, that the structural integrity of containment is assured, and that there is negligible risk impact in changing the Type A test schedule on a one-time basis.

There are no mechanisms which would adversely affect the structural capability of the containment, which is the only leakage mode not captured by the Type B and C testing that will be performed. Absent actual accident conditions, structural deterioration of containment due to temperature, radiation, chemical or other such effects is a gradual phenomenon requiring periods of time well in excess of the proposed interval extension and is subject to detection by periodic visual inspections. At North Anna Unit 2, there has been no evidence of structural deterioration that would impact structural integrity or leak tightness. Only minor corrosion has been identified on the containment floor liner and appropriate repairs completed. In fact, other than postulated accident conditions, the only over-pressure challenge to containment is the integrated leak rate test itself.

This exemption request does not affect the periodic schedule for Type B and C tests which will continue to be performed in accordance with Appendix J and approved exemptions. Demonstrated operability of the associated components and penetrations through Type B and C tests adds assurance that the overall Type A leakage rates remain satisfactory. No leakage trends have been identified which threaten the overall containment leakage. There is no

significant change in the types or increase in the amounts of any effluents that may be released offsite due to the elimination of the performance of this Type A test. This one-time change does not impact the design basis of the plant and would not affect the response of containment during a design basis accident.

Thus, there is significant assurance that the extended interval between Type A tests in concert with the Type B and C testing will continue to provide adequate verification of the leak tight integrity of the containment.

50.12)(a)(2)(iii) Compliance with the Regulation Would Result in Undue Hardship or Other Costs that are Significantly in Excess of Those Contemplated When the Regulation was Adopted."

Postponing the ILRT for North Anna Unit 2 will eliminate unnecessary testing without any compromise of safe operation. Each Type A test currently costs approximately $130,000 to perform. The cost includes equipment calibration and rental and personnel support for the four days required to setup and perform the test. These four days represent lost generation capability, since the test is normally critical path during the outage. Eliminating four days of outage time saves approximately $1,140,000 for replacement power and $120,000 for contracted services.

50.12(a)(2)(vi) Presence of Material Circumstances not Considered when the Regulation was Adopted

Certain material circumstances were not considered when the regulation was adopted. The benefit of time has provided experience and information that provide a better perspective about containment integrity. Two important material circumstances are testing history and the development of probabilistic risk assessments (PRAs).

Since the promulgation of 10 CFR 50, Appendix J, in 1973, more than 20 years of nuclear power plant operating history has been obtained. A review of industry data did not find any instances where a Type A test failed to meet Appendix J acceptance criteria as a result of a containment structural leak not due to initial fabrication or a plant modification. This operating history provides a significant indicator that containment structural integrity (passive) is not a significant safety concern.

Plant specific PRAs were not available in 1973 and, therefore, were not considered when the regulation requiring compliance with Appendix J (10 CFR 50.54(o)) was adopted. Overall plant risk due to containment leakage is relatively small given the small probability of containment leakage itself. The predominant contributor to degraded containment integrity is the phenomenological effects of a severe accident, not pre-existing containment isolation conditions. An assessment of the risk impact of this exemption request concludes that there is no undue risk to the public health and safety as a result of the proposed schedular extension of the Type A test and elimination of the post-modification Type A test for the steam generator replacement.

NO SIGNIFICANT HAZARDS CONSIDERATION DETERMINATION

Virginia Electric and Power Company has performed an evaluation of the proposed exemptions to 10 CFR 50, Appendix J requirements and the proposed administrative Technical Specifications change, in accordance with 10 CFR 50.91(a)(1) regarding no significant hazards considerations using the standards in 10 CFR 50.92(c). A discussion of these standards as they relate to this exemption and amendment request follows.

Criterion 1 - Does Not Involve a Significant Increase in the Probability or Consequences of an Accident Previously Evaluated.

The proposed change will provide a one-time exemption for North Anna Unit 2 from the 10 CFR 50, Appendix J, Section III.D.1(a) leak rate test schedule requirement and from Appendix J, Section IV.A post-modification testing. This change will allow the elimination of the post-modification Type A testing requirements for the steam generator replacement and allow for a one-time extension to the test interval for a Type A integrated leak rate test.

Neither the performance nor the non-performance of a leakage rate test is an initiating event in any accident. Therefore, this proposed change does not involve a significant increase in the probability of a previously evaluated accident.

During operation, the containment is maintained at a subatmospheric pressure (approximately 10.0 psia) which provides for constant monitoring of containment integrity. Any degradation would be identified by inleakage into the containment prior to and during operation. The Technical Specifications require a subatmospheric containment whenever the unit is in Modes 1, 2, 3, or 4. Containment air partial pressure is continuously monitored and has an alarm function in the control room to ensure Technical Specification compliance. If the containment air partial pressure exceeds the established Technical Specification limit, the unit is required to shut down.

Type A tests are capable of detecting both local leak paths and gross containment failure paths. The history at North Anna Unit 2 demonstrates that Type B and C local leak rate tests have consistently detected any excessive local leakage.

Administrative controls govern the maintenance and testing of containment penetrations such that the probability of excessive penetration leakage due to improper maintenance or valve misalignment is very low. Following maintenance on any containment penetration, an LLRT is performed to ensure acceptable leakage levels. Following any LLRT on a containment isolation valve, an independent valve alignment check is performed. Therefore, Type A testing is not necessary to ensure acceptable leakage rates through containment penetrations.

While Type A testing is not necessary to ensure acceptable leakage rates through containment penetrations, Type A testing is necessary to demonstrate that there are no gross containment failures. Structural failure of the containment is considered to be a very unlikely event and, in fact, since North Anna Unit 2 has been in operation, it has

successfully passed every Type A test. Therefore, a one-time exemption increasing the interval for performing Type A test should not result in a significant decrease in the confidence in the leak tightness of the containment structure.

The proposed change also revises the North Anna Units 1 and 2 Technical Specification Surveillance Requirement 4.6.1.2.a to reference the testing frequency requirements of 10 CFR 50 Appendix J and to state that NRC approved exemptions to the applicable regulatory requirements are permitted. The current Technical Specification requires Type A tests be conducted in accordance with Appendix J to 10 CFR 50. The proposed administrative change simply includes the statement "as modified by NRC-approved exemptions." No new requirements are added, nor are any existing requirements deleted. Any specific changes to the requirements of Appendix J will require a submittal from Virginia Electric and Power Company under 10 CFR 50.12 and subsequent review and approval by the NRC prior to implementation. The proposed change is stated generically to avoid the need for further Technical Specification changes if different exemptions are approved in the future.

The proposed change, in itself, does not affect reactor operations or accident analyses and has no radiological consequences. The change provides clarification so that future Technical Specifications changes will not be necessary to correspond to applicable NRC-approved exemptions from the requirements of Appendix J. This exemption request is consistent with the intent of the regulation.

Therefore, this proposed change does not involve a significant increase in the probability or consequences of any accident previously evaluated.

Criterion 2 - Does Not Create the Possibility of a New or Different Kind of Accident from any Previously Evaluated.

This exemption request for North Anna Unit 2 does not affect normal plant operations or configuration, nor does it affect leak rate test methods. The proposed exemption to Section III.D.1(a) of Appendix J allows a one-time test interval of approximately 72 months for the ILRT. Given the North Anna Unit 2 test history, each of the Type A tests has verified the integrity of the containment. The relaxation in schedule should not significantly decrease the confidence in the leak tightness of the containment.

The proposed exemption to Section IV.A of Appendix J to eliminate the post-modification Type A test requirement for the steam generator replacement does not decrease confidence in the leaktightness of the Unit 2 containment structure. The required ASME Section XI testing requirements more than adequately test the affected area of the containment boundary.

The proposed Technical Specification amendment for Units 1 and 2 provides clarification to a specification that paraphrases a codified requirement.

Since the proposed exemptions and proposed Technical Specifications change would not change the design, configuration, or method of operation of the plant, the changes would not create the possibility of a new or different kind of accident from any previously evaluated.

Criterion 3 - Does Not Involve a Significant Reduction in the Margin of Safety.

The purpose of the existing schedule for ILRTs is to ensure that the release of radioactive materials will be restricted to those leak paths and leak rates assumed in accident analyses. The relaxed schedule for ILRTs does not allow for relaxation of Type B and C tests. Therefore, methods for detecting local containment leak paths and leak rates are unaffected by this proposed change. Type B and C testing will be performed during the upcoming steam generator replacement outage which will establish a leakage rate less than 0.06 weight percent per day. The proposed one-time increase of the test interval and the elimination of the post-modification Type A testing requirements for the Unit 2 steam generator replacement do not lead to a significant probability of creating a new leakage path or increased leakage rates and the margin of safety inherent in existing accident analyses is maintained. Therefore, the accident analysis assumptions remain bounding and safety margins remain unchanged.

The proposed North Anna Units 1 and 2 Technical Specifications change is administrative and clarifies the relationship between the requirements of Technical Specification Surveillance Requirement 4.6.1.2.a, Appendix J, and any approved exemptions to Appendix J. It does not, in itself, change a Safety Limit or a Limiting Condition for Operation. The NRC will directly approve any proposed change or exemption to Appendix J prior to implementation.

Therefore, this change does not involve a significant reduction in the margin of safety.

Based on this evaluation, it is concluded that (1) the proposed change does not constitute a significant hazards consideration as defined by 10 CFR 50.92 and (2) there is reasonable assurance that the health and safety of the public will not be endangered by the proposed change.

ENVIRONMENTAL CONSEQUENCES

This exemption request and proposed Technical Specifications change will not change the types of any effluents that may be released offsite, nor create a significant increase in individual or cumulative occupational radiation exposure.

ATTACHMENT 2

Proposed Technical Specifications Change for Appendix J Testing Requirements for North Anna Units 1 and 2