

VIRGINIA ELECTRIC AND POWER COMPANY  
RICHMOND, VIRGINIA 23261

November 20, 1995

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

Serial No. 95-600  
NL&P/ETS:  
Docket Nos. 50-280  
50-281  
License Nos. DPR-32  
DPR-37

Gentlemen:

**VIRGINIA ELECTRIC AND POWER COMPANY**  
**SURRY POWER STATION UNITS 1 AND 2**  
**PROPOSED TECHNICAL SPECIFICATIONS CHANGE**  
**APPENDIX J OPTION B PERFORMANCE-BASED TESTING**

Pursuant to 10 CFR 50.90, the Virginia Electric and Power Company requests amendments, in the form of a change to the Technical Specifications, to Facility Operating License Nos. DPR-32 and DPR-37 for Surry Power Station Units 1 and 2. The proposed Technical Specifications change will permit use of 10 CFR 50 Appendix J, Option B, Performance-Based Containment Leakage Rate Testing.

A discussion of the proposed Technical Specifications change for Surry is provided in Attachment 1. The proposed Technical Specifications change is provided in Attachment 2. It has been determined that the proposed Technical Specifications change does not involve an unreviewed safety question as defined in 10 CFR 50.59 or a significant hazards consideration as defined in 10 CFR 50.92. The basis for our determination that the change does not involve a significant hazards consideration is provided in Attachment 3. The proposed Technical Specifications change has been reviewed and approved by the Station Nuclear Safety and Operating Committee and the Management Safety Review Committee.

To take advantage of the performance-based containment leakage rate testing option of 10 CFR 50 Appendix J, we request your prompt review and disposition of the proposed change prior to the next refueling outage. This refueling outage is currently scheduled to begin in May of 1996.

Should you have any questions or require additional information, please contact us.

Very truly yours,

  
James P. O'Hanlon  
Senior Vice President - Nuclear

Attachments

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Mr. M. W. Branch  
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Surry Power Station

Commissioner  
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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 20<sup>TH</sup> day of November, 1995.

My Commission Expires: May 31, 1998.

*Vicki L. Hull*  
Notary Public

(SEAL)

**Attachment 1**  
**Discussion of Change**  
**Surry Power Station**

## DISCUSSION OF CHANGES

### INTRODUCTION

The Nuclear Regulatory Commission has amended its regulations to provide a performance-based option for leakage-rate testing of containments. This testing option (designated Option B) is available in lieu of compliance with the present prescriptive requirements contained in Appendix J regulations. In order to implement the performance-based leakage-rate testing option, the Technical Specifications must be changed to eliminate reference to the present prescriptive Appendix J requirements. Therefore, Virginia Electric and Power Company (Virginia Power) is proposing changes to the Surry Technical Specifications to eliminate the existing prescriptive testing requirements for leakage rate testing of the containment and instead reference NRC Regulatory Guide 1.163, "Performance-Based Containment Leak-Test Program." These changes will permit use of the performance-based leakage rate testing, Option B of 10 CFR 50 Appendix J.

The operation and operability requirements of the containment and containment penetrations are not affected by the proposed Technical Specification changes. Increasing the leakage rate test interval for the containment and containment penetrations does lead to a slight increase in the probability of a malfunction of equipment important to safety. Due to the longer intervals between tests, the proposed changes will increase the overall accident risk to the public by approximately 0.7% and 2.2% for changes in the frequency of Type A tests and Type B and C tests, respectively. However, this increase in the probability of a malfunction has been judged by Virginia Power to be insignificant. This increase in risk has been reviewed and judged to be acceptable by the NRC as documented in NUREG-1493, "Performance-Based Containment Leakage-Test Program," and the recent changes to 10 CFR 50 Appendix J.

The proposed changes do not involve any physical modifications to the plant or modification in the methods of plant operation which would could cause an accident or event of a different type than previously analyzed. The operational leakage criteria for the containment and the containment penetrations are not affected by the proposed changes. The accident analysis assumptions are not altered by the proposed changes in containment surveillance frequency. Thus, the margin of safety for design basis accidents is unaffected by the proposed changes. Therefore, the proposed changes to the surveillance intervals for the containment and the containment penetrations do not result in an unreviewed safety question or a significant hazards consideration.

### BACKGROUND

#### Current Design and Licensing Basis - Appendix J

Appendix J to 10 CFR 50, "Primary Reactor Containment Leakage Testing for Water-Cooled Reactors," became effective in March 1973. The safety objective of reactor containments is stated in 10 CFR 50, Appendix A, "General Design Criteria for Nuclear Power Plants," Criterion 16, "Containment Design." GDC Criterion 16 mandates "an

essentially leak-tight barrier against the uncontrolled release of radioactivity to the environment." Appendix J to 10 CFR 50 implements, in part, GDC 16 and specifies containment leakage-testing requirements, including the type of test required. For each type of test required, Appendix J specifies how the test should be conducted, the frequency of testing, and reporting requirements. Appendix J requires the following type of containment leak tests:

- Measurement of the containment integrated leakage rate (Type A tests).

The current test requirement is three tests approximately equally spaced over the 10 year inservice inspection interval. The third test must be performed when the unit is shutdown for the 10 year inservice inspections.

- Measurement of the leakage rate across each pressure containing or leakage limiting boundary for various primary reactor containment penetrations (Type B tests).

Except for airlocks, the current test requirement is testing during every reactor shutdown for refueling, or other convenient interval, but in no case at intervals greater than 2 years. Airlocks are tested every six months and after each use.

- Measurement of the containment isolation valve leakage rates (Type C tests).

The current test requirement is testing during every reactor shutdown for refueling, but in no case at intervals greater than 2 years.

## **DISCUSSION**

The recent NRC conclusions on containment leak rate testing, as documented in NUREG-1493, are based on two fundamental components. First is the insight gained through the use of probabilistic risk assessment techniques. This insight allows the NRC to better assess and apply the relative significance of systems important to safety. The second is the significant data base of practical, hands-on experience regarding containment leakage-rate testing gained since 1973, when Appendix J became effective. This operating and testing experience provides solid evidence of the need and activities necessary to conduct Appendix J testing and the cost of those activities both in resources and occupational radiation exposure.

The new risk-based regulation is based on the performance history of components (containment, penetrations, and valves) as a means to justify an increase in the interval for Type A, B, and C tests. The new regulation requires tests to be conducted on an interval based on the performance of the containment structure, penetrations, and valves without specifying the interval in the regulation.

For Surry the as-found leakage rate acceptance criteria is changed from 0.75 La to 1.0 La. This change is consistent with the revised 10 CFR 50 Appendix J, NEI 94-01, Industry Guidelines for Implementing Performance-Based Option of 10 CFR 50, Appendix J, and NUREG-1431, Standard Technical Specifications for Westinghouse Plants, Revision 1. In addition, an "as-found" leakage rate acceptance and operating

criterion 1.0 La for Type A tests is consistent with the design basis and accident analysis assumptions. The "as-left" acceptance criterion remains unchanged at 0.75 La in accordance with the NEI guidance. Therefore, prior to entering an operating conditions where containment integrity is required the as-left Type A leakage rate will not exceed 0.75 La.

### Allowable Leakage Rate

The extensive operations and testing experience show that risk to the general population is generally insensitive to changes in the allowable leakage rate. Specific findings include:

- The allowable containment leakage can be increased by approximately two orders of magnitude with marginal impact on population dose estimates from reactor accidents.
- Calculated population risks are several orders of magnitude below the NRC's Safety Goals as documented in its policy statement "Safety Goals for Operation of Nuclear Power Plants," dated August 4, 1986.

### Leakage Rate Test Interval

Reducing the Type A test frequency from the current three tests every ten years to one test every ten years as endorsed by the rulemaking leads to a marginal increase in risk. However, this marginal increase is insignificant relative to the current risk estimates.

Specific findings include:

#### Type A

Reducing the frequency of Type A tests from the current three every ten years to one every twenty years as documented in NUREG-1493 was found to lead to an imperceptible increase in risk. The estimated increase in risk is very small because Type A tests identify only a few potential containment leakage paths that cannot otherwise be identified by Type B and C testing. Furthermore, operating experience shows that leaks found by Type A tests have only marginally exceeded existing requirements. Given the insensitivity of risk to containment leakage rate and the small fraction of leakage paths detected solely by Type A testing, increasing the interval between Type A tests is possible with minimal impact on public risk.

Although still below previously stated NRC safety goals, decreasing the frequency of testing to one in ten years as endorsed by the rulemaking decreases the timeliness of finding those leaks and, thus, increases the expected overall population risk by 0.7 percent.

## Type B and C

Type B and C tests detect a very large fraction, over 97 percent, of containment leakage paths. Since leakage through Type B penetrations is infrequent and small (less than 1% of the allowable leakage rate) changing the test frequency to coincide with the Type A test schedule is not estimated to result in any change in the overall risk.

Virtually all leakage paths (greater than 97%) are identified by Type C tests of containment isolation valves. Based on the model of component failure, it has been found that performance-based Type C testing alternatives are feasible without significant risk impacts. Although still below previously stated NRC safety goals, for Type B and C testing, the population risk for a performance-based testing schedule would increase overall accident risk by 2.2 percent per year. This increase is considered marginal by the NRC.

The NRC's safety objective established for the Appendix J rulemaking initiative was to allow licensees more flexibility in the allocation of resources while maintaining a high degree of assurance of containment integrity. The performance-based containment leakage testing program endorsed by Regulatory Guide 1.163, "Performance-Based Containment Leak-Test Program," and NEI 94-01, "Industry Guidelines for Implementing Performance-Based Containment Option of 10 CFR 50, Appendix J," meets this objective.

## **SPECIFIC CHANGES**

### Specification 4.4, Containment Tests

- Specification 4.4.B.1- Replace the current prescriptive testing requirements with the following:

"1. The containment and containment penetrations leakage rates shall be demonstrated by performing leakage rate testing in accordance with 10 CFR 50 Appendix J, Option B, as modified by approved exemptions, and Regulatory Guide 1.163. Leakage rate acceptance criteria are as follows:

- a. An overall as-found integrated leakage rate of less than or equal to  $L_a$ , 0.1 percent by weight of the containment air per 24 hours, at the calculated peak pressure (Pa).
- b. A combined leakage rate of less than or equal to  $0.60 L_a$  for all penetrations and valves subject to Type B and C testing when pressurized to Pa.

Prior to entering an operating conditions where containment integrity is required the as-left Type A leakage rate shall not exceed  $0.75 L_a$  and the combined leakage rate of all penetrations subject to Type B and C testing shall not exceed  $0.6 L_a$ ."

- Specification 4.4.F - Is renumbered as 4.4.B.2.

## Specification 6.6, Reporting Requirements

- Specification 6.6.B.4 - Reporting requirements for the leak rate testing program are being deleted as permitted by Option B of 10 CFR 50 Appendix J. Option B requires specific recordkeeping for leakage rate testing in lieu of reporting.

### **SAFETY SIGNIFICANCE**

The proposed Technical Specifications change is necessary to permit the use of Option B, of the revised 10 CFR 50, Appendix J. Option B permits performance-based testing of the containment and containment penetrations. Performance based testing will significantly reduce the amount of testing and personnel exposure for each outage. The proposed change has been reviewed against the criteria of 10 CFR 50.59 and it has been determined that an unreviewed safety question does not exist for the following reasons:

Plant systems and components will not be operated in a different manner as a result of the proposed Technical Specifications change. The proposed change permits a performance-based approach to determining the leakage-rate test frequency for the containment and containment penetrations (Type A, B, and C tests). There are no plant modifications, or changes in methods of operation. Therefore, the changes in testing intervals for the containment and containment penetrations have no affect on the probability of occurrence of a LOCA. The Limiting Conditions for Operation and the leakage-rate acceptance criteria are not being changed. Changing the as-found acceptance criterion to 1.0 La does not increase the probability or consequences of an accident. Therefore, the probability and the consequence of a design base accident are not being increased by the proposed changes in leak rate test interval.

Plant systems and components will not be operated in a different manner as a result of the proposed Technical Specifications change. Changing the test interval for the containment and containment penetrations does not create any new accident precursors or methods of operation. Therefore, the possibility for an accident of a different type than was previously evaluated in the Safety Analysis Report is not created by the proposed Technical Specifications change.

The proposed change increases the probability of a malfunction of equipment important to safety due to the longer intervals between leakage tests. It has been estimated that the longer test intervals will increase the overall accident risk to the public by approximately 0.7% and 2.2% (for changes in the frequency of Type A tests and Type B and C tests, respectively). This increase has been reviewed and found to be acceptable by the NRC as documented in NUREG-1493 and the recent rulemaking to 10 CFR 50 Appendix J. We also agree that this increase in accident risk is insignificant. Changing the as-found acceptance criterion to 1.0 La does not increase the consequences of an accident, since the accident analysis assume a leakage rate of La for Design Basis Accidents.

Plant systems and components will not be operated in a different manner. The Limiting Conditions for Operation for the containment and the containment penetrations are not changed as a result of the proposed Technical Specifications change. Changing the as-found acceptance criterion to 1.0 La does not increase the consequences of an accident, since the accident analysis assume a leakage rate of La for Design Basis Accidents. The as-left Type A test acceptance criterion remains at less than 0.75 La. Therefore, the accident analysis assumptions for design basis accidents are unaffected and the margin of safety is not decreased by the proposed Technical Specifications change.