

Docket No. 50-281

November 21, 1988

Mr. W. R. Cartwright  
Vice President - Nuclear  
Virginia Electric and Power Company  
5000 Dominion Blvd.  
Glen Allen, Virginia 23060

Dear Mr. Cartwright:

SUBJECT: EXEMPTION FROM APPENDIX J, 10 CFR PART 50 FOR  
SURRY UNIT 2 (TAC NO. 69222)

By letter dated August 12, 1988, as supplemented August 15 and August 31, 1988, the Virginia Electric and Power Company (VEPCO) requested an exemption from the requirements of Appendix J to 10 CFR Part 50.

Based on our evaluation, we have granted the one-time exemption from the scheduler requirements of Section III.A.6(b) of Appendix J to 10 CFR Part 50 (Enclosure 1). The exemption allows VEPCO to resume the normal Type A retest schedule in accordance with Section III.D. of Appendix J.

Our Safety Evaluation is also enclosed (Enclosure 2). This completes our review of your exemption request.

A copy of the notice of exemption is being filed with the Office of the Federal Register for publication.

Sincerely,

Original signed by  
Chandu P. Patel, Project Manager  
Project Directorate II-2  
Division of Reactor Projects-I/II  
Office of Nuclear Reactor Regulation

Enclosures:  
As stated

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Docket No. 50-281

Mr. W. R. Cartwright  
Vice President - Nuclear  
Virginia Electric and Power Company  
5000 Dominion Blvd.  
Glen Allen, Virginia 23060

Dear Mr. Cartwright:

SUBJECT: TECHNICAL EXEMPTION REQUEST FROM APPENDIX J, 10 CFR PART 50 FOR  
SURRY UNIT 2 (TAC NO. 69222)

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the Virginia Electric and Power Company (VEPCO) requested an exemption from the  
requirements of Appendix J to 10 CFR Part 50.

Based on our evaluation, we have granted the one-time exemption from the schedular  
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Chandu P. Patel, Project Manager  
Project Directorate II-2  
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Office of Nuclear Reactor Regulation

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LA:RAN-2	PM: <sup>CP</sup> PDII-2	D: <sup>CP</sup> PDII-2	OGC-WF	ADR2	D: DPR
DMiller	CPatel:bd	H Berkow		GLainas	SVarga
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*J. Smith*  
*Reviewed*  
*with copy*  
*noted*

Mr. W. R. Cartwright  
Virginia Electric and Power Company

Surry Power Station

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UNITED STATES OF AMERICA  
NUCLEAR REGULATORY COMMISSION

In the Matter

VIRGINIA ELECTRIC  
AND POWER COMPANY

(Surry Power Station,  
Unit 2)

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Docket No. 50-281

EXEMPTION

I.

The Virginia Electric and Power Company (VEPCO, the licensee) is the holder of Operating License No. DPR-37, which authorizes operation of Surry Power Station Unit 2. The operating license provides, among other things, that the Surry Power Station Unit 2 is subject to all rules, regulations, and Orders of the Commission now or hereafter in effect.

The facility consists of a pressurized water reactor at the licensee's site in Surry, Virginia.

II.

The Code of Federal Regulations, 10 CFR 50.54(o), specifies that primary reactor containments for water-cooled power reactors shall comply with Appendix J, "Primary Reactor Containment Leakage Testing for Water-Cooled Power Reactors." Section III.A.6(b) of Appendix J to 10 CFR Part 50 states the following:

If two consecutive periodic Type A tests fail to meet the applicable acceptance criteria in III.A.5(b), notwithstanding the periodic retest schedule of III.D., a Type A test shall be performed at each plant shutdown for refueling or approximately every 18 months, whichever occurs first, until two consecutive Type A tests meet the acceptance criteria in III.A.5(b), after which time the retest schedule specified in III.D. may be resumed.

From 1983 through 1986, the licensee conducted three Type A tests at Surry Unit 2. All of these tests were considered to be failures due to leakage penalty additions from Type C (local leakage rate testing of containment isolation valves) testing. In each case the leakage was associated with penetrations/valves in systems that are normally filled with water and operating, under post-accident conditions, and/or the containment sump isolation valves. The licensee indicated that the containment sump isolation valves have been replaced and they are no longer a continuing source of containment leakage, and that the last three Type A tests have demonstrated that containment integrity has not significantly degraded over the operating cycle. Therefore, the licensee requested a one-time exemption from the schedular requirements of paragraph III.A.6(b) so that the normal retest schedule can be resumed in accordance with Section III.D.

### III.

By letter dated August 12, 1988, as supplemented August 15 and August 31, 1988, the licensee requested a one-time exemption from 10 CFR Part 50, Appendix J, Section III.A.6(b) so that the normal retest schedule of Appendix J, Section III.D. can be resumed. Surry Unit 2 failed the "as found" Type A tests that were conducted in 1983, 1985, and 1986, due to leakage rate additions from Type C testing. In each case the leakage was associated with the normal containment sump isolation valves (TV-DA-100/200 A&B) and/or valves in systems that are normally filled with water and operating under post-accident conditions. If these leakage additions had not been necessary, the plant would not have required an accelerated test schedule delineated in Section III.A.6(b). In order to avoid addition of a leakage penalty and an accelerated test schedule, the licensee elected to demonstrate to the staff's satisfaction that:

1. the corrective actions taken for the normal containment sump isolation valves for Unit 2 have eliminated the chronic leakage problem, and

2. for the Surry Units 1 and 2, the design of the "water-filled" penetrations is such that it precludes leakage of containment atmosphere through the penetrations during an accident, thus making it unnecessary to add the associated Type C leakage rates to Type A leakage rates.

The licensee stated that accomplishing these two objectives would justify the requested exemption.

The licensee addressed the first issue in its letter dated August 12, 1988. The second issue was addressed in submittals dated February 29, 1988, and August 15, 1988. Section 6.2.2.2 of the Surry Updated Final Safety Analysis Report also contains pertinent information. The staff reviewed these submittals and concluded that the subject "water-filled" containment penetrations are sealed with water to the extent that they need not be vented or drained during Type A tests, and the associated Type C leakage rates need not be added to Type A leakage rate. The staff further concluded that the original leakage path of concern that caused the recent Type A "as found" failures (the normal containment sump isolation valves) has been corrected since these valves no longer exhibit excessive leakage. The staff's detailed evaluation is provided in a Safety Evaluation dated November 21, 1988.

Therefore, on the basis of the licensee's corrective actions to reduce the "as found" containment leakage, the staff concludes that a return to the normal Type A test schedule of Section III.D. of Appendix J to 10 CFR Part 50 is justified.

By letter dated August 12, 1988, the licensee also submitted information to identify the special circumstances for granting this exemption for Surry Unit 2 pursuant to 10 CFR 50.12. The licensee stated that the purpose of Type A testing is to measure and ensure that the leakage through the primary reactor containment

does not exceed the maximum allowable leakage. It also provides assurance that periodic surveillance, maintenance and repairs are made to systems or components penetrating the containment. The licensee has replaced the valves which were a continuing source of containment leakage. The licensee also stated that it has met the intent of the regulations in establishing containment integrity, and maintaining that integrity over the operating cycle. Therefore, the licensee believes that this exemption should be granted pursuant to 10 CFR 50.12(a)(2)(ii) and (v), in that application of the regulation in this particular instance is not necessary to achieve the underlying purpose of the rule, which is to measure and ensure that leakage through the primary containment does not exceed the allowable leakage rate at any time during the operating cycle; and, that the exemption would provide only temporary relief from the applicable requirement and the licensee has made a good faith effort to comply with the regulation. This one-time exemption will enable Surry Unit 2 to resume the retest schedule specified in Section III.D. of 10 CFR Part 50, Appendix J and therefore, prevent unnecessary pressurization of the containment to design basis pressure. The staff agrees that the source of leakage which caused the prior failures has been corrected and an additional Type A test at this time is not required to achieve the underlying purpose of the rule.

#### IV.

Accordingly, the Commission has determined that, pursuant to 10 CFR 50.12(a)(1), this exemption is authorized by law, will not present an undue risk to the public health and safety, and is consistent with the common defense and security. The Commission has further determined that special circumstances, as set forth in 10 CFR 50.12(a)(2)(ii) are present, justifying the exemption; namely that application of the regulation in this particular circumstance is not

necessary to achieve the underlying purpose of the rule and the exemption is for a one-time relief only. Accordingly, the Commission hereby grants an exemption to Section III.A.6(b) of Appendix J to 10 CFR Part 50 to allow the licensee to resume the Type A retest schedule of Section III.D. of Appendix J for Surry Unit 2. This exemption does not apply if the next test is deemed a failure by the NRC acceptance criteria. Such a failure would constitute two consecutive failures and Section III.A.6(b) would again apply.

Pursuant to 10 CFR 51.32, the Commission has determined that the granting of this exemption will not have a significant effect on the quality of the human environment (53 FR 46724).

A copy of the licensee's request for exemption dated August 12, 1988, as supplemented August 15 and August 31, 1988, and previous information submitted by letter dated February 29, 1988, are available for public inspection at the Commission's Public Document Room, 2120 L Street, N.W., Washington, D.C., and at the Swem Library, College of William and Mary, Williamsburg, Virginia 23185. Copies may be obtained upon written request to the U. S. Nuclear Regulatory Commission Washington, D.C., 20555, Attention: Director, Division of Reactor Projects I/II.

This exemption is effective upon issuance.

FOR THE NUCLEAR REGULATORY COMMISSION



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

Dated at Rockville, Maryland  
this 21<sup>st</sup> day of November, 1988



UNITED STATES  
NUCLEAR REGULATORY COMMISSION  
WASHINGTON, D. C. 20555

Enclosure 2

SAFETY EVALUATION BY THE OFFICE OF NUCLEAR REACTOR REGULATION  
REQUEST FOR EXEMPTION FROM CONTAINMENT INTEGRATED LEAKAGE RATE  
TEST - RETEST SCHEDULE  
SURRY POWER STATION, UNITS 1 AND 2  
DOCKET NOS. 50-280 AND 50-281

1.0 INTRODUCTION

By letter dated August 12, 1988, Virginia Electric and Power Company, the licensee for the Surry Power Station, requested a one-time exemption for Surry Unit 2 from the requirements of 10 CFR 50 Appendix J, Section III.A.6.(b) so that the normal retest schedule of Appendix J, Section III.D.1.(a) can be resumed. The normal schedule requires a Type A Containment Integrated Leakage Rate Test (CILRT) to be conducted three times during each 10-year service period. Section III.A.6.(b) states that, if two consecutive Type A tests fail to meet the applicable acceptance criteria, a retest must be performed during each subsequent refueling outage or approximately every 18 months, whichever comes first, until two consecutive tests meet the acceptance criteria given in Section III.A.5.(b). Surry Unit 2 failed the "as found" Type A tests that were conducted in 1983, 1985, and 1986, due to leakage rate additions from Type C testing (local leakage rate testing of containment isolation valves). In each case, the leakage was associated with the normal containment sump isolation valves (TV-DA-100/200 A&B) and/or valves in systems that the licensee asserts are normally filled with water and operating under post-accident conditions. If these leakage additions had not been necessary, the subject Type A tests would have passed and the plant would not require an accelerated test schedule. Therefore, the licensee identified two objectives in their submittal: 1) to demonstrate that the corrective action taken for the normal containment sump isolation valves for Unit 2 has eliminated the chronic leakage problem, and 2) to show, for Units 1 and 2, that the design of the "water-filled" penetrations is such that it precludes leakage of containment atmosphere through the penetrations during an accident thus making it unnecessary to add the associated Type C leakage rates to the Type A leakage rate. The licensee stated that accomplishing these two objectives would justify the requested exemption.

The licensee addressed the first objective in its letter dated August 12, 1988. The second objective was discussed with the licensee during an August 24-25, 1988 meeting at the plant site and was addressed in letters dated February 29, August 15, and August 31, 1988. Section 6.2.2.2 of the facility UFSAR also contained pertinent information. The staff has reviewed these documents and our evaluation follows.

2.0 EVALUATION

1) Normal Containment Sump Isolation Valves

In order to establish the "as found" condition of integrated containment leakage, licensees would ideally conduct a Type A test near the beginning of a refueling outage, before making any repairs or adjustments to containment

boundary components such as containment isolation valves. However, for various practical reasons, most licensees instead conduct local leakage rate tests (e.g., Type C) before the Type A test, making repairs and adjustments as necessary to reduce excessive leakage. The Type A test is then performed near the end of the refueling outage. In order to determine the "as found" integrated leakage rate under these conditions, the licensee performs Type C tests both before and after repairing a valve, and the difference in leakage rates is then added to the Type A leakage rate. In this manner, an "as left" leakage rate (actually measured in the Type A test) and an "as found" leakage rate (Type A measurement plus Type C "penalties") is determined. If either exceeds the test acceptance criterion, a test failure is indicated and an increased Type A test frequency may be required in accordance with the requirements of Appendix J, Section III.A.6.

In the case of Surry Unit 2, Type C penalties (high leakage rates) from the normal containment sump isolation valves (TV-DA-100/200 A&B) have contributed to several "as found" Type A test failures (1983, 1985, 1986). To correct this problem, the licensee redesigned and replaced the valves in both Unit 1 and Unit 2 in 1986. The new valves were of a different type that was intended to be more resistant to wear caused by the frequent cycling open and closed that the valves experienced. This cycling occurred because the valves served as process control valves by controlling the flow of water out of the normal containment sump. When the valve replacement did not completely solve the problem, the licensee installed another valve (a check valve) in each line to serve as a process control valve. This allowed the containment isolation valves to remain open and not cycle during normal plant operation, thereby avoiding excessive wear. The most recent Type C testing results for both Units, as detailed in the licensee's letter dated August 12, 1988, indicate that the leakage problem has been largely eliminated and that these valves no longer exhibit excessive leakage. The staff finds that this corrective action has been effective and supports the requested exemption.

## 2) "Water-Filled" Penetrations

Section III.A.1.(d) of Appendix J requires that during a Type A test, certain piping systems that penetrate containment must be vented to the atmosphere inside containment and drained of water, exposing the associated containment isolation valves to the containment atmosphere during the test and thus including them in the Type A test. It is intended to simulate accident conditions for piping systems that might rupture or otherwise be open to the containment atmosphere during a LOCA. As an alternative to venting and draining a system, Type C tests may be performed on the associated containment isolation valves and the measured leakage rates added to the Type A leakage rate.

Type C additions of this kind from certain valves in the safety injection and containment recirculation spray systems have contributed to the "as found" failures of the last three Type A tests at Surry Unit 2. The licensee asserts that these "water-filled" penetrations are not potential containment atmosphere leak paths, and thus their Type C leakage rates should not be added to the Type A leakage rate.

The containment penetrations in question are nos. 7, 15, 21, 23, 46, 60, 61, 62, and 113 (various high head and low head safety injection pump discharge lines into containment), 68 and 69 (safety injection pump suction lines from the containment recirculation sump), and 66 and 67 (recirculation spray pump suction lines from the containment recirculation sump). The valves in these penetrations are currently Type C tested and will continue to be Type C tested. Further, their leakage rates will continue to be added to the total of all local leakage rates. Total leakage must be less than 0.60 La in accordance with Appendix J, where La is the maximum allowable leakage rate for the containment specified in the facility Technical Specifications. The licensee proposes only that the Type C leakage rates for the subject penetrations not be added to the Type A leakage rate.

The high head and low head safety injection (HHSI and LHSI) systems and the recirculation spray system are Engineered Safety Feature, safety-related, and Seismic Category 1 systems. The HHSI has three redundant pumps whose discharge lines enter a common header outside containment before splitting to the various containment penetrations. The LHSI has two redundant pumps whose discharge lines are connected outside containment by a crosstie line with locked open valves. Water is supplied to these systems from the containment sump for long term core cooling. Therefore, the staff finds that the designs of these systems assure 1) a supply of high pressure water to penetrations 7, 15, 21, 23, 46, 60, 61, 62 and 113 for at least 30 days after the onset of a LOCA including in the event a worst-case single active failure (e.g., loss of a pump or diesel generator), and 2) a water seal of the subject valves thereby precluding containment atmosphere leakage through the closed valve disks. However, most of the subject valves are oriented in such a way that valve packing/stem leakage of each of the valves located outside containment is not precluded by this water seal, thus providing a potential leak path out of the containment. For all of these valves except the one in penetration 60, a water leg (pipe loop) exists between the valve and its penetration. For penetration 60, there is a horizontal run of pipe between the valve and its penetration which acts in a manner similar to a water leg. Considering 1) the presence of the water legs, 2) the fact that the periodic Type C tests on all of the valves of concern include the possible packing/stem leak paths so that such leakage will be maintained low, and 3) that the Surry subatmospheric containment is designed to reduce containment pressure below atmospheric pressure one hour after onset of a LOCA, significant packing/stem leakage for these valves is not likely. Therefore, the staff finds that penetrations 7, 15, 21, 23, 46, 60, 61, 62 and 113 need not be vented and drained during Type A tests and the associated Type C leakage rates need not be added to the Type A leakage rate.

Penetrations 66, 67, 68, and 69 are containment recirculation sump suction paths for the recirculation spray and safety injection pumps. The containment recirculation sump will be filled with water during a LOCA and will remain water filled throughout the accident. Therefore, the staff finds that the recirculation sump penetrations are not potential containment atmosphere leak paths, and the associated Type C leakage rates need not be added to the Type A leakage rate.

### 3.0 CONCLUSION

Based on the above, the staff concludes that "water-filled" containment penetrations 7, 15, 21, 23, 46, 60, 61, 62, 66, 67, 68, 69, and 113 are sealed with water to the extent that they need not be vented or drained during Type A tests, and the associated Type C leakage rates need not be added to the Type A leakage rate. The staff further concludes that the original leak path of concern that has caused the recent Type A "as found" failures, the normal containment sump isolation valves (TV-DA-100/200 A & B), has been corrected since these valves no longer exhibit excessive leakage. Therefore, on the basis of the licensee's effective corrective action to reduce "as found" containment leakage, the staff concludes that a return to the normal Type A test schedule of Section III.D.1.(a) of Appendix J to 10 CFR Part 50 is justified, and the requested exemption for Surry, Unit 2 from the requirements of Section III.A.6.(b) for increased Type A containment leakage rate testing frequency should be granted.

Dated: November 21, 1988

Principal Contributor:  
J. Pulsipher