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

June 10, 1992

Docket No. 50-260

Tennessee Valley Authority
ATTN: Dr. Mark O. Medford, Vice President,
Nuclear Assurance, Licensing & Fuels
3B Lookout Place
1101 Market Street
Chattanooga, Tennessee 37402-2801

Dear Dr. Medford:

SUBJECT: BROWNS FERRY NUCLEAR PLANT UNIT 2 - ISSUANCE OF EXEMPTION TO 10 CFR PART 50, APPENDIX J, SECTIONS III.D.2(a) AND III.D.3 (TAC NO. M82365)

By letter dated December 20, 1991, the Tennessee Valley Authority (TVA) requested an exemption from the schedule requirements of 10 CFR Part 50, Appendix J, Sections III.D.2(a) and III.D.3 for 87 components at the Browns Ferry Nuclear Plant (BFN) Unit 2. These regulations require that Type B and Type C local leak rate tests be performed during every refueling outage at an interval not to exceed 2 years. TVA requested the exemption to avoid a BFN Unit 2 outage solely for the purpose of performing these tests.

The Nuclear Regulatory Commission has granted the requested schedule exemption until the next scheduled refueling outage, which will begin no later than January 29, 1993. The NRC staff finds that the increased confidence in containment integrity following testing is not sufficient to offset increased personnel radiation exposure and other risks associated with performing these tests at power, or the undue burden of a forced outage to perform the testing while shut down. The staff believes there is a high degree of confidence that the components affected by this exemption will not degrade to an unacceptable extent during their extended operating interval between tests. Copies of the exemption and the supporting Safety Evaluation by the staff are enclosed. The exemption has been forwarded to the Office of the Federal Register for publication.

We find that granting the exemption from the requirements of 10 CFR Part 50, Appendix J, Sections III.D.2(a) and III.D.3 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. We further find that special circumstances

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justify the exemption; namely, that application of the regulation in the particular circumstances is not necessary to achieve the underlying purpose of the rule.

Sincerely,

Original signed by

Frederick J. Hebdon, Director
Project Directorate II-4
Division of Reactor Projects - I/II
Office of Nuclear Reactor Regulation

Enclosure:
1. Exemption to 10 CFR Part 50
   Appendix J
2. Safety Evaluation

cc w/enclosures:
See next page

OGC
5/27/92

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5/15/92	5/18/92	5/18/92	5/28/92	5/29/92	5/29/92

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UNITED STATES OF AMERICA
NUCLEAR REGULATORY COMMISSION

In the Matter of TENNESSEE VALLEY AUTHORITY (Browns Ferry Nuclear Plant, Unit 2)	)))))))	Docket No. 50-260

EXEMPTION REGARDING SCHEDULE FOR CONTAINMENT LOCAL LEAK RATE TESTS

I.

The Tennessee Valley Authority (the licensee) is the holder of Facility Operating License No. DPR-52, which authorizes operation of the Browns Ferry Nuclear Plant, Unit 2 (the facility) at steady-state reactor power levels not in excess of 3293 megawatts, thermal. The facility consists of a boiling water reactor located at the licensee's site in Limestone County, Alabama. Two other boiling water reactors located at this site are not affected by this exemption. The license provides, among other things, that the facility is subject to all rules, regulations, and orders of the U. S. Nuclear Regulatory Commission (the Commission) now or hereafter in effect.

II.

Section III of Appendix J to 10 CFR Part 50 requires the development of a program to conduct periodic leak testing of the primary reactor containment and related systems and components, and components penetrating the primary containment pressure boundary. The interval between local leak rate tests for certain components (Type B and Type C testing) is specified by Sections III.D.2(a) and III.D.3 to be no greater than 2 years.

III.

By letter dated December 20, 1991, the licensee, the Tennessee Valley Authority, requested a one-time exemption from the requirements of 10 CFR Part 50, Appendix J, Sections III.D.2.(a) and III.D.3 regarding the periodic Type B and Type C local leak rate test schedule for 87 components at the Browns Ferry Nuclear Plant, Unit 2. The requested exemption would permit continued operation of the facility until its next refueling outage, which will begin no later than January 29, 1993. Otherwise, the required testing would require a plant shutdown no later than July 31, 1992, well before the end of the current fuel cycle.

IV.

Sections III.D.2(a) and III.D.3 of Appendix J to 10 CFR Part 50 state that Type B and Type C tests shall be performed during reactor shutdowns for refueling, at an interval not to exceed 2 years. The licensee has requested a one-time exemption from these regulations.

The 2-year interval requirement for Type B and C components is intended to be often enough to preclude significant deterioration and long enough to permit the tests to be performed during routine plant outages. Leak rate testing of the penetrations during plant shutdown is preferable because of the lower radiation exposures to plant personnel. Furthermore, some penetrations cannot be tested at power. For penetrations that cannot be tested during power operation, or for which testing at power would yield unnecessary radiation exposure of personnel, the Commission staff believes the increase in confidence of containment integrity following a successful test is not significant enough to justify the hardships and costs associated with a plant shutdown specifically to perform the tests within the 2-year time period.

V.

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 further determines that special circumstances, as provided in 10 CFR 50.12(a)(2)(ii), are present justifying the exemption; namely, that application of the regulation in the particular circumstances is not necessary to achieve the underlying purpose of the rule. The underlying purpose of Sections III.D.2(a) and III.D.3 of Appendix J to 10 CFR Part 50 is to provide an interval short enough to prevent serious deterioration from occurring and long enough to permit testing to be performed during regular plant outages. For components that cannot be tested at power, or for components where testing involves unreasonable risk to personnel and equipment, the increased confidence in containment integrity following successful testing is not significant enough to justify a plant outage merely to perform the tests within the 2 year interval. The licensee has presented information accepted by the Commission, which gives a high degree of confidence that the components affected by this exemption will not degrade to an unacceptable extent. Acceptable leakage limits are defined by Sections III.B.3(a) and III.C.3 of Appendix J to 10 CFR Part 50.

Accordingly, the Commission hereby grants an exemption as described in Section III above, from Sections III.D.2(a) and III.D.3 of Appendix J to 10 CFR Part 50 to the effect that Type B and Type C testing for 87 components at Browns Ferry Nuclear Plant, Unit 2, that would otherwise be required to be performed at an earlier date, can be postponed to an outage which will begin no later than January 29, 1993, as specified in the staff's safety evaluation.

Pursuant to 10 CFR 51.32, the Commission has determined that granting this Exemption will not have a significant impact on the environment (57 FR 24063).

This Exemption is effective upon issuance.

FOR THE NUCLEAR REGULATORY COMMISSION

Original signed by

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

Dated at Rockville, Maryland
this 10th day of June 1992

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5/27/92

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

SAFETY EVALUATION BY THE OFFICE OF NUCLEAR REACTOR REGULATION

TEMPORARY EXEMPTION FROM APPENDIX J INTERVAL

FOR LOCAL LEAK RATE TESTING OF CONTAINMENT PENETRATIONS

BROWNS FERRY NUCLEAR PLANT, UNIT 2 DOCKET NO. 50-260

1.0 INTRODUCTION

By letter dated December 20, 1991, the Tennessee Valley Authority, (TVA or the licensee), requested a temporary schedular exemption to extend the interval for Type B and C (local leak rate) testing of certain containment penetrations at the Browns Ferry Nuclear Plant (BFN), Unit 2, beyond the 2-year limit of Appendix J to 10 CFR Part 50.

Appendix J requires these tests to be performed at every refueling outage, but with the interval not to exceed 2 years. Browns Ferry, Unit 2, was in cold shutdown from September, 1984 until May 24, 1991. Type B and C testing began July 30, 1990, in anticipation of a seemingly impending restart. However, the return-to-power sequence took longer than expected, and startup did not occur until May 24, 1991. Leak rate testing was also spread out and was finished in May, 1991, shortly before startup. Since the next refueling outage is scheduled to begin January 29, 1993, the expiration of the 2-year interval for some of the Type B and C tests would force a plant shutdown in July, 1992, because many of the tests cannot be performed at power.

At the time of the restart, the licensee had expected that an extensive mid-cycle outage would be necessary due to problems which usually occur following restart after an extended outage. The licensee planned to conduct Type B and C testing during this expected mid-cycle outage. TVA has since decided that this mid-cycle outage is not necessary. Therefore, the licensee is unable to perform the required testing within required time frames without a shutdown solely for the performance of the testing. The licensee believes a shutdown only to perform the Appendix J testing is unnecessary and expensive in terms of time, money, and radiation exposure. Therefore, the licensee requested a temporary or schedular exemption to extend the test interval for the Type B and C testing for certain components.

Originally, 159 containment boundary components, or approximately 58 percent of the total in the plant, were in need of Type B or C testing before January 29, 1993. However, during two forced outages in October and December, 1991, the licensee was able to perform some of the tests and reduce the number to 121, or approximately 44 percent of the total. This was the number of components for which the licensee requested an exemption in their December 20, 1991, letter. In February 1992, another outage brought the number down to

87 components, or approximately 32 percent. The 87 components (see attached Table 1) include containment isolation valves, expansion bellows, flanges, and valve bonnets/packing. The maximum requested extension of the interval beyond 2 years for any one component is 177 days, or slightly less than 6 months. Sixty-two of the 87 components would be extended no more than 3 months.

Further, the licensee is committed to performing additional Type B and C tests during any forced outages of sufficient duration that may occur before the next refueling outage.

2.0 EVALUATION

The licensee has addressed the following factors to justify the requested exemption.

2.1 Components not testable at power

For the components listed in Table 1, it is either not possible to test with the unit at power, or it is inadvisable to test at power, as discussed below:

1) Approximately half of the components cannot be tested without entering the primary containment, which must remain inerted with nitrogen when the unit is operating.

2) The 24 expansion bellows are hot (both thermally and radioactively) during unit operation. The high temperature could affect the accuracy of leak rate measurements. The stability of the leak rate data obtained from the testing apparatus could be affected, and the measured leak rate could be different from that which would be obtained under cold conditions, due to expansion/contraction of the test volume. In addition, testing at power would result in significant radiation doses to the testing personnel. For these reasons, testing the bellows at power is inadvisable.

3) Eleven components (valves and bonnets/packing) in the HPCI and RCIC systems cannot be tested without entering a Technical Specification Limiting Condition for Operation for the system being tested. In addition, certain Surveillance Instructions must be performed to demonstrate operability before returning the system to service. These constitute avoidable challenges to safety systems. Therefore, testing these components at power is inadvisable.

4) For 8 valves in the Residual Heat Removal (RHR) containment spray system and 2 valves in the Pressure Suppression Chamber (PSC) level control line, a system train must be made inoperable to conduct the tests. This degrades safety systems and is inadvisable at power.

5) For one bonnet in the High Pressure Coolant Injection (HPCI) turbine exhaust line, 30-ft-high scaffolding must be erected in the HPCI room to allow access to the bonnet for testing, at some hazard to personnel and the HPCI system. The interval extension for this component is only 16 days. This short extension is not significant enough to warrant the scaffolding exercise.

6) One flange in the containment ventilation system requires a 3-day interval extension and must have a 20-ft scaffold erected for the test. This very short extension is insignificant.

2.2 Good leak rate history for components

The licensee has performed a detailed analysis of the past leak rate history of the 87 components in question. Most of these components are historically "good performers," and those few that are not were repaired or replaced during the last extended refueling outage. The licensee has used historical leak rate data to conservatively project the leak rate expected to exist on January 29, 1993, the date to which interval extension is requested. The expected incremental increases in component leakage rates due to the extension are small, less than 18 percent of 0.6 times the maximum allowable leakage rate, La. The quantity 0.6 La is the acceptance criterion set by 10 CFR 50, Appendix J for Type B and C testing. The projected increase in total leakage rate due to the test interval extension reduces the margin between as-left leakage rate and 0.6 La by less than 22 percent. This provides reasonable assurance that the requested test interval extension will not result in the Type B and C leakage rate total exceeding the 0.6 La limit of Appendix J.

2.3 Improvements made to testing program

During the extended outage, numerous actions were taken to upgrade the plant's Appendix J program. The following is a summary of actions taken to upgrade the program:

- Block valves, test connections, and vent valves to enable isolation valves to be tested by flow in the accident direction were added.
- Block valves and test connections were added to simplify testing of bonnet and packing seals.
- Valves were reoriented to allow packing and bonnet seals to be tested during the normal Type C test.
- Lines no longer used were capped to remove potential leak paths.
- Changes in valve type were made to improve leakage characteristics.

- Stainless steel overlays were added to ventilation valves to improve leakage characteristics.
- Various repairs, replacements, and modifications of historical problem valves to improve leakage performance were conducted during the outage.

As a result of these upgrades, modifications, and improved maintenance practices, the possibility of significant degradation of containment components is reduced.

2.4 Intent of Appendix J

The staff notes that the 2-year interval requirement for Type B and C components is intended to be often enough to prevent significant deterioration from occurring and long enough to permit the tests to be performed during plant outages. Leak rate testing of the penetrations during plant shutdown is preferable because of the lower radiation exposures to plant personnel. Moreover, as noted before, some penetrations cannot be tested at power. For penetrations that cannot be tested during power operation, or for which testing at power is inadvisable as discussed above, the increase in confidence of containment integrity following a successful test is not significant enough to justify a plant shutdown specifically to perform the tests within the 2-year time period, considering the factors discussed in Sections 2.2 and 2.3 above.

3.0 CONCLUSION

Based on the above evaluation, the staff finds the requested temporary exemption, to allow the Type B and C test intervals of the 87 components listed in Table 1 to be extended to the refueling outage which will begin no later than January 29, 1993, to be acceptable.

Attachment:
Components Requiring Extension -
Table 1

Principal Contributor: J. Pulsipher

Date: June 10, 1992

Attachment

TABLE 1

COMPONENTS REQUIRING EXTENSION

TYPE B TESTED COMPONENTS

COMPONENT	PENETRATION	DESCRIPTION	EXTENSION Days
BELLOWS	X-7A	Inboard Bellows MS Line A	27
BELLOWS	X-7A	Outboard Bellows MS Line A	27
BELLOWS	X-7B	Inboard Bellows MS Line B	10
BELLOWS	X-7B	Outboard Bellows MS Line B	10
BELLOWS	X-7C	Inboard Bellows MS Line C	10
BELLOWS	X-7C	Outboard Bellows MS Line C	10
BELLOWS	X-7D	Inboard Bellows MS Line D	10
BELLOWS	X-7D	Outboard Bellows MS Line D	10
BELLOWS	X-8	Inboard Bellows MS Drain	27
BELLOWS	X-8	Outboard Bellows MS Drain	27
BELLOWS	X-9A	Inboard Bellows FW Line A	111
BELLOWS	X-9A	Outboard Bellows FW Line A	111
BELLOWS	X-9B	Inboard Bellows FW Line B	111
BELLOWS	X-9B	Outboard Bellows FW Line B	111
BELLOWS	X-10	Inboard Bellows RCIC Steam	120
BELLOWS	X-10	Outboard Bellows RCIC Steam	120
BELLOWS	X-11	Inboard Bellows HPCI Steam	9
BELLOWS	X-11	Outboard Bellows HPCI Steam	9
BELLOWS	X-12	Inboard Bellows SDC Suction	42
BELLOWS	X-12	Outboard Bellows SDC Suction	42
BELLOWS	X-13A	Inboard Bellows RHR Discharge	42
BELLOWS	X-13A	Outboard Bellows RHR Discharge	42
BELLOWS	X-13B	Inboard Bellows RHR Discharge	42
BELLOWS	X-13B	Outboard Bellows RHR Discharge	42
FLANGE	N/A	Shear Lug Access Cover 0°	12
FLANGE	N/A	Shear Lug Access Cover 45°	12
FLANGE	N/A	Shear Lug Access Cover 90°	13
FLANGE	N/A	Shear Lug Access Cover 135°	13
FLANGE	N/A	Shear Lug Access Cover 270°	12
FLANGE	N/A	Shear Lug Access Cover 315°	12
BONNET/PACKING	X-218	2-FCV-71-59/601	9
BONNET/PACKING	X-220	2-FCV-73-64/642	9
BONNET/PACKING	71-32	RCIC Vacuum Pump Discharge	64
BONNET/PACKING	73-24	HPCI Turbine Exhaust Drain	167
BONNET	73-23	HPCI Turbine Exhaust	16
FLANGE	64-19	Containment Ventilation	3

TABLE 1 (CONTINUED)

COMPONENTS REQUIRING EXTENSION

TYPE C TESTED COMPONENTS

COMPONENT	PENETRATION	DESCRIPTION	EXTENSION Days
2-3-558	X-9A	Reactor Feedwater A	14
2-3-554	X-9A	Reactor Feedwater A	14
2-FCV-73-45	X-9A	HPCI Injection	14
2-3-572	X-9B	Reactor Feedwater B	137
2-3-568	X-9B	Reactor Feedwater B	137
2-69-579	X-9B	RWCU Return	137
2-FCV-71-40	X-9B	RCIC Injection	137
2-85-576	X-9B	CRD Return	137
2-63-525	X-42	Standby Liquid Control	175
2-63-526	X-42	Standby Liquid Control	175
2-68-508	X-37C	RCP Seal Water	24
2-68-550	X-37C	RCP Seal Water	24
2-FCV-69-1	X-14	RWCU Suction	146
2-FCV-69-2	X-14	RWCU Suction	146
2-FCV-70-47	X-23	RBCCW Return	55
2-70-506	X-24	RBCCW Supply	177
2-FCV-71-2/3	X-10	RCIC Steam Supply	5
2-HCV 73-23/603	X-214	HPCI Turbine Exhaust	16
2-FCV-74-47	X-12	RHR Shutdown Cooling	91
2-FCV-74-48	X-12	RHR Shutdown Cooling	91
2-74-661/662	X-12	RHR Shutdown Cooling	91
2-FCV-77-2A	X-18	Drywell Floor Drain Sump	60
2-FCV-77-2B	X-18	Drywell Floor Drain Sump	60
2-FCV-77-15A	X-19	Drywell Equipment Drain Sump	60
2-FCV-77-15B	X-19	Drywell Equipment Drain Sump	60
2-HCV-71-32/592	X-221	RCIC Vacuum Pump Discharge	64
2-HCV-73-24/609	X-222	HPCI Turbine Exhaust Drain	167
2-FCV-71-18	X-227A	RCIC Pump Suction	6
2-FCV-74-53	X-13A	RHR Return	87
2-FCV-74-54	X-13A	RHR Return	87
2-FCV-74-57/58	X-211A	RHR Containment Spray	85
2-FCV-74-60	X-39B	RHR Containment Spray	88
2-FCV-74-61	X-39B	RHR Containment Spray	88
2-FCV-74-67	X-13B	RHR Return	89
2-FCV-74-68	X-13B	RHR Return	81
2-FCV-74-71/72	X-211B	RHR Containment Spray	75
2-FCV-74-74	X-39A	RHR Containment Spray	89
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