Tennessee Valley Authority, Post Office Box 2000, Decatur, Alabama 35609

TVA-BFN-TS-364
December 8, 1995

10 CFR 50.4
10 CFR 50.90

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

Gentlemen:

In the Matter of	)	Docket Nos. 50-259
Tennessee Valley Authority	)	50-260
		50-296

BROWNS FERRY NUCLEAR PLANT (BFN) - UNITS 1, 2, AND 3 - TECHNICAL SPECIFICATION (TS) 364 AND COST BENEFICIAL LICENSING ACTION (CBLA) 10 - IMPLEMENTATION OF 10 CFR 50, APPENDIX J, OPTION B, PERFORMANCE BASED TESTING

In accordance with the provisions of 10 CFR 50.4 and 50.90, TVA is submitting a request for an amendment (TS-364) to licenses DPR-33, DPR-52 and DPR-68 to change the TSs for Units 1, 2, and 3. The proposed change revises TS section 4.7.A to implement the recent rule change to 10 CFR Part 50, Appendix J. NRC revised 10 CFR Part 50, Appendix J to incorporate Option B for containment leak rate testing. Option B is a voluntary performance-base option that would reward licensees with good performance history.

Option B allows licensees to extend the integrated leak rate test (Type A test) frequency based on an acceptable past performance history. For Type B and Type C local leak rate tests, Option B allows licensees to extend the testing frequency based on the plant-specific experience history of each component and established controls to ensure continued performance during the extended testing interval.

TVA has determined that there are no significant hazards considerations associated with the proposed change and that the change is exempt from environmental review pursuant to the provisions of 10 CFR 51.22(c)(9). The BFN Plant Operations Review Committee and the BFN Nuclear Safety Review Board have reviewed this proposed change and determined that operation of BFN Units 1, 2, and 3 in accordance with the proposed change will not endanger the health and safety of the public. Additionally, in accordance with 10 CFR 50.91(b)(1), TVA is sending a copy of this letter and enclosures to the Alabama State Department of Public Health.

Enclosure 1 to this letter provides the description and evaluation of the proposed change. This includes TVA's determination that the proposed change does not involve a significant hazards consideration, and is exempt from environmental review. Enclosure 2 contains copies of the appropriate TS pages from Units 1, 2, and 3 marked-up to show the proposed change. Enclosure 3 forwards the revised TS pages for Units 1, 2, and 3 which incorporate the proposed change.

TVA has determined that this request represents a CBLA since the continued application of the current leak rate test program involves high cost and low safety benefit. Since the revised rule is performance based, it is difficult for TVA to quantitatively estimate the exact cost savings associated with this proposed change. However, the cost saving certainly will exceed the $100,000 threshold for CBLAs. Due to the significant cost savings associated with the potential reduction in Unit 2 Cycle 8 maintenance activities, TVA requests approval of the enclosed amendment in February 1996 in order to allow implementation for the Unit 2 Cycle 8 refueling outage, which is scheduled to begin in March 1996. Any significant changes to this need date will be communicated through the NRC Project Manager. TVA requests that the revised TS be made effective within 30 days of NRC approval.

If you have any questions about this change, please contact me at (205) 729-2636.

Sincerely,

Pedro Salas
Manager of Site Licensing

Enclosures
cc: see page 4

Subscribed and sworn to before me
on this 8th day of December 1995.

Barbara A. Blanton
Notary Public

My Commission Expires My Commission Expires 10/06/98

Enclosures
cc (Enclosures):

Mr. W. D. Arndt
General Electric Company
735 Broad Street
Suite 804, James Building
Chattanooga, Tennessee 37402

Mr. Johnny Black, Chairman
Limestone County Commission
310 West Washington Street
Athens, Alabama 35611

Mr. Mark S. Lesser, Branch Chief
U.S. Nuclear Regulatory Commission
Region II
101 Marietta Street, NW, Suite 2900
Atlanta, Georgia 30323

NRC Resident Inspector
Browns Ferry Nuclear Plant
Route 12, Box 637
Athens, Alabama 35611

Mr. Joseph F. Williams, Project Manager
U.S. Nuclear Regulatory Commission
One White Flint, North
11555 Rockville Pike
Rockville, Maryland 20852

Dr. Donald E. Williamson
State Health Officer
Alabama State Department of Public Health
434 Monroe Street
Montgomery, Alabama 36130-3017

Mr. R. P. Zimmerman
U.S. Nuclear Regulatory Commission
One White Flint, North
11555 Rockville Pike
Rockville, Maryland 20852

ENCLOSURE 1

TENNESSEE VALLEY AUTHORITY
BROWNS FERRY NUCLEAR PLANT (BFN)
UNITS 1, 2, AND 3

PROPOSED TECHNICAL SPECIFICATION (TS) CHANGE TS-364
DESCRIPTION AND EVALUATION OF THE PROPOSED CHANGE

I. DESCRIPTION OF THE PROPOSED CHANGE

TVA is revising Units 1, 2, and 3 TS Section 4.7.A to implement the revision to 10 CFR 50, Appendix J. The new rule (Option B) provides a voluntary performance[1] based testing option for containment leak rate testing. Option B containment leak rate testing requirements are based on system and component performance in lieu of compliance with the current prescriptive[2] requirements. The proposed TS change is as following:

- **General** - Makes the TS less prescriptive and more performance oriented. Endorse approved industry guidelines (i.e., Regulatory Guide 1.163, Performance-Based Containment Leakage-Test Program) on the conduct of containment tests (including test intervals).

- **Type A Test Interval** - Implements the industry guidance for extension of the Type A test interval from three tests in 10 years to one test in 10 years based on satisfactory performance of two previous tests. However, the visual examination of accessible interior and exterior surfaces of the containment system for structural problems must be conducted prior to initiating a Type A test and during two other refueling outages before the next Type A test if the interval for the Type A test has been extended to 10 years.

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[1] By performance-based, the NRC means establishing regulatory objectives without prescribing the methods or hardware necessary to accomplish the objective, and allowing licensees the flexibility to propose cost-effective methods for implementation.

[2] By prescriptive, NRC means regulations written with a high degree of specificity, leaving proportionately less flexibility and discretion to the licensee. By performance-based, NRC means regulations with goals and limits based upon the operating history of equipment, components, and organizations. Performance-based regulations allow proportionally more flexibility and discretion to licensees, especially those whose performance is superior.

- **Type B and C Test Interval** - For Type B and Type C local leak rate tests, Option B allows licensees to extend the testing frequency on a plant-specific basis based on experience history of each component and established controls to ensure continued performance during the extended testing interval. The Type B test frequency can be extended up to a maximum of once per 10 years. The Type C test frequency can be extended up to once per 60 months or three refueling cycles. However, the Type C testing of the main steam and feedwater isolation valves and the containment purge and vent valves test frequency can only be extended to once per 30 months.

The specific changes are describe below:

1. Units 1, 2, and 3 TS Section 4.7.A.2, TS page 3.7/4.7-3.

   The second paragraph currently reads:

   > "The containment leakage rates shall be demonstrated at the following test schedule and shall be determined in accordance with Appendix J to 10 CFR 50 as modified by approved exemptions."

   Proposed second paragraph for TS Section 4.7.A.2 reads:

   > "Perform leakage rate testing in accordance with the Primary Containment Leakage Rate Testing Program."

2. Units 1, 2, and 3 TS Section 4.7.A.2.a, TS page 3.7/4.7-3.

   Currently reads:

   > "Three type A tests (overall integrated containment leakage rate) shall be conducted at 40 ± 10 month intervals during shutdown at P_a, 49.6 psig, during each 10-year plant inservice inspection."

   The proposed TS deletes Section 4.7.A.2.a.

3. Units 1, 2, and 3 TS Section 4.7.A.2.b, TS page 3.7/4.7-4.

Currently reads:

> "If any periodic type A test fails to meet 0.75 L_a, the test schedule for subsequent type A tests shall be reviewed and approved by the Commission.
>
> If two consecutive type A tests fail to meet 0.75L_a, a type A test shall be performed at least every 18 months until two consecutive type A tests meet 0.75 L_a, at which time the above test schedule may be resumed."

The proposed TS deletes Section 4.7.A.2.b.

4. Units 1, 2, and 3 TS Section 4.7.A.2.c, TS page 3.7/4.7-4.

Currently reads:

> "1. Test duration shall be at least 8 hours.
>
> 2. A 4-hour stabilization period will be required and the containment atmosphere will be considered stabilized when the change in weighted average air temperature averaged over an hour does not deviate by more than 0.5°R/hour from the average rate of change of temperature measured from the previous 4 hours."

The proposed TS deletes Sections 4.7.A.2.c.1 and 4.7.A.2.c.2.

5. Units 1, 2, and 3 TS Section 4.7.A.2.d, TS page 3.7/4.7-5.

Currently reads:

> "1. At least 20 sets of data points at approximately equal time intervals and in no case at intervals greater than one hour shall be provided for proper statistical analysis.
>
> 2. The figure of merit for the instrumentation system shall never exceed 0.25 L_a."

The proposed TS deletes Sections 4.7.A.2.d.1 and 4.7.A.2.d.2.

6. Units 1, 2, and 3 TS Section 4.7.A.2.e, TS page 3.7/4.7-5.

Currently reads:

> "The test shall not be concluded with an increasing calculated leak rate."

The proposed TS deletes Section 4.7.A.2.e.

7. Units 1, 2, and 3 TS Section 4.7.A.2.f, TS page 3.7/4.7-5.

Currently reads:

> "The accuracy of each type A test shall be verified by a supplemental test which:
>
> 1. Confirms the accuracy of the test by verifying that the difference between the supplemental data and the type A test data is within 0.25 L_a.
>
> 2. Has duration sufficient to establish accurately the change in leakage rate between the type A test and the supplemental test.
>
> 3. Requires the quantity of gas injected into the containment or bled from the containment during the supplemental test to be equivalent to at least 25 percent of the total measured leakage at P_a (49.6 psig)."

The proposed TS deletes Sections 4.7.A.2.f.1, 4.7.A.2.f.2 and 4.7.A.2.f.3.

8. Units 1 and 3 TS Section 4.7.A.2.g, TS pages 3.7/4.7-6 and 3.7/4.7-7

Currently reads:

> "Local leak rate tests (LLRTs) shall be performed on the primary containment testable penetrations and isolation valves, which are not part of a water-sealed system, at not less than 49.6 psig (except for the main steam isolation valves, see 4.7.A.2.i) and not less than 54.6 psig for water-sealed valves each operating cycle. Bolted double-gasketed seals shall be tested whenever the seal is closed after being opened and at least once per operating cycle. Acceptable methods of testing are halide gas detection, soap bubbles, pressure decay, hydrostatically pressurized fluid flow or equivalent.

The personnel air lock shall be tested at 6-month intervals at an internal pressure of not less than 49.6 psig. In addition, if the personnel air lock is opened during periods when containment integrity is not required, a test at the end of such a period will be conducted at not less than 49.6 psig. If the personnel air lock is opened during a period when containment integrity is required, a test at ≥ 2.5 psig shall be conducted within 3 days after being opened. If the air lock is opened more frequently than once every 3 days, the air lock shall be tested at least once every 3 days during the period of frequent openings.

The total leakage from all penetrations and isolation valves shall not exceed 60 percent of L_a per 24 hours. Leakage from containment isolation valves that terminate below suppression pool water level may be excluded from the total leakage provided a sufficient fluid inventory is available to ensure the sealing function for at least 30 days at a pressure of 54.6 psig. Leakage from containment isolation valves that are in closed-loop, seismic class I lines that will be water sealed during a DBA will be measured but will be excluded when computing the total leakage."

Proposed TS Section 4.7.A.2.g reads:

"Perform required local leak rate tests, including the primary containment airlock leakage rate testing in accordance with the Primary Containment Leakage Rate Testing Program.

Note: An inoperable air lock does not invalidate the previous successful performance of the overall air lock leakage test.

The acceptance criteria for air lock testing are: (1) Overall air lock leakage rate is ≤ (0.05 L_a) when tested at ≥ Pa. (2) For door seal leakage, the overall air lock leakage rate is ≤ (0.02 L_a) when the air lock is pressurized to (≥ 2.5 psig for at least 15 minutes)."

9. Unit 2 TS Section 4.7.A.2.g, TS pages 3.7/4.7-6 and 3.7/4.7-7

Currently reads:

"Local leak rate tests (LLRTs) shall be performed on the primary containment testable penetrations and isolation valves, which are not part of a water-sealed system, at not less than 49.6 psig

(except for the main steam isolation valves, see 4.7.A.2.i) and not less than 54.6 psig for water-sealed valves each operating cycle. Bolted double-gasketed seals shall be tested whenever the seal is closed after being opened and at least once per operating cycle. Acceptable methods of testing are halide gas detection, soap bubbles, pressure decay, hydrostatically pressurized fluid flow or equivalent.

The personnel air lock shall be tested at 6-month intervals at an internal pressure of not less than 49.6 psig. In addition, if the personnel air lock is opened during periods when containment integrity is not required, a test at the end of such a period will be conducted at not less than 49.6 psig. If the personnel air lock is opened during a period when containment integrity is required, a test at ≥ 2.5 psig shall be conducted within 3 days after being opened. If the air lock is opened more frequently than once every 3 days, the air lock shall be tested at least once every 3 days during the period of frequent openings.

The total path leakage from all penetrations and isolation valves shall not exceed 60 percent of L_a per 24 hours. Leakage from containment isolation valves that terminate below suppression pool water level may be excluded from the total leakage provided a sufficient fluid inventory is available to ensure the sealing function for at least 30 days at a pressure of 54.6 psig. Leakage from containment isolation valves that are in closed-loop, seismic class I lines that will be water sealed during a DBA will be measured but will be excluded when computing the total leakage."

Proposed Unit 2 TS Section 4.7.A.2.g, TS pages 3.7/4.7-6 and 3.7/4.7-7 reads:

"Perform required local leak rate tests, including the primary containment airlock leakage rate testing in accordance with the Primary Containment Leakage Rate Testing Program.

Note: An inoperable air lock does not invalidate the previous successful performance of the overall air lock leakage test.

The acceptance criteria for air lock testing are: (1) Overall air lock leakage rate is ≤ (0.05 L_a) when tested at ≥ Pa. (2) For door seal leakage, the overall air lock leakage rate is ≤ (0.02 L_a) when the air lock is pressurized to (≥ 2.5 psig for at least 15 minutes)."

10. Units 1, 2 and 3 Bases 3.7.A & 4.7.A, (Units 1 and 2 page 3.7/4.7-25, Unit 3 Page 3.7/4.7-24) currently reads:

> "The surveillance testing for measuring leakage rates are consistent with the requirements of Appendix J of 10 CFR 50 (type A, B, and C tests)."

The proposed TS deletes this sentence.

11. Units 1, 2 and 3 (Unit 1 TS page 6.0-24, Units 2 and 3 TS page 6.0-23c). The proposed TS adds a new Section 6.8.4.3:

"Primary Containment Leakage Rate Testing Program

A program shall be established to implement the leakage rate testing of the containment as required by 10 CFR 50.54(o) and 10 CFR 50, Appendix J, Option B, as modified by approved exemptions. This program shall be in accordance with the guidelines contained in Regulatory Guide 1.163, "Performance-Based Containment Leak-Test program, dated September 1995".

The peak calculated containment internal pressure for the design basis loss of coolant accident, P_a, is 49.6 psig.

The maximum allowable primary containment leakage rate, L_a, at P_a, shall be 2% of primary containment air weight per day.

Leakage Rate acceptance criteria are:

a. Primary Containment leakage rate acceptance criterion is $\leq 1.0\ L_a$. During the first unit startup following testing in accordance with this program, the leakage rate acceptance criteria are $\leq 0.60\ L_a$ for the Type B and Type C tests and $\leq 0.75\ L_a$ for Type A tests;

b. Air lock testing acceptance criteria are:

   1) Overall air lock leakage rate is $\leq 0.05\ L_a$ when tested at $\geq P_a$,

   2) Air lock door seals leakage rate is $\leq 0.02\ L_a$ when the overall air lock is pressurized to $\geq$ 2.5 psig for at least 15 minutes."

II. REASON FOR THE PROPOSED CHANGE

TVA is revising TS Section 4.7.A to implement the recent revision to 10 CFR 50, Appendix J, Leakage Rate Testing of Containment of Light Water Cooled Nuclear Power Plants. Currently, containment leakage rate testing is performed in accordance with the prescriptive requirements of Option A to 10 CFR 50, Appendix J. Option A specifies containment leakage testing requirements, including the types of tests required. In addition, for each type of test, Appendix J discusses leakage acceptance criteria, test methodology, frequency of testing and reporting requirements. Accordingly, TVA implemented the Appendix J prescriptive requirements into the BFN TSs.

NRC amended the regulations to provide an Option B to the existing Appendix J. Option B is a performance based approach to Appendix J leakage testing requirements. This option allows licensees with good performance history to reduce the Type A testing frequency from three tests in 10 years to one test in 10 years. For Type B and Type C tests, Option B allows licensees to reduce testing frequency on a plant specific basis based on experience history of each component, and established controls to ensure continued performance during the extended testing interval. Additionally, Option B allows utilities to remove the prescriptive details from the TSs. Therefore, TVA is revising the BFN TSs to comply with the performance based approach provided in the revised 10 CFR 50, Appendix J.

III. SAFETY ANALYSIS

The function of the primary containment is to isolate and contain fission products released from the reactor primary system following a design basis accident and to confine the postulated release of radioactive material. The safety design basis for the primary containment is that it must withstand the pressures and temperatures of the limiting design basis accident without exceeding the design leakage rate. Periodic testing of the leak tightness of the primary containment as well as individual penetrations and valves is necessary to assure that the assumed release rate in the plants' safety analysis is conservative.

In general, TVA's proposed license amendment revises BFN TS Section 4.7.A to implement the recently promulgated 10 CFR 50, Appendix J, Option B. Prior to this rulemaking, NRC performed a review of current regulatory requirements in an effort to relax or eliminate those that are marginal to safety and yet impose significant regulatory burden on licensees. Reactor containment leak testing was identified as an area where the NRC determined that a change to the regulations was warranted.

As discussed in the final regulatory impact analysis for the revised rule, the primary consideration in implementing the performance based leakage rate testing requirements of Appendix J, Option B, is that changes will have at most only a marginal impact on safety. The results of the present analysis confirm the previous observations of insensitivity of population risks from severe reactor accidents to containment leakage rates. This analysis includes comparisons of the predicted reactor accident risks as a function of containment leakage rate with the NRC's Safety Goals. The calculated risks are well below the Safety Goals for all of the reactors considered even at assumed containment leakage rates 100-fold above current requirements.

The risk to both the general population and the most exposed members of the public were analyzed. Based on a detailed examination of the results of the Probabilistic Risk Assessments (PRAs) for the five plants evaluated in NUREG-1150 (NRC90), the Technical Support Document (TSD) found that leakage rates as high as 100 times those currently permitted by the licensees' technical specifications would not increase the containment contribution to risk from severe accidents more than approximately one percent. This increase is marginal to safety. In addition, a change in the allowable leakage rate is estimated to have a negligible impact on occupational radiation exposure.

For Type A tests, specific changes in test frequency are recommended based on risk considerations. For Type B and C tests, analyses indicate the viability of reducing the frequency of testing.

Type A Tests - Reducing the frequency of Type A tests (Integrated Leak Rate Tests - ILRTs) from the current three every ten years to one every 10 years was found to lead to an imperceptible increase in risk. The estimated increase in risk is very small because ILRTs identify only a few potential containment leakage paths that cannot be identified by Type B and C testing, and the leaks that have been found by Type A tests have been only marginally above 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 integrated leakage-rate tests is possible with minimal impact on public risk.

Type B Tests - Reducing the frequency of Type B testing of electrical penetrations should be possible with marginal impact on risk, based on findings that leakages through these penetrations are both infrequent and small (on the order of one percent of the total allowable leakage rate). As the performance history of Type B electrical penetrations shows no instances where leakage was more than a small fraction of the current allowable leakage rate, changing the frequency of testing to coincide with the

schedule for ILRTs is not estimated to result in any change in public radiation exposure.

Type C Tests - The majority of leakage paths are identified by Local Leak Rate Tests (LLRTs) of containment isolation valves (Type C tests). Based on the model of component failure with time, it has been found that performance-based alternatives to current local leak-testing requirements are feasible without significant risk impacts. For Type C tests, the population risk for a performance-based testing schedule would increase overall accident risk by about 2.2 percent per year. This increase is marginal to safety.

In addition, BFN Technical Specification Limiting Condition for Operation 3.7.A.2.c specifies the requirements for the on-line monitoring of primary containment leakage. It states:

> "In N_2 makeup to the primary containment averaged over 24 hours (corrected for pressure, temperature, and venting operations) exceeds 542 SCFH, it must be reduced to < 542 SCFH within 8 hours or the reactor shall be placed in Hot Shutdown within the next 16 hours."

This on-line monitoring system provides greater assurance of achieving containment integrity and early detection of degradations in the boundary.

The incorporation of a note that states an inoperable air lock does not invalidate the previous successful performance of the overall air lock leakage test is consistent with Surveillance Requirement 3.6.1.2.1 of Revision 1 to the BWR/4 Improved Standard Technical Specifications. This note is considered reasonable since either air lock door is capable of providing a fission product barrier in the event of a design basis accident and failure of the air lock interlock mechanism would not affect the leak tight integrity of the doors. The proposed acceptance criteria for air lock testing are considered reasonable, are compatible with the overall contribution to primary containment integrity provided by the air locks, and are consistent with the historical performance of the air locks.

The change in the surveillance frequency for the personnel air lock is consistent with Section 10.2.2.1, Containment Airlocks - Test interval, of the Nuclear Energy Institute Industry Guideline For Implementing Performance-Based Option B of 10 CFR Part 50, Appendix J.

IV. NO SIGNIFICANT HAZARDS CONSIDERATION DETERMINATION

TVA has concluded that operation of Browns Ferry Nuclear Plant (BFN) Units 1, 2, and 3 in accordance with the proposed change to the technical specifications does not involve a significant hazards consideration. TVA's conclusion is based on its evaluation, in accordance with 10 CFR 50.91(a)(1), of the three standards set forth in 10 CFR 50.92(c).

A. The proposed amendment does not involve a significant increase in the probability or consequences of an accident previously evaluated.

The proposed amendment to TS Section 4.7.A is in accordance with Option B to 10 CFR 50, Appendix J. The proposed amendment adds a voluntary performance based option for containment leak rate testing. The changes being proposed do not affect the precursor for any accident or transient analyzed in Chapter 14 of the BFN Updated Final Safety Analysis Report (UFSAR). The proposed change does not increase the total allowable primary containment leakage rate. The proposed change does not reflect a revision to the physical design and/or operation of the plant. Therefore, operation of the facility in accordance with the proposed change does not affect the probability or consequences of an accident previously evaluated.

B. The proposed amendment does not create the possibility of a new or different kind of accident from any accident previously evaluated.

The proposed amendment to TS Section 4.7.A is in accordance with the new performance-based option (Option B) to 10 CFR 50, Appendix J. The changes being proposed will not change the physical plant or the modes of operation defined in the facility license. The proposed changes do not increase the total allowable primary containment leakage rate. The changes do not involve the addition or modification of equipment, nor do they alter the design or operation of plant systems. Therefore, operation of the facility in accordance with the proposed change does not create the possibility of a new or different kind of accident from any previously evaluated.

C. The proposed amendment does not involve a significant reduction in a margin of safety.

The proposed change to TS Section 4.7.A is in accordance with the new option to 10 CFR 50, Appendix J. The proposed option is formulated to adopt performance-based approaches. This option removes the current prescriptive details from the TS.

The proposed changes do not affect plant safety analyses or change the physical design or operation of the plant. The proposed change does not increase the total allowable primary containment leakage rate. Therefore, operation of the facility in accordance with the proposed change does not involve a significant reduction in the margin of safety.

V. ENVIRONMENTAL IMPACT CONSIDERATION

The proposed change does not involve a significant hazards consideration, a significant change in the types of or significant increase in the amounts of any effluents that may be released offsite, or a significant increase in individual or cumulative occupational radiation exposure. Therefore, the proposed change meets the eligibility criteria for categorical exclusion set forth in 10 CFR 51.22(c)(9). Therefore, pursuant to 10 CFR 51.22(b), an environmental assessment of the proposed change is not required.