

ENCLOSURE 2

TENNESSEE VALLEY AUTHORITY
BROWNS FERRY NUCLEAR PLANT (BFN)
UNITS 2 and 3

PROPOSED TECHNICAL SPECIFICATIONS (TS) CHANGE TS-399
INCREASED MAIN STEAM ISOLATION VALVE (MSIV) LEAKAGE
MARKED-UP TS PAGES

I. AFFECTED PAGE LIST

Unit 2	Unit 3
3.6-16	3.6-16
B 3.6-35	B 3.6-35

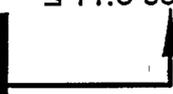
II. MARKED-UP PAGES

Attached

9910120250 990928
PDR ADOCK 05000260
P PDR



SURVEILLANCE REQUIREMENTS (continued)

SURVEILLANCE		FREQUENCY
SR 3.6.1.3.5	Verify the isolation time of each power operated, automatic PCIV, except for MSIVs, is within limits.	In accordance with the Inservice Testing Program
SR 3.6.1.3.6	Verify the isolation time of each MSIV is ≥ 3 seconds and ≤ 5 seconds.	In accordance with the Inservice Testing Program
SR 3.6.1.3.7	Verify each automatic PCIV actuates to the isolation position on an actual or simulated isolation signal.	24 months
SR 3.6.1.3.8	Verify each reactor instrumentation line EFCV actuates to the isolation position on a simulated instrument line break signal.	24 months
SR 3.6.1.3.9	Remove and test the explosive squib from each shear isolation valve of the TIP System.	24 months on a STAGGERED TEST BASIS
SR 3.6.1.3.10	Verify leakage rate through each MSIV is ≤ 11.5 scfh when tested at ≥ 25 psig.	In accordance with the Primary Containment Leakage Rate Testing Program
	<div data-bbox="99 1344 512 1501" style="border: 1px solid black; padding: 5px;"> 200 scfh and that the combined maximum pathway leakage rate for all four main steam lines is ≤ 400 scfh </div> 	
SR 3.6.1.3.11	Verify combined leakage through water tested lines that penetrate primary containment are within the limits specified in the Primary Containment Leakage Rate Testing Program.	In accordance with the Primary Containment Leakage Rate Testing Program

**SURVEILLANCE
REQUIREMENTS**
(continued)

SR 3.6.1.3.9

The TIP shear isolation valves are actuated by explosive charges. An in place functional test is not possible with this design. The explosive squib is removed and tested to provide assurance that the valves will actuate when required. The replacement charge for the explosive squib shall be from the same manufactured batch as the one fired or from another batch that has been certified by having one of the batch successfully fired. The Frequency of 24 months on a STAGGERED TEST BASIS is considered adequate given the administrative controls on replacement charges and the frequent checks of circuit continuity (SR 3.6.1.3.4).

SR 3.6.1.3.10

200

The analyses in References 1 and 5 are based on leakage that is less than the specified leakage rate. Leakage through each MSIV must be ≤ 41.5 scfh when tested at $\geq P_1$ (25 psig). This ensures that MSIV leakage is properly accounted for in determining the overall primary containment leakage rate. The Frequency is specified in the Primary Containment Leakage Rate Testing Program.

The combined maximum pathway leakage rate for all four main steam lines must be ≤ 400 scfh when tested at ≥ 25 psig. If the leakage rate through an individual MSIV exceeds 200 scfh, the leakage rate shall be restored below the alarm limit value as specified in the Containment Leakage Rate Testing Program referenced in TS 5.5.12.

SR 3.6.1.3.11

Surveillance of water tested lines ensures that sufficient inventory will be available to provide a sealing function for at least 30 days at a pressure of 1.1 Pa. Sufficient inventory ensures there is no path for leakage of primary containment atmosphere to the environment following a DBA. Leakage from containment isolation valves that terminate below the suppression pool water level may be excluded from the total leakage provided a sufficient fluid inventory is available as described in 10 CFR 50, Appendix J, Option B.

SURVEILLANCE REQUIREMENTS (continued)

SURVEILLANCE		FREQUENCY
SR 3.6.1.3.5	Verify the isolation time of each power operated, automatic PCIV, except for MSIVs, is within limits.	In accordance with the Inservice Testing Program
SR 3.6.1.3.6	Verify the isolation time of each MSIV is ≥ 3 seconds and ≤ 5 seconds.	In accordance with the Inservice Testing Program
SR 3.6.1.3.7	Verify each automatic PCIV actuates to the isolation position on an actual or simulated isolation signal.	24 months
SR 3.6.1.3.8	Verify each reactor instrumentation line EFCV actuates to the isolation position on a simulated instrument line break signal.	24 months
SR 3.6.1.3.9	Remove and test the explosive squib from each shear isolation valve of the TIP System.	24 months on a STAGGERED TEST BASIS
SR 3.6.1.3.10	Verify leakage rate through each MSIV is ≤ 41.5 scfh when tested at ≥ 25 psig.	In accordance with the Primary Containment Leakage Rate Testing Program
	<div data-bbox="99 1344 512 1501" style="border: 1px solid black; padding: 5px; display: inline-block;"> 200 scfh and that the combined maximum pathway leakage rate for all four main steam lines is ≤ 400 scfh </div> 	
SR 3.6.1.3.11	Verify combined leakage through water tested lines that penetrate primary containment are within the limits specified in the Primary Containment Leakage Rate Testing Program.	In accordance with the Primary Containment Leakage Rate Testing Program

**SURVEILLANCE
REQUIREMENTS**
(continued)

SR 3.6.1.3.9

The TIP shear isolation valves are actuated by explosive charges. An in place functional test is not possible with this design. The explosive squib is removed and tested to provide assurance that the valves will actuate when required. The replacement charge for the explosive squib shall be from the same manufactured batch as the one fired or from another batch that has been certified by having one of the batch successfully fired. The Frequency of 24 months on a STAGGERED TEST BASIS is considered adequate given the administrative controls on replacement charges and the frequent checks of circuit continuity (SR 3.6.1.3.4).

SR 3.6.1.3.10

200

The analyses in References 1 and 5 are based on leakage that is less than the specified leakage rate. Leakage through each MSIV must be ≤ 44.5 scfh when tested at $\geq P_1$ (25 psig). This ensures that MSIV leakage is properly accounted for in determining the overall primary containment leakage rate. The Frequency is specified in the Primary Containment Leakage Rate Testing Program.

The combined maximum pathway leakage rate for all four main steam lines must be ≤ 400 scfh when tested at ≥ 25 psig. If the leakage rate through an individual MSIV exceeds 200 scfh, the leakage rate shall be restored below the alarm limit value as specified in the Containment Leakage Rate Testing Program referenced in TS 5.5.12.

SR 3.6.1.3.11

Surveillance of water tested lines ensures that sufficient inventory will be available to provide a sealing function for at least 30 days at a pressure of 1.1 Pa. Sufficient inventory ensures there is no path for leakage of primary containment atmosphere to the environment following a DBA. Leakage from containment isolation valves that terminate below the suppression pool water level may be excluded from the total leakage provided a sufficient fluid inventory is available as described in 10 CFR 50, Appendix J, Option B.

ENCLOSURE 3

TENNESSEE VALLEY AUTHORITY
BROWNS FERRY NUCLEAR PLANT (BFN)
UNITS 2 and 3

INCREASED MAIN STEAM ISOLATION VALVE (MSIV) LEAKAGE
10 CFR 50 APPENDIX J EXEMPTION

Pursuant to 10 CFR 50.12, an exemption is being requested which would allow exclusion of the MSIVs from the overall integrated leakage rate test acceptance criteria of Paragraph III.A of Appendix J, Option B as measured during the performance of the Type A test and for the combined local leak rate test (Type B and C) as defined in 10 CFR 50, Appendix J, Option B, Paragraph III.B.

I. APPLICABLE RULE

The pertinent applicable rule is 10 CFR 50, Appendix J, Option B, Paragraphs III.A and III.B.

II. REQUESTED EXEMPTION

TVA requests an exemption from the requirements of 10 CFR 50, Appendix J, Option B, Section III.A. This exemption would allow exclusion of the MSIV leakage from the overall integrated leakage rate measured when performing a Type A test.

TVA also requests an exemption from the requirements of 10 CFR 50, Appendix J, Option B, Section III.B. This exemption would allow exclusion of the MSIV leakage from the combined containment local leak rate test (Type B and C).

III. JUSTIFICATION AND ASSESSMENT OF SAFETY IMPACT

The current Technical Specifications (TS) allowable MSIV leakage rate (11.5 Standard Cubic Feet Hour (scfh)) is extremely small considering the valve's physical size and operating characteristics (large size and fast acting). TVA has proposed a TS change to increase the allowable leakage rate using the methodology described in Boiling Water Reactor Owners' Group (BWROG) report NEDC-31858P,



Revision 2, BWROG Report for Increasing MSIV Leakage Rate Limits and Elimination of Leakage Control Systems.

Specifically, TVA proposes to utilize the main steam drain lines to direct MSIV leakage to the main condenser. This drain path takes advantage of the large volume of the steam lines and condenser to provide holdup and plate-out of fission products that may leak through the closed MSIVs. In this approach, the main steam lines, steam drain piping, and the main condenser are used to mitigate the consequences of an accident to limit potential off-site exposures below those specified in 10 CFR 100 and control room doses below those specified in 10 CFR 50 Appendix A, General Design Criteria (GDC) 19.

Paragraph III.A of Appendix J, Option B requires that the overall integrated leakage rate, as measured during the performance of the Type A test, be less than the performance criteria (L_a) with margin as specified in the TS. Appendix J, Option B defines the overall integrated leakage rate as the total leakage rate through all tested leakage paths, including containment welds, valves, fittings, and components that penetrate the containment system. For BFN, TS 5.5.12 defines the leakage rate acceptance criteria as follows: Type A leakage shall be less than or equal to L_a . During the first unit startup following testing in accordance with this program, acceptance criteria is $0.75L_a$ for the type A test.

Paragraph III.B of Appendix J, Option B requires that the combined leakage rate for all penetrations and isolation valves, as measured during local leak rate tests (Type B and C) be less than the performance criteria (L_a) with margin as specified in the TS. For BFN, TS 5.5.12 defines the leakage rate acceptance criteria as less than or equal to $0.60 L_a$ for the Type B and Type C tests.

Limitations on primary containment leakage rates ensure that the total containment leakage volume will not exceed the value assumed in the postulated design basis Loss-of-Coolant Accident Analysis (LOCA) as evaluated in Chapter 14.6 of the Final safety Analysis Report (FSAR). The radiological impact considers both the effect of containment leakage in terms of off-site doses (10 CFR 100) and control room doses (10 CFR 50, Appendix A, GDC 19). Leakages from the containment volume are contained

in the reactor building (secondary containment), filtered through the Standby Gas Treatment System (SBGT), and released at an elevated point through the plant stack.

In support of the TS change, a separate dose calculation was performed which accounts for the radiological effects from the MSIV leakage and from other primary containment leakages following the worst case LOCA. The MSIV leakage was evaluated using the main steam line drain path as recommended in NEDC-31858P, Revision 2 which considers fission product removal by holdup and plate-out in the leak path and main condenser. Additionally, the treatment path was evaluated and determined to be seismically rugged, even though the probability of a LOCA and concurrent seismic event are extremely low.

To further justify the capability of the main steam drain piping and condenser as an alternate pathway, BWR design was compared with earthquake experience data on the performance of non-seismically designed piping and condensers during past earthquakes. It was concluded that the possibility of a failure which would cause a loss of main steam piping or condenser integrity in BWRs main steam systems was highly unlikely, and such a failure would be contrary to historical experience for earthquakes.

Leakage from the MSIVs should not be included in the Type A, or the B and C testing acceptance criteria because the treatment path for MSIV leakage is different than that from containment leakages. Containment leakage is contained in the secondary containment, treated by the SBGT, and released at an elevated point through the plant stack. MSIV leakage is treated by delay and plate-out in the main steam drain piping and condenser. Releases from the condenser are evaluated as direct releases to atmosphere.

Leakage from the MSIVs should not be included in the combined local leak rate test (Type B and C) acceptance criteria because a specific allowable leak rate has been allotted for the MSIVs in Surveillance Requirement (SR) 3.6.1.3.10 and since the MSIV leakage is analyzed as a separate source term as discussed in the previous paragraph.

As noted previously, the basis for the leak rate test acceptance criteria is to establish the maximum leak rate assumed in the FSAR LOCA analysis. The pertinent LOCA analysis has been revised to incorporate the increased MSIV leak rate criteria as a separate source term release pathway. The MSIVs will continue to be tested in accordance with the Primary Containment Leak Rate Testing Program to ensure leakages remain within the revised LOCA analysis assumptions.

There is sufficient remaining dose margin based on the revised analysis to allow for possible degradation of the MSIV leakage barrier between leakage tests. The TS Bases will also be revised to require that any MSIV exceeding 200 scfh leak rate will be refurbished to a value prescribed in the Primary Containment Leakage Rate Testing Program.

Therefore, the proposed exemptions to the requirements of 10 CFR 50, Appendix J are acceptable and do not compromise the safety design basis of the primary containment or the overall purpose of performing leak rate testing.

10 CFR 50 authorizes the Commission to grant exemptions from the requirements of regulations provided that:

- The exemption is authorized by law;
- The exemption does not present an undue risk to the public health and safety;
- The requested exemption will not endanger the common defense and security; and
- Special circumstances are present as defined in 10 CFR 50.12(a)(2)

IV. AUTHORIZED BY LAW

TVA was issued its Operating License for BFN under the provisions of Section 104.b of the Atomic Energy Act. Operating Licenses issued by the Commission pursuant to Section 104.b are not limited, by statute, to specific methods of testing primary containment integrity. Thus, the Commission is authorized by law to exempt TVA from the requirements of 10 CFR 50 Appendix J.



V. NO UNDUE RISK TO THE PUBLIC HEALTH AND SAFETY

The revised MSIV leakage rate has been incorporated into the radiological analysis for a postulated LOCA as an addition to the designed containment leak rate. The analysis demonstrates an acceptable increase in the dose exposures previously calculated for the control room and off-site. The revised calculations remain well within the guidelines of 10 CFR 100 for off-site doses and 10 CFR 50 Appendix A, GDC 19 for control room dose.

In addition, TS SR 3.6.1.3.10 provides for allowable MSIV leak rates, which assure that the MSIV function is not compromised. Finally, potential MSIV leakage is subject to holdup and plate-out in the main steam piping and condenser, thus minimizing its affect on the total dose released.

The implementation of the proposed MSIV treatment method will provide BFN with a reliable capability to process MSIV leakage. Therefore, the proposed exemption presents no undue risk to public health and safety.

VI. BE CONSISTENT WITH THE COMMON DEFENSE AND SECURITY

The Commission's Statement of Considerations in support of the exemption rule note with approval the explanation of this standard as set forth in Long Island Lighting Company (Shoreham Nuclear Power Station, Unit 1) LBP-84-45, 20 NRC 1343, 1400 (October 29, 1984). There, the term "common defense and security" refers principally to the safeguarding of special nuclear material, the absence of foreign control over the applicant, the protection of Restricted Data, and the availability of special nuclear material for defense needs. The granting of the requested exemption will not affect any of these matters and, thus, the requested exemption is consistent with the common defense and security.

VII. MUST ENTAIL SPECIAL CIRCUMSTANCES

According to NRC regulations, special circumstances are present if any one of six different cases cited in 10CFR50.12(a)(2) are present. TVA submits that the existence of special circumstances (ii), (iii) and (iv) are applicable for this exemption.



- (ii) Application of the regulation in the particular circumstances would not serve the underlying purpose of the rule or is not needed to satisfy the underlying purpose of the rule.

The underlying purpose of the rule is to limit radiological releases to within the off-site and control room dose limits prescribed in 10 CFR 100 and 10 CFR 50, Appendix A, GDC 19. Paragraph III.A of Appendix J, Option B requires that the overall integrated leakage rate, as measured during the performance of the Type A test, be less than the performance criteria (L_a) with margin as specified in the TS. Appendix J, Option B defines the overall integrated leakage rate as the total leakage rate through all tested leakage paths, including containment welds, valves, fittings, and components that penetrate the containment system. For BFN, TS 5.5.12 defines the leakage rate acceptance criteria as follows: Type A leakage shall be less than or equal to L_a . During the first unit startup following testing in accordance with this program, acceptance criteria is 0.75 for the type A test. Paragraph III.B of Appendix J, Option B requires that the combined leakage rate for all penetrations and isolation valves, as measured during local leak rate tests (Type B and C) to meet the acceptance criterion as specified in the TS ($0.60 L_a$). Currently, MSIV leakage is included in the test results for these criteria.

Including this leakage in the test acceptance criteria is not necessary to achieve the underlying purpose of the rule because MSIV leakage is not directed into the secondary containment. Instead, the MSIVs leakage is directed through the main steam drain piping into the condenser. Compliance with 10 CFR 50 Appendix J Type C acceptance criteria is not necessary because a specific leak rate is already in TS SR 3.6.1.3.10. The radiological safety analysis has been revised to assess the specific consequences of MSIV leakage following a design basis LOCA. The analysis has demonstrated that the revised LOCA doses are well within the off-site and control room dose guidelines of 10 CFR 100 and GDC 19 respectively.



- (iii) Compliance would result in undue hardship or other costs that are significantly in excess of those contemplated when the regulation was adopted, or that are significantly in excess of those incurred by others by others similarly situated.

Strict compliance with Paragraphs III.A and III.B of Appendix J, Option B requires that the combined leakage rate for Type A tests and leakage for all penetrations and isolation valves, as measured during local leak rate tests (Type B and C) meet the acceptance criterion specified in the TS. This results in undue hardship and other costs that are significantly in excess of those contemplated when the regulation was adopted. The proposed increase in the MSIV allowable leak rate will not be practical if the MSIV leak rate results are included in the overall test acceptance criteria. Compliance requires unnecessary repair and retesting of the MSIVs. This significantly impacts the maintenance work load during plant outages and can result in extending outages.

Examples of these maintenance induced defects include machine-induced seat cracking, machining of guide ribs, excessive pilot valve seat leakage, and mechanical defects induced by assembly and disassembly. By not having to disassemble the valves and refurbish them for minor leakage, BFN avoids introducing one of the root causes of recurring leakage. Industrial experience suggests that, by attempting to correct non-existing or minimal defects in the valves, it is likely that some actual defects may be introduced that lead to later leak test failures.

In addition, the frequent maintenance work results in needless dose exposures to maintenance personnel which are inconsistent with As Low As Reasonably Achievable principles and also leads to additional economic burdens.



- (iv) The exemption would result in benefit to the public health and safety that compensates for any decrease in safety that may result from the grant of the exemption.

Enclosure 1 contains an application for a license amendment to change TS to increase the allowable MSIV leak rate. This application is partially based on the fact that the current limit is too restrictive, and results in excessive MSIV maintenance and repair, which may result in additional MSIV failures. The proposed change will benefit the public health and safety by reducing the potential for MSIV failures, and thus keeping the MSIVs within the radiological analysis values.

TVA proposes to implement an alternate reliable and effective treatment path (the main steam lines and condenser) for MSIV leakage treatment. This treatment method is effective to treat MSIV leakage over an expanded operating range without exceeding the off-site and control room dose limits. Except for the requirement to establish a proper flow path from the MSIVs to the condenser, the proposed method is passive and does not require any logic control or interlocks.

The method is consistent with the philosophy of protection by multiple leak tight barriers used in containment design for limiting fission product release to the environment. Therefore, the proposed method is highly reliable for MSIV treatment. The implementation will provide BFN with a capability to process MSIV leakage, and will also provide a uniform basis for establishing a plant-specific MSIV leakage limit.

The exemption from Appendix J requirements for MSIV leakage rates is required so that BFN can operate with the proposed TS increased allowable MSIV leakage rates. This results in reduced radiological exposure to plant personnel, greater overall MSIV reliability, and significant economic benefit to TVA and its customers as a result of



reduced plant outage durations. These benefits will compensate for any decrease in safety that may result from the granting of the exemption.

Thus, as discussed above, special circumstances exist warranting the grant of the exemption.

VIII. ENVIROMENTAL IMPACT

The proposed exemption has been analyzed and determined not to cause additional construction or operational activities which may significantly affect the environment. It does not result in a significant increase in any adverse environmental impact previously evaluated, result in a significant change in effluents or power levels, or affect any matter not previously reviewed by the NRC that may have a significant environmental impact.

The proposed exemption does not alter the land use for the plant, any water uses or impacts on water quality, air or ambient air quality. The proposed action does not affect the ecology of the site and does not affect the noise emitted by the site. Therefore, the proposed exemption the does not affect the previous analysis of environmental impacts.



ENCLOSURE 4

TENNESSEE VALLEY AUTHORITY
BROWNS FERRY NUCLEAR PLANT (BFN)
UNITS 2 and 3

PROPOSED TECHNICAL SPECIFICATIONS (TS) CHANGE TS-399
INCREASED MAIN STEAM ISOLATION VALVE (MSIV) LEAKAGE
EQE SEISMIC EVALUATION REPORT