



UNITED STATES  
NUCLEAR REGULATORY COMMISSION

WASHINGTON, D.C. 20555-0001

January 24, 2001

Mr. J. A. Scalice  
Chief Nuclear Officer and  
Executive Vice President  
Tennessee Valley Authority  
6A Lookout Place  
1101 Market Street  
Chattanooga, TN 37402-2801


**SUBJECT: BROWN FERRY NUCLEAR PLANT, UNITS 2 AND 3 - ISSUANCE OF  
AMENDMENTS REGARDING MAIN STEAM ISOLATION VALVE LEAKAGE  
LIMITS (TAC NOS. MB0317 AND MB0318)**

Dear Mr. Scalice:

The Commission has issued the enclosed Amendment Nos. 267 and 227 to Facility Operating Licenses Nos. DPR-52 and DPR-68 for the Browns Ferry Nuclear Plant, Units 2 and 3, respectively. These amendments are in response to your application dated October 30, 2000. These amendments revise the leakage limits for main steam isolation valves.

A copy of the Safety Evaluation is also enclosed. Notice of Issuance will be included in the Commission's biweekly *Federal Register* notice.

Sincerely,

  
William O. Long, Senior Project Manager, Section 2  
Project Directorate II  
Division of Licensing Project Management

Docket Nos. 50-260 and 50-296

Enclosures: 1. Amendment No. 267 to  
License No. DPR-52  
2. Amendment No. 227 to  
License No. DPR-68  
3. Safety Evaluation

cc w/enclosures: See next page

NRR-058

January 24, 2001

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/RA/

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- 2. Amendment No. 227 to License No. DPR-68
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UNITED STATES  
NUCLEAR REGULATORY COMMISSION  
WASHINGTON, D.C. 20555-0001

TENNESSEE VALLEY AUTHORITY

DOCKET NO. 50-260

BROWNS FERRY NUCLEAR PLANT, UNIT 2

AMENDMENT TO FACILITY OPERATING LICENSE

Amendment No. 267  
License No. DPR-52

1. The Nuclear Regulatory Commission (the Commission) has found that:
  - A. The application for amendment by Tennessee Valley Authority (the licensee) dated October 30, 2000 complies with the standards and requirements of the Atomic Energy Act of 1954, as amended (the Act), and the Commission's rules and regulations set forth in 10 CFR Chapter I;
  - B. The facility will operate in conformity with the application, the provisions of the Act, and the rules and regulations of the Commission;
  - C. There is reasonable assurance (i) that the activities authorized by this amendment can be conducted without endangering the health and safety of the public, and (ii) that such activities will be conducted in compliance with the Commission's regulations;
  - D. The issuance of this amendment will not be inimical to the common defense and security or to the health and safety of the public; and
  - E. The issuance of this amendment is in accordance with 10 CFR Part 51 of the Commission's regulations and all applicable requirements have been satisfied.

2. Accordingly, the license is amended by changes to the Technical Specifications as indicated in the attachment to this license amendment and paragraph 2.C.(2) of Facility Operating License No. DPR-52 is hereby amended to read as follows:

(2) Technical Specifications

The Technical Specifications contained in Appendices A and B, as revised through Amendment No. 267 , are hereby incorporated in the license. The licensee shall operate the facility in accordance with the Technical Specifications.

3. This license amendment is effective as of its date of issuance and shall be implemented within 60 days from the date of issuance.

FOR THE NUCLEAR REGULATORY COMMISSION



Richard P. Correia, Chief, Section 2  
Project Directorate II  
Division of Licensing Project Management  
Office of Nuclear Reactor Regulation

Attachment: Changes to the Technical  
Specifications

Date of Issuance: January 24, 2001

ATTACHMENT TO LICENSE AMENDMENT NO. 267

FACILITY OPERATING LICENSE NO. DPR-52

DOCKET NO. 50-260

Replace the following pages of the Appendix A Technical Specifications with the attached revised pages. The revised pages are identified by amendment number and contain marginal lines indicating the areas of change.

REMOVE

3.6-16  
B 3.6-35

INSERT

3.6-16  
B 3.6-35

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 $\geq 3$ seconds and $\leq 5$ 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 $\leq 100$ scfh and that the combined leakage rate for all four main steam lines is $\leq 150$ scfh when tested at $\geq 25$ psig.	In accordance with the Primary Containment Leakage Rate Testing Program
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

BASES

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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

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  $\leq 100$  scfh when tested at  $\geq P_t$  (25 psig). The combined leakage rate for all four main steam lines must be  $\leq 150$  scfh when tested at  $\geq 25$  psig in accordance with the Primary Containment Leakage Rate Testing Program. If the leakage rate through an individual MSIV exceeds 100 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. 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.

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

(continued)

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UNITED STATES  
NUCLEAR REGULATORY COMMISSION  
WASHINGTON, D.C. 20555-0001

TENNESSEE VALLEY AUTHORITY

DOCKET NO. 50-296

BROWNS FERRY NUCLEAR PLANT, UNIT 3

AMENDMENT TO FACILITY OPERATING LICENSE

Amendment No. 227  
License No. DPR-68

1. The Nuclear Regulatory Commission (the Commission) has found that:
  - A. The application for amendment by Tennessee Valley Authority (the licensee) dated October 30, 2000 complies with the standards and requirements of the Atomic Energy Act of 1954, as amended (the Act), and the Commission's rules and regulations set forth in 10 CFR Chapter I;
  - B. The facility will operate in conformity with the application, the provisions of the Act, and the rules and regulations of the Commission;
  - C. There is reasonable assurance (i) that the activities authorized by this amendment can be conducted without endangering the health and safety of the public, and (ii) that such activities will be conducted in compliance with the Commission's regulations;
  - D. The issuance of this amendment will not be inimical to the common defense and security or to the health and safety of the public; and
  - E. The issuance of this amendment is in accordance with 10 CFR Part 51 of the Commission's regulations and all applicable requirements have been satisfied.



2. Accordingly, the license is amended by changes to the Technical Specifications as indicated in the attachment to this license amendment and paragraph 2.C.(2) of Facility Operating License No. DPR-68 is hereby amended to read as follows:

(2) Technical Specifications

The Technical Specifications contained in Appendices A and B, as revised through Amendment No.227, are hereby incorporated in the license. The licensee shall operate the facility in accordance with the Technical Specifications.

3. This license amendment is effective as of its date of issuance and shall be implemented within 60 days from the date of issuance.

FOR THE NUCLEAR REGULATORY COMMISSION



Richard P. Correia, Chief, Section 2  
Project Directorate II  
Division of Licensing Project Management  
Office of Nuclear Reactor Regulation

Attachment: Changes to the Technical  
Specifications

Date of Issuance: January 24, 2001

ATTACHMENT TO LICENSE AMENDMENT NO.227

FACILITY OPERATING LICENSE NO. DPR-68

DOCKET NO. 50-296

Replace the following pages of the Appendix A Technical Specifications with the attached revised pages. The revised pages are identified by amendment number and contain marginal lines indicating the areas of change.

REMOVE

3.6-16  
B 3.6-35

INSERT

3.6-16  
B 3.6-35

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 $\geq 3$ seconds and $\leq 5$ 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 $\leq 100$ scfh and that the combined leakage rate for all four main steam lines is $\leq 150$ scfh when tested at $\geq 25$ psig.	In accordance with the Primary Containment Leakage Rate Testing Program
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

BASES

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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

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  $\leq 100$  scfh when tested at  $\geq P_1$  (25 psig). The combined leakage rate for all four main steam lines must be  $\leq 150$  scfh when tested at  $\geq 25$  psig in accordance with the Primary Containment Leakage Rate Testing Program. If the leakage rate through an individual MSIV exceeds 100 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. 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.

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

(continued)



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WASHINGTON, D.C. 20555-0001

SAFETY EVALUATION BY THE OFFICE OF NUCLEAR REACTOR REGULATION  
RELATED TO AMENDMENT NO. 267 TO FACILITY OPERATING LICENSE NO. DPR-52  
AND AMENDMENT NO. 227 TO FACILITY OPERATING LICENSE NO. DPR-68

TENNESSEE VALLEY AUTHORITY

BROWNS FERRY NUCLEAR PLANT, UNITS 2, AND 3

DOCKET NOS. 50-260, AND 50-296

1.0 INTRODUCTION

By application dated October 30, 2000, Tennessee Valley Authority (the licensee) submitted a request for a change to the technical specifications (TSs) of Browns Ferry Nuclear Plant (BFNP), Units 2 and 3. The proposed TS change would revise the acceptance criteria of the leak rate surveillance tests for the units' main steam isolation valves (MSIVs).

Both BFNP Units 2 and 3, situated in Limestone County, Alabama, are 3458 megawatt-thermal General Electric BWR-4s with Mark I primary containment structures. The plant design employs four main steam lines (MSLs) to transport primary steam from the reactor vessel to the units' main turbines, thereby penetrating the primary containment structure. In order that these primary containment penetrations have the capability of being isolated, each MSL has two MSIVs, one inboard and one outboard of the primary containment structure. In response to a severe reactor transient or accident, the MSIVs are designed to close quickly to form part of the primary containment boundary against the release of radioactivity. MSIV leakage is regulated, therefore, to lessen the potential for radioactive release following an accident.

2.0 BACKGROUND

2.1 Discussion of MSIV Leak Rate Testing Requirements

Leakage testing requirements for reactor primary containments are given in Appendix J to Title 10 of the *Code of Federal Regulations (10 CFR)*, Part 50. Appendix J specifies two options for meeting its requirements. For BFNP Units 2 and 3, the licensee has chosen the performance-based Option B. Guidelines for meeting Option B of Appendix J are specified in Regulatory Guide 1.163, "Performance-Based Containment Leak-Test Program"; NEI 94-01,<sup>1</sup> "Industry Guideline for Implementing Performance-Based Option of 10 CFR Part 50, Appendix J"; and ANSI/ANS-56.8-1994,<sup>2</sup> "Containment System Leakage Testing Requirements."

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<sup>1</sup> NEI = Nuclear Energy Institute

<sup>2</sup> ANSI = American National Standards Institute  
ANS = American Nuclear Society

The pertinent guidelines in these documents concern the acceptable methodologies for primary containment isolation valve leak rate surveillance tests, both in the “as-found” and “as-left” cases. These names are descriptive; “as-found” means the isolation valve is tested in the condition in which it is found after the previous operating cycle (i.e., before any maintenance may be performed), and “as-left” means that the isolation valve is tested in the condition in which it will be left before the coming operating cycle (i.e., after any necessary maintenance has been performed).

The applicable guidelines from ANSI/ANS-56.8-1994 specify different acceptance criteria for the “as-found” and the “as-left” leak rate tests for primary containment isolation valves. For an “as-found” test, the leak rate may be determined using the “minimum pathway leakage rate” (MNPLR), while for an “as-left” test, the rate must be determined using the “maximum pathway leakage rate” (MXPLR). For two isolation valves in series, like Browns Ferry’s MSIVs, the difference between the MNPLR and MXPLR is simple: using the MNPLR basis, the leak rate past both valves is taken to be the smaller individual leak rate of the two valves, whereas, using the MXPLR basis, the leak rate past both valves is taken to be the larger individual leak rate of the two valves. The MXPLR acceptance criterion, therefore, is more stringent.

## 2.2 Proposed TS Change

Surveillance requirement (SR) 3.6.1.3.10 in the TSs for BFNP Units 2 and 3 applies to MSIV leak rate testing for both the “as-found” and “as-left” cases. Currently this SR reads as follows:

Verify leakage rate through each MSIV is  $\leq$  100 scfh and that the combined maximum pathway leakage rate for all four main steam lines is  $\leq$  150 scfh when tested at  $\geq$  25 psig.<sup>3</sup>

The licensee’s proposed change would delete the words “maximum pathway” from SR 3.6.1.3.10 in the TSs for Units 2 and 3.

As opposed to the current SR, which generically specifies the MXPLR criterion for MSIV combined leak rate tests, the wording of the proposed SR would clearly allow the licensee the flexibility to use the appropriate acceptance criterion for each of the two cases. Thus, for the “as-left” case, the proposed change would have no impact; in both the regulatory guidelines and the current TSs, the MXPLR criterion is considered appropriate. However, for the “as-found” case, removing the words “maximum pathway” would unequivocally permit the use of the more relaxed MNPLR criterion, which is considered appropriate by the regulatory guidance.

As the main regulatory purpose of the “as-found” MSIV leak rate test is to satisfy reportability requirements, the proposed change would effectively modify the TSs of BFNP Units 2 and 3 to more clearly support use of the less restrictive MNPLR as the appropriate reportability criterion for MSIV leakage rate.

## 2.3 Licensee’s Justification for Proposed TS Change

As previously discussed, specifying the MXPLR as the generic acceptance criterion for MSIV leakage rate testing is stringent beyond regulatory requirements for the “as-found” surveillance. Accordingly, the licensee’s proposed change to SR 3.6.1.3.10 would employ less prescriptive

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<sup>3</sup> scfh = standard cubic feet per hour  
psig = pounds per square inch, gage

language to allow interpretations which are consistent with the appropriate regulatory guidelines for both the "as-found" and "as-left" MSIV leakage rate surveillances.

The licensee regards the proposed change as an administrative clarification involving no change to the MSIV leak rate testing methodology. The licensee interprets the current wording of SR 3.6.1.3.10 to allow use of the MNPLR criterion for the "as-found" MSIV leak rate test. To support its proposal and justify its interpretation of SR 3.6.1.3.10, the licensee has stated that "NUREG-1022, Revision 1, January 1998, 'Event Report Guidelines,' specifies ... that event reportability be based on a[n] 'as-found' minimum path evaluation."

### 3.0 EVALUATION

#### 3.1 Staff Analysis of Licensee's Justification

Due to the current phrasing of SR 3.6.1.3.10, the staff does not believe it is clear that the licensee's proposal should be treated as an administrative change. In the interest of performing a conservative safety review, the staff feels it is necessary to regard the proposed change as a relaxation.

The staff has considered the guidance of NUREG-1022. Though this document does not outline specific reportability criteria for primary containment leakage rate testing, it does cite excess "as-found" containment leakage using the MNPLR criterion as an example of a reportable event. The staff finds that the inclusion of such an example in NUREG-1022 suggests that the licensee's interpretation of MSIV leakage rate reportability requirements could be considered valid.

The licensee has stated that the proposed TS change would eliminate confusion and inconsistency regarding the proper acceptance criterion for "as-found" MSIV leak rate tests. The current phrasing of the acceptance criterion in SR 3.6.1.3.10 for "as-found" MSIV leak rate testing appears to be inconsistent with standard regulatory guidance. The staff agrees that the proposed TS change would reduce confusion through the use of language which clearly permits interpretations which are consistent with regulatory guidelines.

#### 3.2 Safety Significance of Proposed TS Change

The current wording of SR 3.6.1.3.10, as mentioned in subsection 2.3, is more stringent than is required by the regulatory guidance for Appendix J. The proposed change would reduce slightly the current, higher level of stringency, but only to the appropriate level. The proposed change would also be consistent with standard industry practice. Therefore, as the proposed change has been analyzed and is consistent with regulatory policy, the staff believes it would not compromise the currently accepted margin of safety.

As discussed in subsection 2.2, the proposed change to SR 3.6.1.3.10 would effectively provide a less-stringent clarification of MSIV leakage rate testing reporting requirements. The proposed change would not affect the requirement for the licensee to perform (at the appropriate frequency) an "as-left" MSIV leak rate test to meet the more stringent MXPLR acceptance criterion before returning to operation. The requirement for meeting the MXPLR criterion before plant operation is permitted ensures that proper MSIV maintenance will be performed to protect the public safety. Use of the MNPLR criterion for reportability requirements ensures that both licensee personnel and U.S. Nuclear Regulatory Commission (NRC) staff are not unduly occupied with issues of low safety significance.

Additionally, the staff has reviewed the amendment package dated March 14, 2000, that granted the licensee the TS change which, in addition to increasing allowable MSIV leak rates, rewrote SR 3.6.1.3.10 to include the words "maximum pathway." The staff has also reviewed the licensee's submittals regarding this amendment package, dated September 28, 1999, and February 4, 2000. Nowhere in these documents can the staff find a technical basis for requiring the "as-found" MSIV leakage rate test to be performed using the MXPLR acceptance criterion.

### 3.3 Findings

The change would clarify the TS requirements for BFNP Units 2 and 3 by removing unnecessary and confusing terminology. The staff has reviewed the proposed license amendment and finds that the proposed change would remain within the regulatory guidelines and maintain the current margin of safety.

### 4.0 STATE CONSULTATION

In accordance with the Commission's regulations, the Alabama State official was notified of the proposed issuance of the amendment. The State official had no comments.

### 5.0 ENVIRONMENTAL CONSIDERATION

The amendment changes a surveillance requirement with respect to installation or use of a facility component located within the restricted area as defined in 10 CFR Part 20. The NRC staff has determined that the amendment involves no significant increase in the amounts, and no significant change in the types, of any effluents that may be released offsite, and that there is no significant increase in individual or cumulative occupational radiation exposure. The Commission has previously issued a proposed finding that the amendment involves no significant hazards consideration, and there has been no public comment on such finding (65 FR 71138). Accordingly, the amendment meets the eligibility criteria for categorical exclusion set forth in 10 CFR 51.22(c)(9). Pursuant to 10 CFR 51.22(b) no environmental impact statement or environmental assessment need be prepared in connection with the issuance of the amendment.

### 6.0 CONCLUSION

The Commission has concluded, based on the considerations discussed above, that: (1) there is reasonable assurance that the health and safety of the public will not be endangered by operation in the proposed manner, (2) such activities will be conducted in compliance with the Commission's regulations, and (3) the issuance of the amendment will not be inimical to the common defense and security or to the health and safety of the public.

Principal Contributor: John Lehning, NRR

Date: January 24, 2001



Mr. J. A. Scalice  
Tennessee Valley Authority

**BROWNS FERRY NUCLEAR PLANT**

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