

January 28, 2003

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: BROWNS FERRY NUCLEAR PLANT, UNITS 2 AND 3 — ISSUANCE OF AMENDMENTS RE: IMPLEMENTATION OF THE BOILING-WATER REACTOR VESSEL AND INTERNALS PROJECT REACTOR PRESSURE VESSEL INTEGRATED SURVEILLANCE PROGRAM TO ADDRESS THE REQUIREMENTS OF APPENDIX H TO 10 CFR PART 50 (TAC NOS. MB6677 AND MB6678)

Dear Mr. Scalice:

The Commission has issued the enclosed Amendment Nos. 279 and 238 to Facility Operating Licenses Nos. DPR-52 and DPR-68 for the Browns Ferry Nuclear Plant, Units 2 and 3, respectively. These amendments consist of changes to your Updated Final Safety Analysis Report in response to your application dated November 6, 2002. These amendments modify the basis for Tennessee Valley Authority's compliance with the requirements of Appendix H to Title 10 of the *Code of Federal Regulations* Part 50, "Reactor Vessel Material Surveillance Program Requirements."

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

Sincerely,

**/RA/**

Kahtan N. Jabbour, Senior Project Manager, Section 2  
Project Directorate II  
Division of Licensing Project Management  
Office of Nuclear Reactor Regulation

Docket Nos. 50-260 and 50-296

Enclosures: 1. Amendment No. 279 to  
License No. DPR-52  
2. Amendment No. 238 to  
License No. DPR-68  
3. Safety Evaluation

cc w/encls: See next page

January 28 2003

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: BROWNS FERRY NUCLEAR PLANT, UNITS 2 AND 3 — ISSUANCE OF AMENDMENTS RE: IMPLEMENTATION OF THE BOILING-WATER REACTOR VESSEL AND INTERNALS PROJECT REACTOR PRESSURE VESSEL INTEGRATED SURVEILLANCE PROGRAM TO ADDRESS THE REQUIREMENTS OF APPENDIX H TO 10 CFR PART 50 (TAC NOS. MB6677 AND MB6678)

Dear Mr. Scalice:

The Commission has issued the enclosed Amendment Nos. 279 and 238 to Facility Operating Licenses Nos. DPR-52 and DPR-68 for the Browns Ferry Nuclear Plant, Units 2 and 3, respectively. These amendments consist of changes to your Updated Final Safety Analysis Report in response to your application dated November 6, 2002. These amendments modify the basis for Tennessee Valley Authority's compliance with the requirements of Appendix H to Title 10 of the *Code of Federal Regulations* Part 50, "Reactor Vessel Material Surveillance Program Requirements."

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

Sincerely,

/RA/

Kahtan N. Jabbour, Senior Project Manager, Section 2  
Project Directorate II  
Division of Licensing Project Management  
Office of Nuclear Reactor Regulation

Docket Nos. 50-260 and 50-296

- Enclosures: 1. Amendment No. 279 to  
License No. DPR-52  
2. Amendment No. 238 to  
License No. DPR-68  
3. Safety Evaluation

cc w/encls: See next page

Distribution: See next page

**ADAMS Accession No. ML030290418**

OFFICE	PDII-2/PM	PDII-2/LA	SRXB/SC*	EMCB/SC*	OGC	PDII-2/SC
NAME	KJabbour	BClayton	SE Dated	SE Dated	BSmith	AHowe
DATE	12/26/02	12/24/02	12/13/02	12/13/02	1/3/03	1/24/03

**OFFICIAL RECORD COPY**

Distribution

PUBLIC

PDII-2 Reading

H. Berkow

A. Howe

K. Jabbour

B. Clayton

OGC

ACRS

G. Hill (4)

R. Dennig

M. Mitchell

L. Lois

S. Cahill

TENNESSEE VALLEY AUTHORITY  
DOCKET NOS. 50-260 AND 50-296  
BROWNS FERRY NUCLEAR PLANT, UNITS 2 AND 3  
AMENDMENTS TO FACILITY OPERATING LICENSES

Amendment Nos. 279  
and 238  
License Nos. DPR-52  
and DPR-68

1. The Nuclear Regulatory Commission (the Commission) has found that:
  - A. The application for amendment by Tennessee Valley Authority (the licensee) dated November 6, 2002, 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, changes to the Updated Final Safety Analysis Report (UFSAR) to reflect the modification of Browns Ferry Unit 2 and 3 basis for their compliance with the requirements of Appendix H to 10 CFR Part 50, "Reactor Vessel Material Surveillance Program Requirements," as set forth in the application for amendment by Tennessee Valley Authority dated November 6, 2002, are authorized. The licensee shall submit the revised description authorized by these amendments with the next update of the UFSAR.
3. These license amendments are effective as of date of issuance and shall be implemented as specified in 2 above.

FOR THE NUCLEAR REGULATORY COMMISSION

*/RA/*

Allen G. Howe, Chief, Section 2  
Project Directorate II  
Division of Licensing Project Management  
Office of Nuclear Reactor Regulation

Date of Issuance: January 28, 2003

SAFETY EVALUATION BY THE OFFICE OF NUCLEAR REACTOR REGULATION  
RELATED TO AMENDMENT NO. 279 TO FACILITY OPERATING LICENSE NO. DPR-52  
AND AMENDMENT NO. 238 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 letter dated November 6, 2002, the Tennessee Valley Authority (TVA or the licensee) proposed a license amendment to revise the Updated Final Safety Analysis Report (UFSAR) to modify the basis for its compliance with the requirements of Appendix H to Title 10 of the *Code of Federal Regulations* Part 50 (10 CFR Part 50), "Reactor Vessel Material Surveillance Program Requirements." The objective of TVA's request is to implement the Boiling-Water Reactor Vessel and Internals Project (BWRVIP) reactor pressure vessel (RPV) integrated surveillance program (ISP) as the basis for demonstrating compliance of Browns Ferry Units 2 and 3 with the requirements Appendix H to 10 CFR Part 50.

The BWRVIP RPV ISP was submitted for U.S. Nuclear Regulatory Commission (NRC) staff review and approval in topical reports BWRVIP-78, "BWR Vessel and Internals Project, BWR Integrated Surveillance Program Plan," and BWRVIP-86, "BWR Vessel and Internals Project, BWR Integrated Surveillance Program Implementation Plan." Additional information necessary to establish the technical basis for, and proposed implementation of, the BWRVIP ISP was provided in letters from the BWRVIP to the NRC dated December 22, 2000, and May 30, 2001. The NRC staff approved the proposed BWRVIP ISP in a safety evaluation (SE), which was provided to the BWRVIP by letter dated February 1, 2002. However, the NRC staff's SE required that plant-specific information be provided by BWR licensees who plan to implement the BWRVIP ISP for their facilities. TVA's November 6, 2002, submittal addressed the plant-specific information required in the NRC staff's February 1, 2002, BWRVIP ISP SE.

## 2.0 EVALUATION

### 2.1 REGULATORY REQUIREMENTS AND STAFF POSITIONS

Nuclear power plant licensees are required by Appendix H to 10 CFR Part 50 to implement RPV surveillance programs to "monitor changes in the fracture toughness properties of ferritic materials in the reactor vessel beltline region . . . which result from exposure of these materials to neutron irradiation and the thermal environment." Two specific alternatives are provided with regard to the design of a facility's RPV surveillance program that may be used to address the requirements of Appendix H to 10 CFR Part 50.

The first alternative is the implementation of a plant-specific RPV surveillance program consistent with the requirements of American Society for Testing and Materials (ASTM) Standard Practice E 185, "Standard Practice for Conducting Surveillance Tests for Light-Water Cooled Nuclear Power Reactor Vessels." In the design of a plant-specific RPV surveillance program, a licensee may use the edition of ASTM Standard Practice E 185 that was current on the issue date of the American Society of Mechanical Engineers (ASME) Code to which the reactor vessel was purchased, or later editions through the 1982 edition.

The second alternative provided in Appendix H to 10 CFR Part 50 is the implementation of an ISP. An ISP is defined in Appendix H to 10 CFR Part 50 as occurring when, "the representative materials chosen for surveillance for a reactor are irradiated in one or more other reactors that have similar design and operating features." Five specific criteria are stated in Appendix H to 10 CFR Part 50 that must be met to support approval of an ISP:

- a. The reactor in which the materials will be irradiated and the reactor for which the materials are being irradiated must have sufficiently similar design and operating features to permit accurate comparisons of the predicted amount of radiation damage.
- b. Each reactor must have an adequate dosimetry program.
- c. There must be adequate arrangement for data sharing between plants.
- d. There must be a contingency plan to assure that the surveillance program for each reactor will not be jeopardized by operation at reduced power level or by an extended outage of another reactor from which data are expected.
- e. There must be substantial advantages to be gained, such as reduced power outages or reduced personnel exposure to radiation, as a direct result of not requiring surveillance capsules in all reactors in the set.

As noted in Section 1.0 of this SE, the NRC staff approved the proposed BWRVIP ISP in an SE that was issued to the BWRVIP by letter dated February 1, 2002 (Reference 6). In Reference 6, all of the criteria cited above for approval of an ISP were addressed either completely or partially. For those criteria that could not be fully addressed in Reference 6, plant-specific information was required. The NRC staff identified in Reference 6 the specific information that would be required from licensees who plan to implement the BWRVIP for their facilities. As stated in Reference 6:

[L]icensees who wish to participate in the BWR ISP must provide, for NRC staff review and approval, information which defines how they will determine RPV and/or surveillance capsule fluences based on the dosimetry data which will be available for their facilities. This information must be submitted concurrently with each licensee's submittal to replace their existing plant-specific surveillance program with the BWR ISP as part of their facility's licensing basis. The information submitted must be sufficient for the staff to determine that:

(1) RPV and surveillance capsule fluences will be established . . . based on the use of an NRC-approved fluence methodology that will provide acceptable results based on the available dosimetry data,

(2) if one methodology is used to determine the neutron fluence values for a licensee's RPV and one or more different methodologies are used to establish the neutron fluence values for the ISP surveillance capsules which "represent" that RPV in the ISP, the results of these differing methodologies are compatible (i.e., within acceptable levels of uncertainty for each calculation).

This plant-specific information was required by the NRC staff to ensure that criterion (b.) for an ISP from Appendix H to 10 CFR Part 50 could be met by each facility and to confirm that data that would be shared as part of the BWRVIP ISP could be effectively utilized by each licensee for the monitoring of RPV embrittlement for their facility.

## 2.2 TECHNICAL EVALUATION

In its letter of November 6, 2002, TVA submitted information for Browns Ferry Units 2 and 3 that addressed the information requested in the NRC staff's February 1, 2002, BWRVIP ISP SE (Reference 6). TVA provided a revised page 4.2-16 of the Browns Ferry Units 2 and 3 UFSAR, which stated:

Revisions to fluence calculations using data from the surveillance capsule specimens will use an NRC approved methodology that meets Regulatory Guide 1.190.

The NRC staff has concluded that the inclusion of this statement in the Browns Ferry Units 2 and 3 UFSAR is sufficient to address both items (1) and (2) from Reference 6. Regarding item (1), the licensee's use of an NRC-approved methodology, for determining the Browns Ferry Units 2 and 3 RPVs' neutron fluence values, that is consistent with the attributes of Regulatory Guide (RG) 1.190, "Calculational and Dosimetry Methods for Determining Pressure Vessel Neutron Fluence," is acceptable. Regarding item (2), the licensee's use of an NRC-approved methodology, for determining the fluences of RPV surveillance capsules tested under the BWRVIP ISP, that is consistent with the attributes of RG 1.190 is acceptable. The NRC staff has concluded that any two (or more) approved fluence methodologies provide "compatible" results if the values are within each other's uncertainty bound.

On January 17, 2003, the NRC staff held a telephone conference with TVA representatives to clarify the above UFSAR statement because RG 1.190 has clear guidance on how plant-specific data from the surveillance capsule specimens may be used. TVA representatives confirmed that they are cognizant of the RG's limitations, and that it is their intent to utilize the plant-specific data from the surveillance capsule specimens within the limitations of RG 1.190.

TVA provided an additional commitment in their November 6, 2002, submittal regarding when they will perform an updated RPV fluence analysis for the Browns Ferry Units 2 and 3 RPVs:

The BFN [Browns Ferry Nuclear] Improved Technical Specifications (ITS) for Unit 2 . . . and Unit 3 . . . revised the Pressure Temperature (P/T) curves required for reactor heatup and cooldown such that they are valid for 17.2 Effective Full Power Years (EFPY) and 13.1 EFPY for Units 2 and 3, respectively. Based upon current plant operating experience, new P/T curves must be implemented in the Spring of



2004 for both units. BFN intends to use an updated fluence methodology provided by GE [General Electric] Nuclear Energy (GENE) . . . and approved by the NRC to develop the revised P/T curves. This methodology [is consistent with] Regulatory Guide 1.190.

The NRC staff finds this commitment acceptable since the current RPV fluence calculations for the Browns Ferry Units 2 and 3 RPVs are expected to remain conservative with respect to the actual, accumulated RPV neutron fluence through 17.2 EFPY of operation for Browns Ferry Unit 2, and 13.1 EFPY of operation for Browns Ferry Unit 3.

Inasmuch as this action was submitted as a license amendment, consistent with the NRC staff's understanding of the decision given in Commission Memorandum and Order CLI-96-13, TVA provided revised language for page 4.2-16 of the Browns Ferry Units 2 and 3 UFSAR, which documented the licensee's incorporation of the BWRVIP ISP into the Browns Ferry Units 2 and 3 licensing basis:

“For Units 2 and 3, Integrated Surveillance Program (ISP) implementation and surveillance specimen schedule withdrawal and testing is governed and controlled by BWRVIP-86 (BWR Integrated Surveillance Program (ISP) Implementation Plan), BWRVIP-78 (BWR Integrated Surveillance Program Plan), the BWRVIP responses to NRC RAIs dated May 30, 2001, and December 22, 2001, and the NRC's Safety Evaluation dated February 1, 2002.”

The NRC staff has concluded that the information provided by TVA is sufficient to conclude that the BWRVIP ISP, as approved in Reference 6, can be implemented for Browns Ferry Units 2 and 3 as the basis for demonstrating the facility's continued compliance with the requirements of Appendix H to 10 CFR Part 50. As part of the implementation and documentation of the licensee's intent to utilize the BWRVIP ISP for this purpose, the licensee shall modify the Browns Ferry Units 2 and 3 UFSAR as noted in Section 2.0 of this SE and as stated in their November 6, 2002, submittal.

### 3.0 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.

### 4.0 ENVIRONMENTAL CONSIDERATION

The amendments change a 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 amendments involve 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 amendments involve no significant hazards consideration, and there has been no public comment on such finding (67 FR 70770). Accordingly, the amendments meet 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 amendments.

## 5.0 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 amendments will not be inimical to the common defense and security or to the health and safety of the public.

## 6.0 REFERENCES

1. A. S. Bhatnagar (TVA) to NRC Document Control Desk, "Browns Ferry Nuclear Plant, BFN Units 2 and 3 - Request for License Amendment - Revision to the Reactor Pressure Vessel (RPV) Material Surveillance Program," November 6, 2002.
2. C. Terry (BWRVIP) to NRC Document Control Desk, "Project No. 704 - BWR Vessel and Internals Project, BWR Integrated Surveillance Program Plan (BWRVIP-78)," December 22, 1999.
3. C. Terry (BWRVIP) to NRC Document Control Desk, "Project No. 704 - BWRVIP-86: BWR Vessel and Internals Project, BWR Integrated Surveillance Program Implementation Plan," Electric Power Research Institute (EPRI) Technical Report 1000888, December 22, 2000.
4. C. Terry (BWRVIP) to NRC Document Control Desk, "Project No. 704 - BWRVIP Response to NRC Request for Additional Information Regarding BWRVIP-78," December 15, 2000.
5. C. Terry (BWRVIP) to NRC Document Control Desk, "Project No. 704 - BWRVIP Response to Second NRC Request for Additional Information on the BWR Integrated Surveillance Program," May 30, 2001.
6. W. H. Bateman (NRC) to C. Terry, "Safety Evaluation Regarding EPRI Proprietary Reports "BWR Vessel and Internals Project, BWR Integrated Surveillance Program Plan (BWRVIP-78)" and "BWRVIP-86: BWR Vessel and Internals Project, BWR Integrated Surveillance Program Implementation Plan," February 1, 2002.

Principal Contributors: Matthew A. Mitchell, NRR  
Lambros Lois, NRR

Date: January 28, 2003

Mr. J. A. Scalice  
Tennessee Valley Authority

**BROWNS FERRY NUCLEAR PLANT**

cc:

Mr. Karl W. Singer, Senior Vice President  
Nuclear Operations  
Tennessee Valley Authority  
6A Lookout Place  
1101 Market Street  
Chattanooga, TN 37402-2801

Mr. Mark J. Burzynski, Manager  
Nuclear Licensing  
Tennessee Valley Authority  
4X Blue Ridge  
1101 Market Street  
Chattanooga, TN 37402-2801

Mr. James E. Maddox, Acting Vice President  
Engineering & Technical Services  
Tennessee Valley Authority  
6A Lookout Place  
1101 Market Street  
Chattanooga, TN 37402-2801

Mr. Timothy E. Abney, Manager  
Licensing and Industry Affairs  
Browns Ferry Nuclear Plant  
Tennessee Valley Authority  
P.O. Box 2000  
Decatur, AL 35609

Mr. Ashok S. Bhatnagar, Site Vice President  
Browns Ferry Nuclear Plant  
Tennessee Valley Authority  
P.O. Box 2000  
Decatur, AL 35609

Senior Resident Inspector  
U.S. Nuclear Regulatory Commission  
Browns Ferry Nuclear Plant  
P.O. Box 149  
Athens, AL 35611

General Counsel  
Tennessee Valley Authority  
ET 11A  
400 West Summit Hill Drive  
Knoxville, TN 37902

State Health Officer  
Alabama Dept. of Public Health  
RSA Tower - Administration  
Suite 1552  
P.O. Box 303017  
Montgomery, AL 36130-3017

Mr. Robert J. Adney, General Manager  
Nuclear Assurance  
Tennessee Valley Authority  
6A Lookout Place  
1101 Market Street  
Chattanooga, TN 37402-2801

Chairman  
Limestone County Commission  
310 West Washington Street  
Athens, AL 35611

Mr. Robert G. Jones, Plant Manager  
Browns Ferry Nuclear Plant  
Tennessee Valley Authority  
P.O. Box 2000  
Decatur, AL 35609