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TVA-BFN-TS-404  
November 6, 2002

10 CFR 50.90

U.S. Nuclear Regulatory Commission  
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Washington, D.C. 20555-0001

Gentlemen:

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

**BROWNS FERRY NUCLEAR PLANT, BFN UNITS 2, AND 3 - REQUEST FOR LICENSE AMENDMENT - REVISION TO THE REACTOR PRESSURE VESSEL (RPV) MATERIAL SURVEILLANCE PROGRAM**

Pursuant to 10 CFR 50.90, TVA is submitting a request for an amendment (TS-404) to licenses DPR-52 and DPR-68 for BFN, Units 2 and 3, respectively. TVA is requesting a change to the BFN Units 2 and 3 RPV material surveillance program required by 10 CFR 50, Appendix H, which will incorporate the Boiling Water Reactor Vessel and Internals Project (BWRVIP) Integrated Surveillance Program (ISP) into the BFN Units 2 and 3 licensing basis.

The BWRVIP ISP was developed in response to an issue raised by the NRC staff regarding the potential lack of adequate unirradiated baseline Charpy V-notch (CVN) data for one or more materials in plant-specific RPV surveillance programs at several BWRs. The lack of baseline properties would inhibit a licensee's ability to effectively monitor changes in the fracture toughness properties of RPV materials in accordance with Appendix H to 10 CFR 50.

In NRC Regulatory Issue Summary (RIS) 2002-05, "NRC Approval of Boiling Water Reactor Pressure Vessel Integrated Surveillance Program," NRC approved the BWRVIP ISP and provided guidance for BWR licensees participating in the

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ISP program. Consistent with the guidance provided in RIS 2002-05, TVA is submitting this proposed change as a license amendment to facilitate NRC review and approval.

TVA has determined that there are no significant hazards considerations associated with the proposed change and that the change qualifies for a categorical exclusion from environmental review pursuant to the provisions of 10 CFR 51.22(c)(9). 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.

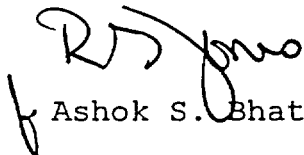
Enclosure 1 to this letter provides the description and evaluation of the proposed change. This includes TVA's determination that the proposed change does not involve a significant hazards consideration, and is exempt from environmental review. Enclosure 2 contains the applicable pages of the BFN Updated Final Safety Analysis Report marked to show the change.

TVA plans to implement the proposed change in early 2003 to support deletion of work (i.e., removal of test specimens) from the Unit 2 Cycle 12 refueling outage. Therefore, TVA requests NRC approval of this change by February 1, 2003, and that implementation be within 30 days of NRC approval.

There are no new regulatory commitments in this submittal. If you have any questions about this change, please telephone me at (256) 729-2636.

I declare under penalty of perjury that the foregoing is true and correct. Executed on this 6th day of November, 2002.

Sincerely,

  
f Ashok S. Bhatnagar

cc: See Page 3

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Enclosures

cc: (Enclosures)  
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## ENCLOSURE 1

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

#### REQUEST FOR LICENSE AMENDMENT REVISION TO THE REACTOR PRESSURE VESSEL (RPV) MATERIAL SURVEILLANCE PROGRAM DESCRIPTION AND EVALUATION OF THE PROPOSED CHANGE

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#### I. Introduction

Appendix H to 10 CFR Part 50, "Reactor Vessel Material Surveillance Program Requirements," requires that reactor pressure vessels have their beltline regions monitored by a surveillance program that complies with American Society for Testing and Materials (ASTM) E185-82, except as modified by Appendix H. ASTM E185-82 provides guidelines for designing a minimum surveillance program, selecting materials, and evaluating test results for light-water cooled nuclear power reactor vessels. It also provides recommendations for minimum number of surveillance capsules and their withdrawal schedules. 10 CFR 50 Appendix H further requires that the proposed withdrawal schedule be submitted with a technical justification and approved by NRC prior to implementation.

Over the past several years, EPRI and BWR licensees under the Boiling Water Reactor Vessel and Internals Project (BWRVIP) developed an Integrated Surveillance Program (ISP) and submitted it for NRC approval. The ISP was developed in response to an issue raised by the NRC staff regarding the potential lack of adequate unirradiated baseline Charpy V-notch (CVN) data for one or more materials in plant-specific RPV surveillance programs at several BWRs. The lack of baseline properties would inhibit a licensee's ability to effectively monitor changes in the fracture toughness properties of RPV materials in accordance with Appendix H to 10 CFR 50.

By letter dated February 1, 2002, the NRC staff completed its review of the final BWRVIP ISP Plan and found it acceptable. The NRC safety evaluation (SE) concluded that the proposed ISP, if implemented in accordance with the conditions in the SE, to be an acceptable alternative to all existing BWR plant-specific RPV surveillance programs for the purpose of maintaining compliance with the

requirements 10 CFR 50 Appendix H through the end of current facility 40-year operating licenses.

## II. Description of the Proposed Change

TVA is proposing to revise the licensing basis for BFN Units 2 and 3 by replacing the current plant-specific RPV material surveillance program with the Boiling Water Reactor Vessel Internals Project (BWRVIP) Integrated Surveillance Program (ISP), which was approved by the NRC in its SE dated February 1, 2002 (Reference 2).

## III. Reason for the Proposed Change

The BWRVIP ISP was developed in response to an issue raised by the NRC staff regarding the potential lack of adequate unirradiated baseline CVN data for one or more materials in plant-specific RPV surveillance programs at several BWRs. The lack of baseline properties would inhibit a licensee's ability to effectively monitor changes in the fracture toughness properties of RPV materials in accordance with Appendix H to 10 CFR 50. The BWRVIP ISP, as endorsed by the NRC in Regulatory Issue Summary No. 2002-05 (Reference 1), resolves this issue.

Implementation of the ISP will provide additional benefits. When the original surveillance materials were selected for plant-specific surveillance programs, the state of knowledge concerning RPV material response to irradiation and post-irradiation fracture toughness was not the same as it is today. As a result, many facilities did not include what would be identified today as the plant's limiting RPV materials in their surveillance programs. Hence, the effort to identify and evaluate materials from other BWRs, which may better represent a facility's limiting materials, should improve the overall evaluation of BWR RPV embrittlement. Also, the inclusion of data from the testing of BWR Owners' Group (BWROG) Supplemental Surveillance Program (SSP) capsules will improve overall quality of the data being used to evaluate BWR RPV embrittlement. Finally, implementation of the ISP is also expected to reduce the cost of surveillance testing and analysis since surveillance materials that are of little or no value (either because they lack adequate unirradiated baseline CVN data or because they are not the best representative materials) will no longer be tested.

#### IV. Safety Analysis

In its safety evaluation dated February 1, 2002 (reference 2), the NRC concluded that the proposed BWRVIP ISP, if implemented in accordance with the conditions in the SE, is an acceptable alternative to all existing BWR plant-specific RPV surveillance programs for the purpose of maintaining compliance with the requirements of Appendix H to 10 CFR Part 50 through the end of current facility 40 year operating licenses. The NRC SE requires that each license (1) provide information regarding which specific neutron fluence methodology will be implemented as part of the ISP and (2) address the neutron fluence methodology compatibility issue as it applies to the comparison of neutron fluences calculated in the ISP which are designated to represent its RPV.

The BFN Improved Technical Specifications (ITS) for Unit 2 Amendment No. 275) and Unit 3 (Amendment 233) 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 Nuclear Energy (GENE) (Reference 3) and approved by NRC to develop the revised P/T curves. This methodology has been endorsed in Regulatory Guide 1.190 (Reference 4).

Based upon the ISP Capsule Test Matrix, the surveillance material contained in BFN Unit 2 is representative of both BFN Units 2 and 3. Thus, in accordance with the ISP, no further capsules will be removed and tested from BFN Unit 3. To increase fluence per NRC staff recommendations, the next surveillance capsule withdrawal for Unit 2 is scheduled for the Spring of 2011 during the Unit 2 Cycle 16 refueling outage. Material contained in this capsule will be removed and tested in 2011, and fluence calculations for Units 2 and 3 will be reevaluated using a methodology approved by the NRC and demonstrated to be compatible with the methodology provided by GENE for the revised P/T curves.

In summary, participation in the ISP will improve compliance with the regulatory requirements in Appendix H to 10 CFR 50 while reducing cost, exposure,

and outage time associated with capsule removal, shipping, and testing.

V. No Significant Hazards Consideration Determination

TVA is proposing to revise the licensing basis for the Browns Ferry Nuclear Plant Units 2 and 3 by replacing the plant-specific reactor pressure vessel (RPV) material surveillance program with the Boiling Water Reactor Vessel Internals Project (BWRVIP) Integrated Surveillance Program (ISP). This change is acceptable because the BWRVIP ISP has been approved by the NRC staff as meeting the requirements of paragraph III.C of Appendix H to 10 CFR 50 for an integrated surveillance program.

In accordance with the criteria set forth in 10 CFR 50.92, TVA has evaluated the proposed license amendment and determined it does not represent a significant hazards consideration. The following is provided in support of this conclusion.

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

The proposed change implements a integrated surveillance program that has been evaluated by the NRC staff as meeting the requirements of paragraph III.C of Appendix H to 10 CFR 50. Consequently, the change does not significantly increase the probability of any accident previously evaluated. The change provides the same assurance of RPV integrity. The change will not cause the reactor pressure vessel or interfacing systems to be operated outside their design or testing limits. Also, the change will not alter any assumptions previously made in evaluating the radiological consequences of accidents. Therefore, the proposed change does not involve a significant increase in 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 change revises the BFN Units 2 and 3 licensing basis to reflect participation in the BWRVIP ISP. The proposed change does not involve a

modification of the design of plant structures, systems, or components. The change will not impact the manner in which the plant is operated as plant operating and testing procedures will not be affected by the change. The change will not degrade the reliability of structures, systems, or components important to safety as equipment protection features will not be deleted or modified, equipment redundancy or independence will not be reduced, supporting system performance will not be increased, and increased or more severe testing of equipment will not be imposed. No new accident types or failure modes will be introduced as a result of this proposed change. Therefore, the proposed changes does not create the possibility of a new or different kind of accident from that previously evaluated.

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

The proposed change has been evaluated as providing an acceptable alternative to the plant-specific RPV material surveillance program and meets the requirements of 10 CFR 50 Appendix H for RPV material surveillance.

Appendix G to 10 CFR 50 describes the conditions that require pressure temperature (P/T) limits and provides the general bases for these limits. Until the results from the Integrated Surveillance Program become available, RG 1.99, Revision 2 will be used to predict the amount of neutron irradiation damage. The use of operating limits based on these criteria, as defined by applicable regulations, codes, and standards, provide reasonable assurance that nonductile or rapidly propagating failure will not occur. The P/T limits are not derived from Design Basis Accident (DBA) analyses. They are prescribed during normal operation to avoid encountering pressure, temperature, and temperature rate of change conditions that might cause undetected flaws to propagate and cause nonductile failure of the reactor coolant pressure boundary (RCPB). Since the P/T limits are not derived from any DBA, there are no acceptance limits related to the P/T limits. Rather, the P/T limits are acceptance limits themselves since they preclude operation in an unanalyzed condition.



The proposed change will not affect any safety limits, limiting safety system settings, or limiting conditions of operation. The proposed change does not represent a change in initial conditions, or in a system response time, or in any other parameter affecting the course of an accident analysis supporting the Bases of any Technical Specification. Further, the proposed change does not involve a revision to P/T limits but rather a revision to the surveillance capsule withdrawal schedule for the second surveillance capsule. The current P/T limits were established based on adjusted reference temperatures for RPV beltline materials calculated in accordance with RG 1.99, Revision 2. P/T limits will continue to be revised, as necessary, for changes in adjusted reference temperature due to changes in fluence when two or more credible surveillance data sets become available. When two or more credible surveillance data sets become available, P/T limits will be revised as prescribed by RG 1.99, Revision 2 or other NRC approved guidance. Therefore, the proposed change does not involve a significant reduction in a margin of safety.

## VI. Environmental Impact Consideration

The proposed amendment 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 amendment meets the eligibility criteria for categorical exclusion set forth in 10 CFR 51.22(c)(9), and pursuant to 10 CFR 51.22(b), an environmental assessment of the proposed amendment is not required.

## References

1. Regulatory Issue Summary No. 2002-05, "NRC Approval of Boiling Water Reactor Pressure Vessel Integrated Surveillance Program," dated April 8, 2002.

2. NRC letter from W. H. Bateman to C. Terry (BWRVIP Chairman) titled "Safety Evaluation Regarding EPRI Proprietary Report '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,'" dated February 1, 2002.
3. NEDO-32983-A, "GE Methodology for Reactor Pressure Vessel Fast Neutron Flux Evaluations," Revision 0, dated December 2001.
4. Regulatory Guide 1.190, "Calculational and Dosimetry Methods for Determining Pressure Vessel Neutron Fluence," March 2001.

ENCLOSURE 2

TENNESSEE VALLEY AUTHORITY  
BROWNS FERRY NUCLEAR PLANT  
UNITS 2 AND 3

PROPOSED TECHNICAL SPECIFICATION (TS) CHANGE TS-404  
PROPOSED UFSAR MARK-UP

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I. BFN UFSAR, Amendment 19 Affected Page List

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II. Marked-up Pages

See Attached

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Added text shown in italics

## BFN-19

No weak direction specimens were included in the reactor vessel material surveillance program. All Charpy V-notch specimens were taken parallel to the direction of rolling. The majority of developmental work on radiation effects has been with longitudinal specimens. This is considered the best specimen to be used for determination of changes in transition temperature. At the low neutron fluence levels of BWR plants, no change in transverse shelf level is expected and transition temperature changes are minimal.

The specimens and neutron monitor wires were placed near core midheight adjacent to the reactor vessel wall where the neutron exposure is similar to that of the vessel wall (see Subsection 3.3). The specimens were installed at startup or just prior to full-power operation. ~~Selected groups of specimens may be removed at intervals over the lifetime of the reactor and can be tested to compare mechanical properties with the properties of control specimens which are not irradiated.~~ The current reactor vessel material surveillance program conforms to ASTM E185-82. ~~NRC review of the surveillance program is documented by NRC Safety Evaluations dated September 20, 1999 (L44 990927-001) and April 2, 2001 (L44 010411-001).~~ *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 withdrawal schedule for the second Unit 2 capsule located at azimuth 120° will be in accordance with the ISP. Presently, there are no plans to withdrawal any capsules from Unit 3, as the BFN Unit 2 capsule provides the best representative material for both units. Test results will provide the necessary data to monitor embrittlement for Units 2 and 3. Unit 1 is currently not in the scope of the ISP, but will be evaluated for inclusion prior to unit restart. Since the predicted adjusted reference temperature of the reactor vessel beltline steel is less than 100°F at end-of-life, the use of the capsules per the ISP meets the requirements of 10 CFR 50, Appendix H, and ASTM E185-82. Revisions to fluence calculations using data obtained from the surveillance capsule specimens will use an NRC approved methodology that meets Regulatory Guide 1.190.*