

October 31, 2005

APPLICANT: Tennessee Valley Authority

FACILITY: Browns Ferry Nuclear Plant, Units 1, 2, and 3

SUBJECT: SUMMARY OF CONFERENCE CALLS HELD ON OCTOBER 14 AND 18, 2005,
BETWEEN THE NRC STAFF AND TENNESSEE VALLEY AUTHORITY
LICENSE RENEWAL STAFF, CONCERNING INFORMATION ON BROWNS
FERRY NUCLEAR PLANT, UNITS 1, 2, AND 3, LICENSE RENEWAL
APPLICATION (TAC NOS. MC1704, MC1705, AND MC1706)

The U.S. Nuclear Regulatory Commission (NRC) staff, conducted two separate conference calls with Tennessee Valley Authority (TVA or the applicant) on October 14 and 18, 2005. These calls concerned interim evaluation by the Advisory Committee on Reactor Safeguards (ACRS) of the Safety Evaluation Report (SER) with open items presented in connection with the license renewal review of Browns Ferry Nuclear Plant (BFN) License Renewal Application (LRA). As a result of the conference calls, the applicant agreed to provide supplemental responses to the staff requests by November 14, 2005. A brief summary of the items discussed in these two conference calls are shown in Enclosures 1 and 2. Enclosure 3 provides a listing of the conference call participants.

The applicant had an opportunity to comment on the meeting summary and did not have any comments.

/RA/

Yaira Diaz Sanabria, Project Manager
License Renewal Section A
License Renewal and Environmental Impacts Program
Division of Regulatory Improvement Programs
Office of Nuclear Reactor Regulation

Docket Nos.: 50-259, 50-260, and 50-296

Enclosures: As stated

October 31, 2005

APPLICANT: Tennessee Valley Authority

FACILITY: Browns Ferry Nuclear Plant, Units 1, 2, and 3

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**SUMMARY OF THE ITEMS DISCUSSED IN A
CONFERENCE CALL HELD ON OCTOBER 14, 2005
BETWEEN THE NRC AND TVA**

License renewal SER Status:

The U.S. Nuclear Regulatory Commission (NRC or the staff) discussed status of the following four open items included in the Advisory Committee on Reactor Safeguards (ACRS) Interim evaluation as follows:

1. Open Item, OI 2.4-3 Drywell Shell Corrosion - This topic needs additional discussion between the staff and Tennessee Valley Authority (TVA) to resolve items related to aging management of Drywell liner plates.
- 2.. Program description for the proposed Unit 1 Periodic Inspection Program (B.2.1.42) - The program description provided by TVA for this new and plant specific program needs finalization of program elements as recommended by ACRS.
 - A. Intended scope
 - B. Detection of aging effects: Criteria for identification of susceptible location
 - C. Monitoring and trending: Frequency: such as prior to restart, before entering license renewal duration PEO, and after
 - D. Acceptance criteria: Corrective Action: Determination of action to be taken if or not degradation has been identified)
 - E. Operating Experience: Lessons learned from Unit 2 and/or Unit 3
3. Open Item, OI 4.7.7 Stress Relaxation of Core Shroud Hold-Down Bolts - This topic needs additional discussion between the staff and TVA to resolve the issue satisfactorily. A follow-up conference call was conducted on October 18, 2005 between the NRC staff, TVA, and General Electric (enclosure 2).
4. Open Item from AMR inspection on inspection of Residual Heat Removal Service Water (RHRSW) Piping - This issue was identified during the regional inspection of license renewal for aging management review (AMR). TVA needs to provide appropriate response to the regional inspection team to satisfactorily resolve the issue prior to the next ACRS full committee meeting in March 2006.
5. The staff also discussed other issues from the committee's interim evaluation report comments/recommendations for which the staff is required to provide appropriate responses. It was agreed that the applicant will provide formal responses to these topics by November 15, 2005 as follows:
 - A. Lack of operating experience for Unit 1 in satisfying the intent of the license renewal rule (10 CFR 54.17c). The staff provided a few examples of past exemptions provided to other applicants so that TVA could tailor their justifications for BFN Unit 1. The staff also discussed plausible compensatory actions such as, Unit 1 restart inspection, its operating history, replacement of piping and components which did not meet the reconstitution inspection criteria.

- B. Providing suitable input for the Wet Layup sections for the SER so that staff can write a cohesive safety evaluation on the applicability of Unit 2 & 3 experience to unit 1.
- C. Clarification of One-Time Inspection Program versus Unit 1 Periodic Inspection Program and the One-time inspection Program consistency with GALL.

**SUMMARY OF THE ITEMS DISCUSSED IN THE
CONFERENCE CALL ON OCTOBER 18, 2005
BETWEEN THE NRC AND TVA**

Follow up to Open Item 4.7.7 (Item 3 of October 14, 2005 meeting brief) - Stress Relaxation Core Hold-Down Bolts:

Background

For the period of extended operation, the projected loss of hold down bolt preload (stress relaxation) is taken as 20%, which bounds the original BWRVIP-25 analysis. With a loss of 20% in preload, the applicant stated that sliding of the core plate under both normal and accident conditions will be prevented by friction due to initially imposed high bolt preload.

The staff requested that the applicant, TVA, demonstrate, based on a BWRVIP 25 type structural analysis, that the axial and bending stresses in the highest loaded bolts meet the ASME Section III allowable stresses considering the 20% decrease in bolt preload at the end of the period of extended operation. By letter dated September 6, 2005, TVA provided an analysis showing that the axial bolt stresses meet the ASME Section III Class 1 Level D design allowable, and that bending of the hold down bolts does not occur, as a result of the prevention of sliding by the high preload and an assumed large friction coefficient.

Discussion

General Electric (GE) provided their methodology used applicable to BFN. In its information, GE did not use the staff approved analysis that was used in BWRVIP-25, "Core plate Inspection Guidelines," report for the BFN units. The methodology used in the BWRVIP-25 report is more conservative. For BFN units, GE used a less conservative methodology, such as using a coefficient of friction value of 0.5 (dry environment) to ensure prevention of sliding of the core plate which eliminated the bending stresses in the core plate hold-down bolts. The staff determined that the methodology used for BFN units is not supported by the information provided in the literature. The staff position is that GE should apply the methodology that was used in the BWRVIP-25 report for the BFN units.

The staff also questioned whether the applicant had considered using wedges to prevent core plate sliding, and if the wedges are installed, the aging management of core plate hold-down bolts will not be considered TLAA item. The applicant stated that this option was evaluated but it results costly to install wedges in each unit, therefore, this options was withdrawn. TVA has agreed to have another conference call with the staff probably within 3 weeks to discuss this item.

The NRC staff needs supplemental information and identified the following concerns:

1. The analysis is significantly different from the structural analysis in BWRVIP 25, and is not based on a finite element model of the core plate.
2. Not clear if all loads listed in BWRVIP 25, such as fuel lift load, were included in the analysis.

3. The applicant selected friction due to high bolt preload (significantly larger than that specified in BWRVIP 25) as the means to prevent side motion of the core plate. BWRVIP 25 recommends the use of wedges to prevent side motion; it does not recommend high bolt preload and friction. The staff questions the basis for the applicant's choice.
4. The TVA analysis assumes a high static coefficient of dry friction as the mechanism to prevent side motion of the core plate. The staff questions the basis for this assumption for a core plate that is in a pressurized water environment.
5. Page 4-6 and Appendix A of BWRVIP 25 state that "of special interest is the amount of bending induced in the bolts when the core plate bows upward, or when load from the beams is no longer transferred to the rim." No such bending was evaluated in the TVA analysis.
6. The BWRVIP 25 structural analysis shows a variation of the axial forces in the hold down bolts with location around the plate circumference, and that the axial force in the highest-loaded bolt is about twice the mean axial bolt load. The TVA analysis shows that all bolts are uniformly loaded in tension. This indicates that the highest stresses in the hold down bolts have not been determined.
7. The effect of the large bolt preloads on the structural integrity of the core plate was not evaluated.

Based on the conference call TVA agreed that it needed further consultation with their vendor, GE, to resolve this issue. The staff identified that TVA needs to prioritize this issue whose resolution is very important in satisfactorily concluding the safety review and the progress so far made since March 2005 (when the problem was initially identified) is not entirely satisfactory. TVA took staff comments under advisement and agreed that they will impress upon the TVA's management to expeditiously resolve this item.

**LIST OF PARTICIPANTS FOR TELEPHONE CONFERENCE CALL
TO DISCUSS BROWNS FERRY NUCLEAR PLANT, UNITS 1, 2 AND 3
LICENSE RENEWAL APPLICATION
OCTOBER 14, 2005**

<u>Participants</u>	<u>Affiliations</u>
Ram Subbaratnam	U.S. Nuclear Regulatory Commission (NRC)
Yaira Diaz	NRC
Ken Brune	Tennessee Valley Authority (TVA)
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**LIST OF PARTICIPANTS FOR TELEPHONE CONFERENCE CALL
TO DISCUSS BROWNS FERRY NUCLEAR PLANT, UNITS 1, 2 AND 3
LICENSE RENEWAL APPLICATION
OCTOBER 18, 2005**

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BROWNS FERRY NUCLEAR PLANT

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