



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

July 16, 2013

Mr. Joseph W. Shea  
Manager, Corp. Nuclear Licensing Programs  
Tennessee Valley Authority  
1101 Market Street, LP 4B-C  
Chattanooga, TN 37402-2801

SUBJECT: BROWNS FERRY NUCLEAR PLANT REVIEW OF COMMITMENT SUBMITTAL  
FOR LICENSE RENEWAL REGARDING THE ONE-TIME INSPECTION  
PROCEDURE (TAC NOS. ME7797, ME7798, AND ME7799)

By letter dated November 1, 2011 (Agencywide Document Access Management System [ADAMS] Accession No. ML11308A018), the Tennessee Valley Authority, the licensee for the Browns Ferry Nuclear Plant (BFN), submitted information to fulfill a commitment for license renewal regarding the BFN one-time inspection procedure for Units 1, 2 and 3. The licensee's commitment is specified in Commitment no. 25 in Appendix A of NUREG-1843, "Safety Evaluation Report Related to the License Renewal of the Browns Ferry Nuclear Plant, Units 1, 2, and 3," dated January 2006, and Supplement 1 to NUREG-1843, dated April 2006. Commitment no. 25 addresses the One-Time Inspection program and states that BFN will "develop and submit procedure for NRC review" and the commitment will be implemented "at least two years prior to the expiration of the current operating license."

The U.S. Nuclear Regulatory Commission staff reviewed the information in the licensee's letter and a response dated February 28, 2013, to the staff's request for additional information, and determined that the licensee has fulfilled Commitment no. 25 for license renewal by demonstrating that the program, as revised, will adequately manage aging of applicable components during the period of extended operation.

Sincerely,

A handwritten signature in black ink, appearing to read "Heather M. Jones".

Heather M. Jones, Project Manager  
Subsequent Renewal, Guidance  
Update and Operations Branch  
Division of License Renewal  
Office of Nuclear Reactor Regulation

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

Enclosure:  
As stated

cc w/encl: Listserv

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*/RA/*

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ADAMS Accession No.: **ML13177A352**

OFFICE	LA:RPB1/DLR	PM:RSRG/DLR	BC:RSRG/DLR	PM:RSRG/DLR
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DATE	7/ 3 /2013	7/3/2013	7/15/2013	7/16/2013

**OFFICIAL RECORD COPY**

Letter to Mr. Shea from H. Jones dated July 16, 2013

**SUBJECT:    BROWNS FERRY NUCLEAR PLANT REVIEW OF COMMITMENT SUBMITTAL  
              FOR LICENSE RENEWAL REGARDING THE ONE-TIME INSPECTION  
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**HJones**

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**SBloom**

**OFFICE OF NUCLEAR REACTOR REGULATION**  
**REVIEW OF COMMITMENT FOR LICENSE RENEWAL**  
**EVALUATION OF ONE-TIME INSPECTION PROCEDURE**  
**BROWNS FERRY NUCLEAR PLANT, UNITS 1, 2, AND 3**  
**DOCKET NUMBERS 50-259, 50-260, AND 50-296**

By letter dated November 1, 2011 (Agencywide Document Access Management System [ADAMS] Accession No. ML11308A018), Tennessee Valley Authority (TVA), the licensee for Browns Ferry Nuclear Plant (BFN), Units 1, 2, and 3, submitted the BFN One-Time Inspection (OTI) procedure to fulfill a portion of Commitment no. 25 from its license renewal application (LRA). The licensee committed to develop the OTI Program procedure and submit it to the NRC for review at least two years prior to the expiration of the current operating license.

By letter dated November 30, 2012 (ADAMS Accession No. ML12324A024), the NRC requested that the licensee: (1) state the basis for the number of inspections that will be performed for each aging effect within each inspection group and (2) discuss how the chosen number of inspections is sufficient to identify whether an aging effect is occurring and describe the method and associated acceptance criteria that will be used to identify elastomer degradation.

By letter dated February 28, 2013 (ADAMS Accession No. ML13067A398), Entergy Nuclear Operations, Inc., provided the additional information requested, as well as submitted an additional commitment to include in the OTI procedure acceptance criteria for inspection of elastomer components and specific guidance on determining the number of inspections to be performed for each aging effect within an inspection group.

**Background**

In accordance with Part 54, "Requirements for Renewal of Operating Licenses for Nuclear Power Plants," of Title 10 of the *Code of Federal Regulations* (10 CFR Part 54), the NRC issued Renewed Facility Operating Licenses DPR-33, DPR-52, and DPR-68 to BFN, Units 1, 2 and 3, respectively, on May 4, 2006. NUREG-1843, "Safety Evaluation Report Related to the License Renewal of the Browns Ferry Nuclear Plant, Units 1, 2, and 3," and Supplement 1 to NUREG-1843, both dated April 2006, document the NRC staff's technical review of the LRA. Components that perform an intended function within the scope of license renewal are subject to an aging management review in order to ensure that the effects of aging will be adequately managed so that the intended function(s) will be maintained consistent with the current licensing basis for the period of extended operation, as required by 10 CFR 54.21(a)(3).

NUREG-1843, Appendix A, "Commitments for License Renewals of BFN Units 1, 2, and 3," lists the commitments that are associated with the licensee's aging management programs (AMPs) for managing the aging effects for the BFN systems, structures, and components during the period of extended operation. Commitment no. 25 in Appendix A, Table 1, "BFN Commitment List Associated with LRA Appendix A Aging Management Programs and TLAA's (Non-Unit Specific)," addresses the OTI Program and states that BFN will "develop and submit procedure for NRC review" and the commitment will be implemented "at least two years prior to the expiration of the current operating license." Commitment no. 25 contains other activities associated with the OTI Program that are not related to the development and submittal of the procedure and are not included in this review.

ENCLOSURE

### **Summary of Information in Licensee's Letter Dated November 1, 2011**

In its letter dated November 1, 2011, TVA submitted the OTI Procedure, OTI-565, Revision 3, for NRC review. The procedure describes scoping, inspection point selection, inspection performance, documentation and evaluation of inspection results, and disposition of inspection anomalies.

The program owner establishes the scope of the inspections by first defining the total population of components for which the OTI Program was credited in the LRA. Then, all components are organized into unique inspection groups of each material and environment combination. The sample size for each inspection group is 20 percent of the group population with a maximum of 25 inspections. Inspection points are selected by considering susceptibility to the various aging effects, which include cracking, elastomer degradation, fouling, loss of material, and reduction in fracture toughness. Locations most susceptible to age-related degradation include low-flow or stagnant locations, areas where there is contact between dissimilar metals, areas susceptible to fouling, and areas with elevated temperatures.

The procedure includes direction for performing visual examination methods and discusses the use of other inspection methods, such as ultrasonic, radiographic, magnetic particle, or performance testing. The acceptance criteria includes any indication of degradation, evidence of general or local corrosion, evidence of relevant condition for microbiologically-influenced corrosion (e.g., biological activity), and evidence of fouling or other indication of reduction of heat transfer capability.

The program owner evaluates the inspection data to determine if any identified degradation is related to aging and, if so, evaluates the rate of aging and if additional monitoring or other actions are needed within the period of extended operation.

### **NRC Staff Review**

The staff reviewed the OTI procedure against LRA Section B.2.1.29, "One-Time Inspection Program," as evaluated by the NRC staff in Section 3.0.3.1.7 of NUREG-1843 and its supplement. LRA Section B.2.1.29 states that the OTI Program is a new program that will be consistent with NUREG-1801, "Generic Aging Lessons Learned (GALL) Report, Revision 0," AMP XI.M32, "One-Time Inspection." In order to obtain information necessary to verify that the procedure is consistent with the LRA program description and GALL Report AMP XI.M32, the staff issued requests for additional information (RAIs) for the subjects discussed below.

The OTI procedure bases the number of required inspections on the number of components in each inspection group; however, the procedure does not discuss how to determine the number of inspections performed for each of the different aging effects. The staff noted that, if adequate inspections are not performed for components with each aging effect in an inspection group, the OTI procedure may not be able to adequately identify whether an aging effect is occurring. By letter dated November 30, 2012, the staff issued RAI Question 1 requesting that the licensee state the basis for the number inspections that will be performed for each aging effect within each inspection group.

In its response dated February 28, 2013, the licensee stated that, unless otherwise noted, the inspection of a component within an inspection group will include each of the aging effects for that group. For example, if the applicable aging effects for an inspection group include cracking and loss of material, then each of the inspected components is examined for both cracking and loss of material. For those cases where an aging effect applies only to select systems in the group, the inspection for that aging effect will be focused only on the select systems. The number of those inspections will be 20 percent of the subpopulation of components to which the aging effect applies. The licensee also stated that adequate justification will be documented if the number of inspections for a specific aging effect is less than 20 percent of the population. The licensee made a commitment, to be completed by October 1, 2013, to include specific guidance in the procedure for determining the number of inspections for each aging effect within an inspection group.

The staff finds the licensee's response acceptable because the licensee will inspect 20 percent (up to a maximum of 25) of the components in each inspection group to which a specific aging effect applies, and that sample size is consistent with the current staff guidance in NUREG-1801, Revision 2, AMP XI.M32, "One-Time Inspection," as adequate for determining whether an aging effect is occurring. The staff's concern described in RAI Question 1 is resolved.

The OTI procedure includes inspection of elastomer components exposed to air/gas or fuel oil for elastomer degradation. The procedure includes direction for performing visual examination methods (VT-1 and VT-3), and discusses the use of other inspection methods at the discretion of the program owner. However, the OTI procedure does not discuss how elastomer degradation will be identified and what acceptance criteria will be used. The staff noted that visual examinations may not be capable of detecting changes in the physical properties of elastomer materials (e.g., hardening). By letter dated November 30, 2012, the staff issued RAI Question 2 requesting that the licensee describe the method and acceptance criteria for elastomer inspections.

In its response dated February 28, 2013, the licensee stated that the OTI Program is credited for the aging management of elastomer flexible connections in the diesel generator systems. The licensee also stated that the flexible connections are covered in a sheathing material that prevents tactile examinations. However, the licensee further stated that the inspection of these connections involves disconnecting at least one end of the hose and performing internal visual inspections for signs of degradation and, in this process, hardening of the elastomer materials would be evident at the hose end. The acceptance criteria for the inspections will be no visible signs of degradation, as evidenced by cracking, crazing, discoloration, or hardening observed during the process of disconnecting the hose. The licensee made a commitment, to be completed by October 1, 2013, to include acceptance criteria for the inspection of elastomer components.

The staff finds the licensee's response acceptable because the visual inspection of the ends of the disconnected hoses, coupled with observations of elastomer hardening during the disconnection and inspection, is capable of confirming the absence of cracking and other changes in material properties. The staff noted that the licensee's stated acceptance criteria are consistent with current staff guidance in NUREG-1801, Revision 2, AMPs XI.M35, "External Surfaces Monitoring," and XI.M38, "Inspection of Internal Surfaces in Miscellaneous Piping and Ducting Components." The staff's concern described in RAI Question 2 is resolved.

Based on its review of BFN OTI Procedure, O-TI-565, and the licensee's responses to RAI Questions 1 and 2, the staff finds that the OTI procedure is consistent with the LRA program description and GALL Report AMP XI.M32.

**Conclusion**

Based on its review of BFN OTI Procedure, O-TI-565, Revision 3, and the licensee's response to the RAIs, the staff concludes that the licensee has fulfilled the portion of Commitment no. 25 related to the development of the implementing procedure for the OTI Program. The staff reviewed a new commitment related to revising the procedure to include acceptance criteria for elastomer inspections and specific guidance on determining the number of inspections for each aging effect and concludes that the licensee has demonstrated that the program, as revised, will adequately manage aging of applicable components during the period of extended operation.

Primary Contributor: John Wise, NRR/DLR