

December 20, 2004

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

SUBJECT: REQUEST FOR ADDITIONAL INFORMATION FOR THE REVIEW OF THE
BROWNS FERRY NUCLEAR, UNITS 1, 2, AND 3, LICENSE RENEWAL
APPLICATION

Dear Mr. Singer:

By letter dated December 31, 2003, Tennessee Valley Authority, (TVA or the applicant) submitted an application pursuant to 10 CFR Part 54, to renew the operating licenses for Browns Ferry Nuclear (BFN), Units 1, 2, and 3, for review by the U.S. Nuclear Regulatory Commission (NRC). The NRC staff is reviewing the information contained in the license renewal application (LRA) and has identified, in the enclosure, areas where additional information is needed to complete the review.

These RAIs were discussed with your staff, Ken Brune, and a mutually agreeable date for this response is within 30 days from the date of this letter. If you have any questions, please contact me at 301-415-1594 or e-mail YKS@nrc.gov.

Sincerely,

/RA/

Yaira K. 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

Enclosure: As stated

cc w/encls: See next page

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- 2 - **BROWNS FERRY NUCLEAR PLANT**

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DISTRIBUTION: Ltr to K. Singer, TVA, Re: Browns Ferry RAI, Dated: December 20, 2004

Adams accession no.: **ML043560382**

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BROWNS FERRY NUCLEAR, UNITS 1, 2, AND 3
LICENSE RENEWAL APPLICATION (LRA)
REQUEST FOR ADDITIONAL INFORMATION (RAI)

RAI 2.4-1

BFN LRA Drawing No. 0-10E201-01-LR, "License Renewal Screening for Information Only Location of Structures" identifies structures that are not in scope of license renewal. These structures include East Access Facility, Isolation Valve Pits, Rad waste Building, South Access Retaining Walls, Water and Oil Storage Building, part of Gate Structure No.2 adjacent to Diesel HPFP House, Raw Water Treatment Facility, structural elements within the Transformer Yard and other miscellaneous buildings. It is not obvious to the staff that all of the above listed structures serve no intended function as defined in 54.4(a)(1). The staff cannot evaluate whether these structures are correctly excluded from the license renewal scope. Additional descriptive information is needed for the above listed structures before a determination can be made. Therefore, the applicant is requested to submit a more detailed description of these structures, define their function, and describe the technical bases for exclusion from the license renewal scope. Also verify that none of these structures serve a seismic II/I intended function as defined in 54.4(a)(2).

RAI 2.4-2

LRA Section 2.4.1.1 discusses the scoping and screening results for the Primary Containment Structure. It is the staff's understanding that this section of the LRA addresses not only the primary containment (drywell, pressure suppression chamber, and the vent system connecting the two structures), but also all the structures inside the primary containment, all attachments to the containment, and the containment supports. LRA Table 2.4.1.1 identifies the primary containment component types requiring aging management review and the associated component intended function(s). Since LRA Table 2.4.1.1 combines many components under a single component type, the staff requests that the applicant identify, as appropriate, which component type is intended to cover the specific components listed in (a) through (k) below, or identify the location in the LRA where these specific components are addressed. If these specific components are not considered to be within the scope of license renewal, please provide the technical bases for their exclusion..

- (a) Reactor Vessel to Biological Shield Stabilizers
- (b) Biological Shield to Containment Stabilizer
- (c) RPV Male Stabilizer Attached to Outside of Drywell Shell
- (d) RPV Female Stabilizer and Anchor Rods (also referred to as Gib) embedded in Reactor Building concrete wall
- (e) Biological Shield Wall and Anchor Bolts
- (f) Reactor Vessel Support Skirt and Anchor bolts

Enclosure

(g) Reactor Vessel Support Ring Girder and Anchor Bolts
Reactor Vessel Support Pedestal

(h) Drywell internal steel shear ring

(i) Drywell steel support skirt and anchor bolts

(j) The drywell head closure bolts and double gasket, tongue-and-groove seal arrangement

RAI 2.4-3

Leakage through the refueling seals located at the top of the drywell potentially exposes the carbon steel drywell shell inner and outer surfaces to loss of material due to corrosion. This is a particular concern for the embedded portion of the drywell shell. Corrosion detected on the outer shell surface in the sand pocket region in a number of Mark I steel containments has been attributed to leakage past the drywell-to-reactor building refueling seal, coupled with clogging of the sand pocket drains. Leakage into the drywell, past the reactor vessel-to-drywell refueling seal, creates the potential for corrosion of the inaccessible portion of the inner surface of the drywell shell, embedded in the concrete floor.

From the information contained in the LRA, it is not clear to the staff (1) whether the refueling seals have been included in the license renewal scope, and (2) if included, how aging management is being addressed. Therefore, the applicant is requested to verify that the BFN plants' refueling seals are included in a component type that require an aging management review (AMR), or a detailed explanation for their exclusion. Also, provide a detailed description of the plant-specific operating experience for the refueling seals in all three (3) units, including incidences of degradation, method of detection, root cause, corrective actions, and current inspection procedures.

RAI 2.4-4

LRA Table 2.4.2.1, Reactor Building Structure presents a list of component types that are part of the reactor building, the auxiliary and emergency systems of the nuclear steam supply system, the biological shield, the spent fuel pool, the steam dryer/moisture separator storage pool, the reactor cavity reactor auxiliary equipment, the steel superstructure with metal siding and the built-up roof, etc. The applicant is requested to provide a description of the "Neutron-Absorbing Sheets" used for BFN spent fuel storage racks and confirm that they are part of the spent fuel storage racks listed in Table 2.4.2.1.

RAI 2.4-5

Referring to Section 2.4.2.1, Reactor Buildings of the LRA, clarify if BFN's reactor buildings are designed to maintain an internal negative pressure under neutral wind conditions in order to serve as the secondary containment whose primary purpose is to minimize the ground level release of airborne radioactive materials and to provide for a controlled, elevated release of the building atmosphere under accident conditions. If yes, are BFN's Reactor Building pipe penetrations provided with some type of silicone rubber seals that allow pipe movement while providing a seal between the pipe and the Reactor Buildings and maintain the negative internal

pressure. As applicable, confirm that these penetration seals are designated as within the scope of AMR and are included in Table 2.4.2.1 of the LRA.

RAI 2.4-6

Referring to Section 2.4.4.5, "South Dike of Cool Water Channel between Gate Structure Nos. 2 and 3," the paragraph at the end of the "Description" (page 2.4-37) states that the portion of the structure that contains components requiring an AMR is the portion above the RHRSW System discharge piping. Clarify if the entire "South Dike of Cooling Water Channel between Gate Structure Nos. 2 and 3" or only the portion as indicated in the above paragraph is designated to be within the scope requiring an AMR. Also, if only portion of the South Dike structure requires an AMR, discuss BFN's basis for defining the specific geometric boundary of the portion requiring an AMR.

RAI 2.4-7

Section 2.4.5.2 of the LRA discusses the screening results of BFN's Containment Atmosphere Dilution Storage Tank's Foundations. With respect to Table 2.4.5.2, besides the single item listed therein, as appropriate, identify other items such as structural steel embedments; carbon steel boltings; reinforced concrete slabs and foundation footings, and grouted concrete that require an AMR.

RAI 2.4-8

Section 2.4.3.1, Diesel Generator Buildings of the LRA refers to Units 1 and 2 Diesel Generator Building and Unit 3 Diesel Generator Building. The license Renewal drawing No. 0-10E201-01-LR shows a diesel generator building at the west side of the reactor building and another diesel generator building at the east side of the same without a stipulation as to which diesel generator building is designated for Units 1 and 2 shutdown function and the other building is intended for shutdown of the Unit 3 reactor. Please clarify this ambiguity and explain why the four separate Unit 3 Shutdown boards are located in Unit 3 Diesel Generator Building, whereas, the other four shared Units 1 and 2 shutdown boards are located in the Reactor Buildings. Also regarding Table 2.4.3.1, as appropriate, identify other items such as structural steel embedments; carbon steel boltings; reinforced concrete foundation footings; grouted concrete; and water proofing membrane materials that require an AMR.

RAI 2.4-9

Section 2.4.3, Class 1 Group 3 Structures lists the following structures on page 2.4-12 of the LRA that are not shown in BFN Drawing No. 0-10E201-01-LR. Please provide more information regarding the following items:

- (a) Clarify the reason why the three vent vaults shown in Drawing No. 0-10E201-01-LR do not indicate the specific systems or components contained or sheltered within them. Also, Section 2.4.3.3, Off-Gas Treatment Building is described to have only exterior walls and bottom slab, implying that there is no top slab for the building. Confirm that the building has no top slab and there are no component types (e.g., electrical and I & C penetrations, structural steel embedments; carbon steel boltings; reinforced concrete

foundation footings; grouted concrete, and water proofing membrane materials, etc.) other than those listed in Table 2.4.3.3 that require an AMR.

- (b) Describe the specific location of the Vacuum Pipe Building and confirm that there are no items such as structural steel embedments, carbon steel boltings; reinforced concrete foundation footings; grouted concrete, compressible joints and seals, water proofing membrane and caulking materials that require an AMR.
- (c) Describe the specific location of the Residual Heat Removal Service Water Tunnels including their embedded boundaries in Drawing No. 0-10E201-01-LR. Also, as appropriate, identify items requiring an AMR that are part of the Service Water Tunnels, such as structural steel embedments, carbon steel boltings; reinforced concrete beams, walls, slabs, foundation footings; grouted concrete, mechanical penetrations, water proofing membrane and caulking materials.
- (d) Describe the specific locations of the Electrical Cable Tunnel from the Intake Pumping Station to the Powerhouse including the portion running east-west under the southern portion of the Turbine Buildings. As appropriate, identify items such as structural steel embedments; carbon steel boltings; reinforced concrete beams, walls, slabs, foundation footings; grouted concrete, mechanical penetrations, water proofing membrane and caulking materials that require an AMR.
- (e) List the BFN in-scope structures that have one or more of the Underground Concrete Encased Structures described in Section 2.4.3.7 of the LRA. As appropriate, identify items such as structural steel embedments, carbon steel boltings; reinforced concrete walls, slabs and foundation footings; grouted concrete, and water proofing membrane that require an AMR.

RAI 2.4-10

Provide additional information regarding the following Class I Group 6 Structures:

- (a) With respect to the Intake Pumping Station, as appropriate, identify items such as hatches and plugs; structural steel embedments; carbon steel boltings; reinforced concrete foundation footings; grouted concrete; and water proofing membrane materials that require an AMR.
- (b) Regarding the Condensate Water Storage Tanks's Foundation and Trenches, confirm that the equipment supports and foundations as well as the trenches listed in Table 2.4.5.1 consist of reinforced concrete components. As appropriate, identify items such as structural steel embedments; carbon steel boltings; grouted concrete; and water proofing membrane materials that require an AMR.

RAI 2.4-11

Provide additional information regarding the following Non Class I Structures:

- (a) With respect to the BFN Turbine Buildings, explain the basis for stating that masonry block utilized for Units 1 and 3 is not in scope for period of extended operation. Also identify, as appropriate, items such as structural steel embedments; carbon steel boltings; grouted concrete; metal sidings and water proofing membrane materials that require an AMR.
- (b) Regarding the Diesel High Pressure Fire Pump House, identify, as appropriate, items such as structural steel embedments; carbon steel boltings; grouted concrete, and water proofing membrane materials that require an AMR.
- (c) With respect to BFN Vent vaults, identify, as appropriate, items such as structural steel embedments; carbon steel boltings; grouted concrete, and water proofing membrane materials that require an AMR.
- (d) With respect to BFN's Transformer Yard, 161 kV Switchyard and 500 KV Switchyard, identify, as appropriate, items such as structural steel embedments; carbon steel plates and boltings; reinforced concrete pads and footings; grouted concrete; and water proofing membrane materials that require an AMR.

RAI 2.4-12

Based on information provided in LRA Section 2.4.2.1, Reactor Buildings; Section 2.4.2.2, Equipment Access Lock; Section 2.4.3.1, Diesel Generator Buildings; Section 2.4.4.1, Intake Pumping Station and Section 2.4.7.1, Turbine Buildings, it is unclear to the staff which cranes and hoists have been determined as within the scope of license renewal and which subset of the in-scope items have been screened in as items requiring an AMR.

The applicant is requested to clarify the treatment of cranes and hoists in the scoping and screening, and in the aging management review. Please submit the following information:

- (a) A list of all cranes/hoists/rails and associated components in the scope of license renewal.
- (b) Provide additional information to identify the location in the LRA where cranes/hoists/rails and associated components are addressed. If these specific components are not considered to be within the scope of license renewal, please provide the technical bases for their exclusion.
- (c) A list of all cranes/hoists/rails and associated components requiring an aging management review (i.e., passive, long-lived).
- (d) A list of all cranes/hoists/rails and associated components requiring aging management and/or TLAA.

RAI 2.4-13

Based on information provided in LRA Section 2.4.8.1, Structures and Component Supports Commodity Group, it is not clear to the staff that all component supports within the scope of license renewal are included in the component supports commodity group. Also, clarification is needed for several components listed in Table 2.4.8.1.

In order to complete the screening review for component supports, the staff requests the applicant to submit the following information:

- (a) Clarify if the ASME Equivalent Supports and Components listed in Table 2.4.8.1 include the reactor vessel support skirt/support ring and reactor vessel upper lateral stabilizer support. If not, where are these supports addressed in the LRA? If not managed by ASME Section XI, Subsection IWF, submit the technical basis for crediting an alternate aging management program.
- (b) Clarify if the ASME Equivalent Supports and Components of the Table 2.4.8.1 include the drywell lower ring support and the drywell upper lateral support. If not managed by ASME Section XI, Subsection IWF, submit the aging management review for the drywell supports, including the technical basis for this exception.
- (c) Since LRA Section 2.4.8.1 is not referenced anywhere in LRA Sections 2.3 or 2.4, verify that all supports associated with components listed in LRA Sections 2.3 and 2.4.1 through 2.4.7 are included in the component types listed in Table 2.4.8.1. If not, identify the supports not included and submit the aging management review, including credited aging management programs.
- (d) Confirm that the "Bolting and Fasteners" listed in Table 2.4.8.1 includes anchors directly installed into concrete.

RAI 2.4-14

Based on information provided in LRA Section 2.4, the staff cannot identify the insulation and insulation jacketing included in the license renewal scope nor the specific subsets of insulation and insulation jacketing that are included in Section 2.4 tables. It is also unclear whether insulation and jacketing on the reactor coolant system has been included.

In order to complete the screening review for insulation and insulation jacketing, the staff requests the applicant to submit the following information:

- (a) Specifically identify the structures and structural components designated as within the license renewal scope that have insulation and/or insulation jacketing, and identify their location in the plant.
- (b) List all insulation and insulation jacketing materials associated with the item (a) above that require an aging management review and the results of the aging management review for each.

- (c) For insulation and insulation jacketing materials associated with the item (a) above that do not require aging management, submit the technical basis for this conclusion, including plant-specific operating experience.
- (d) For insulation and insulation jacketing materials associated with the item (a) above that require aging management, identify the aging management program(s) credited to manage aging.