

March 11, 2005

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 (RAI) FOR THE REVIEW OF
THE BROWNS FERRY NUCLEAR PLANT, UNITS 1, 2, AND 3, LICENSE
RENEWAL APPLICATION (TAC NOS. MC1704, MC1705 AND MC1706)

Dear Mr. Singer:

By letter dated December 31, 2003, Tennessee Valley Authority, (TVA or the applicant) submitted an application pursuant to Title 10 of the *Code of Federal Regulations* Part 54 (10 CFR Part 54), to renew the operating licenses for Browns Ferry Nuclear (BFN) Plant, 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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BROWNS FERRY NUCLEAR PLANT

Tennessee Valley Authority

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BROWNS FERRY NUCLEAR PLANT
Tennessee Valley Authority

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DISTRIBUTION: Letter to: K. Springer, Re: RAI for review of Browns Ferry Nuclear Plants,
Units 1, 2 and 3, Dated: March 11, 2005
Adams Accession No.: **ML050700309**

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

RAI 3.1.2.4-7

BFN LRA Tables 3.1.2.3 and 3.1.2.4 present the aging management review (AMR) for small bore piping and fittings less than 4 inch nominal pipe size (NPS 4) in treated water environment for the reactor coolant system (RCS).

In Section 3.1.2.2.4, the applicant addresses the potential of crack initiation and growth due to thermal and mechanical loading or stress corrosion cracking (SCC) including intergranular stress corrosion cracking (IGSCC), that could occur in small bore piping in the RCS and connected system piping less than NPS 4.

The GALL (NUREG-1801) report recommends that a plant-specific destructive examination or a nondestructive examination (NDE) that permits inspection of the inside surfaces of the piping be conducted to ensure that cracking has not occurred and the component intended function will be maintained during the extended period.

By letter dated October 8, 2004, the applicant submitted its formal response to the consistent with GALL audit, stating that:

Combinations of NDE, including visual, ultrasonic, and surface techniques are performed following procedures consistent with the ASME Code and 10 CFR 50, Appendix B. For small bore piping less than NPS 4, including pipe, fittings, and branch connections, a plant-specific destructive examination of replaced piping due to plant modifications or NDE that permits inspection of the inside surfaces of the piping is to be conducted to ensure that cracking has not occurred.

Either destructive examination or NDE that is capable of detecting inside surface cracking is required. Since there are ultrasonic testing (UT) inspectable, full penetration butt welds within the scope of license renewal, BFN has chosen not to perform destructive examination of socket welds. BFN has not identified butt welds in ASME Class 1 piping 1-inch NPS and less. Therefore, 1-inch NPS and less piping will not be selected for small-bore piping NDE examination. This sample population provides adequate indication of whether inside diameter cracking is occurring in small-bore piping. However, the sample selection criteria used for butt welded NPS piping less than 1 inch is not representative for socket welded piping.

Therefore, provide the technical bases: (1) for concluding that NDE will detect adverse conditions in full penetration butt welds in piping 1-inch NPS or greater before adverse conditions develop in socket welded piping, for 1-inch NPS and less; and (2) for not crediting destructive examination of replaced piping due to plant modifications for aging management of socket welded piping, NPS 1 and less.

RAI 3.5-16

In LRA Table 3.5.2.12, the applicant states that no aging management is required for submerged reinforced concrete. Plant-specific Note 5 states that for cracking, loss of bond, loss of material (spalling, scaling) due to corrosion of embedded steel in concrete for inaccessible areas, no plant-specific aging management is required. Plant-specific Note 6 states that for increase in porosity and permeability, cracking, loss of material (spalling, scaling) due to aggressive chemical attack of concrete for inaccessible areas, no plant-specific aging is required.

During the BFN on-site AMR audit, the staff noted that a submerged component is not necessarily inaccessible. If the submerged component is accessible, it is expected that the component will be managed by the Inspection of Water Control Structures Program (B.2.1.37). The applicant was asked to identify all the submerged concrete components in the Intake Pumping Station; provide the technical basis for designating these components as being inaccessible; identify all the submerged concrete structures that will be inspected under AMP B.2.1.37; and describe the implementing details of the inspection of submerged structures included in the AMP B.2.1.37.

By letter dated October 8, 2004, the applicant stated:

(1) Browns Ferry groundwater and Wheeler Reservoir water sample measurements presented in the response to the consistent with GALL audit Question 297 have confirmed that parameters are well below threshold limits that could cause concrete degradation (i.e., an aggressive environment does not exist).

(2) It is not credible to postulate that some environmental event will occur in the future that would affect the quality of groundwater in the vicinity of Browns Ferry, and that a change in the environment due to a chemical release would be considered as an "abnormal event". The applicant noted that NUREG-1800, "Standard Review Plan for the Review of License Renewal Applications for Nuclear Power Plants," states that aging effects from abnormal events need not be postulated specifically for license renewal.

(3) In-scope submerged concrete exposed to Wheeler Reservoir water is not readily accessible for inspection. Several in-scope submerged concrete common areas outside of individual pump bays where continuous flow make diver entry unsafe would require a multiple unit outage to inspect.

(4) Browns Ferry will perform a one-time inspection of the in-scope submerged concrete in one individual pump bay to confirm the absence of aggressive environmental aging effects and that a loss of intended function has not occurred due to aggressive environment aging effects. Browns Ferry will also continue to perform periodic inspections of accessible concrete in an inside air environment and outside air environment for in-scope structures with the Structures Monitoring Program.

After the review of the above response, including the facts that an aggressive environment does not exist for Browns Ferry groundwater, and continuous water flow in several in-scope submerged concrete common areas outside of individual pump bays makes diver entry unsafe,

the staff requests the applicant to provide the following additional information, and the corresponding plant-specific commitment and the UFSAR supplement.

1. A discussion of past inspection findings, and repairs and maintenance experience for BFN's submerged reinforced concrete structures (e.g., intake structure)
2. Referring to the discussion columns of Items III A6.1-b, and III A6.1-d in GALL Volume II (NUREG-1801), provide a discussion of the pertinent BFN submerged reinforced concrete test data (as available) which demonstrate that the conditions stated in the above referenced GALL discussion columns are fully met.
3. A detailed description of the above indicated one-time inspection of the in-scope submerged concrete in one individual pump bay including: method of inspection; concrete elements and parameters or types of degradation to be inspected; criteria for judging the observed types, extent and severity of reinforced concrete degradation which would trigger BFN's commitment to an AMP for BFN submerged concrete with a periodic inspection provision and an inspection frequency, and a BFN schedule for implementing the one-time inspection program.
4. A discussion of the methods that will be employed to ensure that the raw service water in close proximity to the intake structure remains non-aggressive to the submerged concrete during the extended period of operation (e.g., periodic monitoring of the raw water for pH, chloride concentration, sulfate concentration, abrasive particulates, detrimental organic agents).