November 3, 2004

10 CFR 54

U.S. Nuclear Regulatory Commission
ATTN: Document Control Desk
Mail Stop: OWFN P1-35
Washington, D.C. 20555-0001

Gentlemen:

In the Matter of	)	Docket Nos. 50-259
Tennessee Valley Authority	)	50-260
		50-296

BROWNS FERRY NUCLEAR PLANT (BFN) – UNITS 1, 2, AND 3 LICENSE RENEWAL APPLICATION – REACTOR SYSTEMS SECTION 2.3.1, 2.3.2, AND 2.3.3 – REQUEST FOR ADDITONAL INFORMATION (TAC NOS. MC1704, MC1705, AND MC1706)

By letter dated December 31, 2003, TVA submitted, for NRC review, an application pursuant to 10 CFR 54, to renew the operating licenses for the BFN Plant, Units 1, 2, and 3. As part of its review of TVA's license renewal application, the NRC staff, by letter dated October 8, 2004, identified areas where additional information is needed to complete its review.

The specific area requiring a request for additional information (RAIs) is related to Reactor Coolant Systems, Engineering Safety Features, and Auxiliary Systems, Sections 2.3.1, 2.3.2, and 2.3.3 respectively. Drafted forms of these RAIs were discussed with the TVA Staff on a telephone conference call on September 15, 2004.

The enclosure to this letter contains the specific NRC requests for additional information and the corresponding TVA response.

If you have any questions regarding this information, please contact Ken Brune, Browns Ferry License Renewal Project Manager, at (423) 751-8421.

I declare under penalty of perjury that the forgoing is true and correct. Executed on this 3rd day of November, 2004.

Sincerely,

Original Signed by:

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Enclosure:
cc: See page 3

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ENCLOSURE

TENNESSEE VALLEY AUTHORITY
BROWNS FERRY NUCLEAR PLANT (BFN)
UNITS 1, 2, AND 3
LICENSE RENEWAL APPLICATION (LRA)

RESPONSE TO NRC REQUEST FOR ADDITIONAL INFORMATION (RAI), RELATED TO REACTOR SYSTEMS SECTION 2.3.1, 2.3.2, AMD 2.3.3

(SEE ATTACHED)

TENNESSEE VALLEY AUTHORITY
BROWNS FERRY NUCLEAR PLANT (BFN)
UNITS 1, 2, AND 3
LICENSE RENEWAL APPLICATION (LRA)

RESPONSE TO NRC REQUEST FOR ADDITIONAL INFORMATION (RAI), RELATED TO REACTOR SYSTEMS SECTION 2.3.1, 2.3.2, AMD 2.3.3

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Listed below are the specific NRC requests for additional information and the corresponding TVA responses.

2.3.1.2 Reactor Vessel Internals (RVI)

NRC RAI 2.3.1.2-1

In Table 2.3.1.2 of the LRA, one of the intended functions of core spray spargers was appropriately identified as maintaining the spray pattern in a manner that all fuel assemblies will be adequately cooled following a LOCA. The staff's understanding is that adequate long-term core cooling following a LOCA can only be assured by retaining the original spray distribution evaluation report (SER) for the BWRVIP-18 report, the staff had concluded that when performing inspection of core spray spargers, all BWR plants must be treated as "geometry-critical" plants. Furthermore, it is staff's understanding that the previous BWRVIP designations of "geometry-tolerant" plants have been rescinded and all plants are now considered to be "geometry-critical." Consequently, in order to assure adequate cooling of the uncovered upper third of the core, the core spray system must provide adequate spray distribution to all bundles in the core. The staff also believes that leakage through sparger and piping cracks, as well as repairs and potential

blockage of spray nozzles, must be considered in assessing the core spray distribution. As a result, it is essential that spraying water on the fuel assemblies in a pattern that was originally designed must be maintained, and that the applicant's aging management activities be devised to provide a reasonable assurance that the original spray distribution will be preserved during the period of extended operation.

On the basis of the above discussion, the staff requests the applicant to affirm that when performing inspection of core spray spargers, the BFN plants are inspected in accordance to the requirements for the "geometry-critical" plants, as required by the staff SER for BWRVIP-18 report; and that the original spray pattern assumed for the CLB will be preserved during the extended period of operation.

TVA Response to RAI 2.3.1.2-1

BFN is performing inspections as required by the BWRVIP-18 Report as modified by Jan. 11, 1999 letter, which treats all plants the same including BFN, when inspecting core spray spargers. Based on the Water Chemistry Program and that the nozzles are constructed of a stainless steel material, corrosion is not a credible aging mechanism to cause flow blockage.

NRC RAI 2.3.1.2-2

Recent industry experience of steam dryer failures at operating BWRs following power uprate, for example at Quad Cities; and potential to generate loose parts that can degrade safety-related components have necessitated the staff to reconsider whether steam dryer should be within the scope of license renewal, in accordance with 10 CFR 54.4(a)(2), requiring aging management. Although the steam dryer does not perform a safety-related function, the steam dryer must maintain its structural integrity to support emergency core cooling system (ECCS) operation, and also to prevent the occurrence of loose parts in the reactor vessel or steam lines that could adversely affect plant operation. The Interim Staff Guidance (ISG-09), which provides clarification of the 10 CFR 54.4(a)(2) scoping criterion, states that if industry failures of non safety-related SSCs have previously been experienced that may impact safety-related SSCs, then the applicant should include such non safety-related SSCs within the scope of license renewal; or to provide explanation that similar failures are unlikely to occur at the BFN plant following power uprate. The staff, therefore, requests the applicant to include the steam dryers within the scope of license renewal requiring aging management. The

applicant's response should also include the following additional information:

a) Are the steam dryer designs at BFN and Quad Cities similar? If not, please describe the significant differences between the two designs which support the conclusion that steam dryer failure similar to Quad Cities are unlikely to develop at the BFN steam dryers following power uprate.

b) Describe any actions, including analysis that will be performed to confirm whether extended power uprate conditions will either generate, or not generate loose parts from the steam dryer.

TVA Response to RAI 2.3.1.2-2

The steam dryers have been added within the scope of license renewal for 10 CFR 54.4(a)(2) scoping criterion.

a) There are three general types of steam dryer configurations see Figure 1):

   1. BWR/3-style steam dryers with a square hood and internal braces (NOTE: This is the configuration of the steam dryers at Quad Cities).

   2. BWR/4-style steam dryers that have slanted hoods (NOTE: This is the configuration of the steam dryers at BFN).

   3. BWR/5 and later steam dryer designs that incorporate curved hoods to optimize the steam flow.

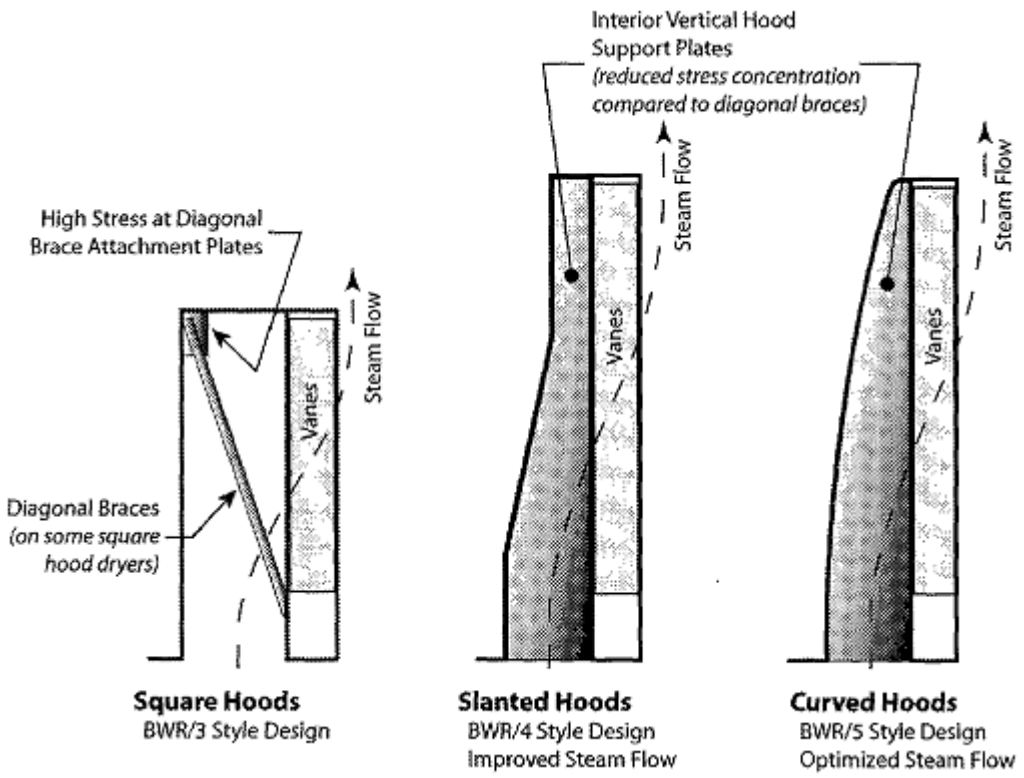

Figure 1 - Steam Dryer Hood Configurations

The BFN dryers are not the same design as the dryers at Quad Cities. Basically the BFN dryer is a slanted hood design which is less susceptible to vibration induced failures than the square hood Quad Cities dryers. GE has conducted finite element model analysis which documents that the square hood is more susceptible to operating stresses.

b) The forcing function for the dryer loads has been identified as being primarily acoustic loads which originate in the steam lines. The BWRVIP and the industry (GE and utilities such as Exelon and Entergy) have efforts underway to develop methods to measure and document the amount of additional loads which maybe placed on the dryer as the result of uprated conditions. As part of the EPU licensing process the NRC is requiring that utilities evaluate dryers in a manner which includes consideration of the additional loads that result from uprated conditions. TVA will be following the guidance provided by the BWROG and will meet the licensing requirements imposed by the NRC for dryer load determination. Following the determination of the dryer loads, the BFN dryers will be evaluated for modifications to insure dryer integrity. Also, the BWRVIP is currently preparing guidelines for inspection and evaluation of steam dryers.

This guideline, will be used by the industry to insure that the integrity of the dryer is maintained without the generation of loose parts. The BWRVIP steam dryer guidelines will be issued prior to BFN implementing EPU. TVA will follow the BWRVIP guidelines for the inspection and evaluation of the BFN dryers to insure their future integrity under uprated operating conditions.

2.3.1.4 Reactor Recirculation System (RRS)

NRC RAI 2.3.1.4-1

In the LRA Table 2.3.1.4 for the RRS and for a few other systems (for example Containment Inerting system), heat exchangers have been identified as a component type within the scope of license renewal. However, for these heat exchangers, the pressure boundary was identified as the only intended function requiring aging management, not their heat transfer function. The staff requests the applicant to clarify why the heat transfer function, in addition to pressure boundary, was not also identified as one of the intended functions which needs to be maintained during the extended period of operation by assigning appropriate aging management program for it.

TVA Response to RAI 2.3.1.4-1

The heat exchangers associated with Table 2.3.1.4 are the heat exchangers shown on LR drawings 2-47E844-2-LR and 3-47E817-2-LR. The shell sides of these heat exchangers are in scope for secondary containment as a pressure boundary for the Raw Water System (024). These heat exchangers are not safety related, the tube side is in scope for 10 CFR 54.4(a)(2) requirements only, and so these heat exchangers are not being credited for their heat transfer function.

2.3.2.5 Core Spray System

NRC RAI 2.3.2.5-1

The low pressure coolant injection (LPCI) coupling was identified in the BWRVIP-06 report as a safety-related component. It appears, however, that the component was not identified in the LRA requiring an AMR. If the component exists at BFN, then the staff requests the applicant to justify its exclusion from aging management; otherwise, submit an AMR for the subject component.

TVA Response to RAI 2.3.2.5-1

BFN does not contain a LPCI coupling; therefore, this component was not identified in the LRA. In addition, BFN is not listed in BWRVIP-42 (LPCI Coupling Inspection and Flaw Evaluation Guidance) Table 2-2 as a plant with a LPCI Coupling.

2.3.2.7 Containment Atmospheric Dilution (CAD) System

NRC RAI 2.3.2.7-1

In Section 2.3.2.7 of the LRA and in the UFSAR Sections 5.2.3 and 5.2.6, it is indicated that each train of the CAD system has a liquid nitrogen supply tank, an ambient vaporizer and an "unqualified" electric heater. One of the intended functions identified for the CAD system is to provide dilution of the primary containment atmosphere with nitrogen after a LOCA to maintain gas concentrations below level which could produce a combustible gas mixture. However, in Table 2.3.2.7 of the LRA, the components of the CAD system which mainly perform pressure boundary function have been listed as within the scope of license renewal. Please confirm whether all the components of the CAD system that perform containment atmosphere dilution function (in addition to pressure boundary function) have been included within the scope requiring aging management.

TVA Response to RAI 2.3.2.7-1

All components within the CAD System (084) are in scope. The containment atmosphere dilution function is insured by maintaining the pressure boundary of the system.

2.3.3.23 Reactor Core Isolation Cooling

NRC RAI 2.3.3.23-1

In Section 4.7.5 of the UFSAR, it is stated that the reactor core isolation cooling (RCIC) makeup water is delivered into the reactor vessel through a connection to the feedwater line and is distributed within the reactor vessel through the feedwater sparger. The connection to the feedwater line is provided with a thermal sleeve. It is further stated that the thermal sleeve (liner) in the feedwater line is designed as a nonpressure-containing liner and is provided to protect the pressure-containing piping tee from excessive thermal stress. In Table 2.3.3.23 of the LRA, thermal sleeve (liner) was not identified as a component type within the scope of license renewal. The staff, therefore, requests the applicant to

include this component type within the scope requiring aging management.

TVA Response to RAI 2.3.3.23-1

The material for this component was identified as Pipe and Pipe Fitting in RCPB table in the Feedwater System (003) and will be inspected as part of the one time inspection program.

2.3.3.32 Neutron Monitoring System

NRC RAI 2.3.3.32-1

(a) In page 2.3-104 of the LRA, it is stated that the Average Power Range Monitor Subsystem averages the Local Power Range Monitor Subsystem signals to provide an overall indication of reactor power for control and trip functions. A subsystem of the Average Power Range Monitor Subsystem [the Oscillation Power Range Monitor (OPRM)] ensures reactor operation in a stable thermal-hydraulic region. The Rod Block Monitor receives input from Local Power Range Monitors close to a control rod to prevent fuel damage in the event of a rod withdrawal error. Furthermore, it was stated in the LRA that the portions of the Neutron Monitoring System that contain components subject to an AMR are only those that form part of the reactor coolant pressure boundary. The staff believes that in addition to the portions that are pressure boundary, OPRM and its functions, as described above, are passive and safety-related; and hence meets the criteria delineated in 10 CFR 54.4(a)(1) and 10 CFR 54.21(a)(1). Therefore, unless the OPRM is subject to replacement based on a "qualified life" or "specified time period" or degradation of its ability to perform its intended functions due to aging is readily monitorable, the component should be within the scope requiring aging management. Please provide a justification for why these components are not within the scope of license renewal.

(b) The staff also requests the applicant to provide the basis for excluding other neutron monitoring subsystems in BFN (except portions that perform pressure boundary function) from the scope of license renewal.

TVA Response to RAI 2.3.3.32-1

(a&b)Section 2.3 of the LRA lists the mechanical scoping and screening results. The only mechanical safety-related passive intended function of the Neutron Monitoring System is Reactor Coolant Pressure Boundary. The scoping and screening results for the electrical components of the Neutron Monitoring System are addressed in section 2.5 of the LRA.

As stated in section 2.5 of the LRA, the "spaces approach" was utilized for scoping of electrical components which does not exclude any electrical components from the scope of license renewal.