February 28, 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 (LRA) – LRA SECTION 3.5 – RESPONSE TO NRC REQUEST FOR FOLLOW UP QUESTION FOR RAI 3.5-7 (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 Browns Ferry Nuclear Plant, Units 1, 2, and 3. As part of its review of TVA's license response letter dated January 31, 2005, the NRC staff, through an informal request, identified an additional follow up question for RAI 3.5-7. This question concentrates on the characteristics of the non-aggressive ground water at BFN.

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

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 foregoing is true and correct. Executed on this 28th day of February, 2005.

Sincerely,

Original signed by:

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Manager of Licensing
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Enclosure:
cc: See page 3

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cc: continued page 4

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s://Licensing/Lic/BFN LR Follow Up RAI 3.5-7 TVA Response Letter.doc

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 VERBAL REQUEST FOR FOLLOW UP QUESTION FOR RAI 3.5-7

(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 VERBAL REQUEST FOR FOLLOW UP QUESTION FOR RAI 3.5-7

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 Browns Ferry Nuclear Plant, Units 1, 2, and 3. As part of its review of TVA's license response letter dated January 31, 2005, the NRC staff, through an informal request, identified an additional follow up question for RAI 3.5-7. This question concentrates on the characteristics of the non-aggressive ground water at BFN.

The following contains the original NRC RAI request, the supplemental question from the NRC and the TVA response to the NRC request for additional information.

NRC RAI 3.5-7:

Under "Buried" environment of Table 3.0.2, "External Service Environments" of the LRA states that ground water at BFN is non-aggressive. Provide historical BFN site ground water chemistry test results together with a discussion of the extent of past ground water sampling and testing frequency as well as the extent of fluctuation of the test results to support the above assertion.
(*Supplement question from NRC dated 2-14-05: In the past, the NRC has had several discussions with the ACRS regarding the issue of phosphate concentrations in ground water and the potential impact on inaccessible concrete aging. Please add a discussion of why phosphates would not have an impact on inaccessible concrete.*)

TVA Response to Follow Up for NRC RAI 3.5-7:

Since BFN did not have data available from the construction period or since plant start-up, baseline sampling was performed over the past year of groundwater and the Wheeler Reservoir. The baseline sampling was to establish if BFN had aggressive or non-aggressive groundwater as defined by the following criteria: pH <5.5, Chlorides > 500 ppm and Sulfates > 1500 ppm. Additionally, the samples would include testing for phosphates as an attribute. [It should be noted that phosphate is not

presently listed as an attribute in the GALL criteria for defining an aggressive environment and no industry threshold limits have been established for phosphate that would cause degradation of concrete features.] The samples were taken at intervals to take into consideration seasonal variations. The samples were taken from the existing site radiological monitoring wells and from the Wheeler Reservoir in close proximity to the Intake Pumping Station structure. Samples were taken at various depths in the monitoring well and the Reservoir by the site environment staff and analyzed by an off-site laboratory for the site environment group.

Results of Browns Ferry groundwater and Wheeler Reservoir water sampling are as follows:

a. Groundwater:

- pH ranges from 6.33 to 8.77 which are well above <5.5 (Note in the well that the value 6.33 was obtained, the remaining pH readings ranged from 7.16 to 7.60 during the time period of sampling. Only one other well had a pH value below 7 and its pH was 6.92 with the remaining readings ranging between 7.12 and 7.6.)

- Chlorides – maximum reading of 18.3 ppm which is well below the threshold of 500 ppm

- Sulfates – maximum reading of 30.3 ppm which is well below the threshold of 1500 ppm

- Phosphates - maximum readings of < 0.500 ppm. This is an extremely low value and .500 ppm was the standard's lowest detectable limit. No reference material was found citing a limit for phosphates which may cause an aggressive groundwater environment.

b. Wheeler Reservoir:

- pH ranges from 7.28 to 8.64 which are well above <5.5.

- Chlorides – maximum reading of 13.9 ppm which is well below the threshold of 500 ppm.

- Sulfates – maximum reading of 15.5 ppm which is well below the threshold of 1500 ppm.

- Phosphates - maximum readings of < 0.500 ppm. This is an extremely low value and .500 ppm was the standard's lowest detectable limit. TVA is responsible for 49 concrete dams on the Tennessee River and its tributaries and monitors them regularly for concrete degradation. TVA's Manager of Dam Safety and Engineering Department was consulted for the results of this monitoring in regards to chemical attack. The results show that neither phosphates nor any other form of chemical attack have been identified as a contributor to concrete dam structure degradation from TVA reservoir water over the last seventy years.

Browns Ferry groundwater water and Wheeler Reservoir sample measurements have confirmed that BFN groundwater is non-aggressive, and the parameters are well below threshold limits that could cause concrete degradation (an aggressive environment does not exist).