Tennessee Valley Authority, Post Office Box 2000, Decatur, Alabama 35609-2000

April 18, 2007

TVA-BFN-TS-431
TVA-BFN-TS-418

10 CFR 50.90

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 - TECHNICAL SPECIFICATIONS (TS) CHANGES TS-431 AND TS-418 - EXTENDED POWER UPRATE (EPU) - SUPPLEMENTAL RESPONSE TO REQUESTS FOR ADDITIONAL INFORMATION (RAI)

By letters dated June 28, 2004 (ADAMS Accession No. ML041840109) and June 25, 2004 (ML041840301), TVA submitted license amendment applications for the EPU of BFN Unit 1 and BFN Units 2 and 3, respectively. This letter provides supplemental information regarding two prior NRC RAIs, which the NRC staff requested via email.

Enclosure 1 to this letter provides supplemental information in response to EPU Round 12 RAI question SBWB-64, which TVA originally provided by letter dated February 26, 2007 (ML070600339).

Enclosure 1 contains information that Areva NP, Inc. (Areva) considers to be proprietary in nature and subsequently, pursuant to 10 CFR 9.17(a)(4), 2.390(a)(4) and 2.390(d)(1),

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such information should be withheld from public disclosure. Enclosure 2 is a redacted version of Enclosure 1 with the proprietary material removed and is suitable for public disclosure. Enclosure 3 contains an affidavit from Areva supporting this request for withholding from public disclosure.

In addition, Enclosure 4 provides supplemental information in response to Round 10 RAI question EEMB-118, which TVA originally provided by letter dated October 5, 2006 (ML062860267).

TVA has determined that the additional information provided by this letter does not affect the no significant hazards considerations associated with the proposed TS changes. The proposed TS changes still qualify for a categorical exclusion from environmental review pursuant to the provisions of 10 CFR 51.22(c)(9).

No new regulatory commitments have been made in this submittal. If you have any questions regarding this letter, please contact me at (256)729-2636.

I declare under penalty of perjury that the foregoing is true and correct. Executed on this 18th day of April, 2007.

Sincerely,

William D. Crouch

William D. Crouch
Manager of Licensing
and Industry Affairs

Enclosures:
1. Supplemental Response to RAI Question SBWB-64 - (Proprietary Information Version)
2. Supplemental Response to RAI Question SBWB-64 - (Non-Proprietary Information Version)
3. Areva Affidavit
4. Supplemental Response to RAI Question EEMB-118

Enclosures
cc (Enclosures):
State Health Officer
Alabama Dept. of Public Health
RSA Tower - Administration
Suite 1552
P.O. Box 303017
Montgomery, AL 36130-3017

U.S. Nuclear Regulatory Commission
Region II
Sam Nunn Atlanta Federal Center
61 Forsyth Street, SW, Suite 23T85
Atlanta, Georgia 30303-3415

NRC Senior Resident Inspector
Browns Ferry Nuclear Plant
10833 Shaw Road
Athens, Alabama 35611-6970

NRC Unit 1 Restart Senior Resident Inspector
Browns Ferry Nuclear Plant
10833 Shaw Road
Athens, Alabama 35611-6970

Eva A. Brown, Project Manager
U.S. Nuclear Regulatory Commission
(MS 08G9)
One White Flint, North
11555 Rockville Pike
Rockville, Maryland 20852-2739

Margaret Chernoff, Project Manager
U.S. Nuclear Regulatory Commission
(MS 08G9)
One White Flint, North
11555 Rockville Pike
Rockville, Maryland 20852-2739

ENCLOSURE 2

TENNESSEE VALLEY AUTHORITY
BROWNS FERRY NUCLEAR PLANT (BFN)
UNITS 1, 2, and 3

TECHNICAL SPECIFICATIONS (TS) CHANGES TS-431 AND TS-418
EXTENDED POWER UPRATE (EPU)

SUPPLEMENTAL RESPONSE TO REQUESTS FOR
ADDITIONAL INFORMATION

SUPPLEMENTAL RESPONSE TO RAI QUESTION SBWB-64
(NON-PROPRIETARY VERSION)

This enclosure provides a redacted version of TVA's supplemental response to BFN EPU Round 12 RAI question SBWB-64 that is contained in Enclosure 1. TVA originally provided a response to the subject RAI question by letter dated February 26, 2007 (ADAMS Accession No. ML070600339).

NRC RAI SBWB-64 Supplement

There are still concerns with the response to SBWB-64 as the staff finds that the response does not provide enough information regarding why the AREVA results for the 0.05 ft^2 break is so very less limiting. Specifically, the staff requests that AREVA supply the plots/results for the 0.05 ft^2 break. The sequence of events table and all of the plotted results for the AREVA 0.05 ft^2 break may be enough to support the contention that the small break is not limiting for the ATRIUM-10 fuel.

TVA Response to RAI SBWB-64 Supplement

In response to an email request by the NRC staff for the sequence of events and plots/results from Areva for the 0.05 ft^2 break, the following information is provided to supplement TVA's response of February 26, 2007 (ML070600339).

Below in Table SBWB-64S-1 and Table SBWB-64S-2 are the sequence of events for the mid-peaked and top-peaked 0.05 ft^2 break cases that AREVA NP* analyzed in the Browns Ferry Units 2 and 3 ATRIUM™-10⊕ break spectrum analysis. Figures SBWB-64S-1 through SBWB-64S-68 are plots of key parameters for these break cases. The peak clad temperatures (PCT) for the mid-peaked and top-peaked 0.05 ft^2 cases are 1222°F and 1235°F, respectively.

An Appendix K LOCA method (like EXEM BWR-2000) conservatively predicts the limiting core and hot node condition that could be experienced for any LOCA break size. A break spectrum is analyzed that covers the entire range of possible break sizes to identify the break that produces the limiting core and hot node conditions. Different Appendix K methodologies incorporate submodels that may result in different levels of conservatism for different break sizes (jet pump model, recirculation pump model, etc.). Therefore, different Appendix K methods may well predict different limiting break sizes; however, the PCT for the limiting case obtained from an Appendix K model will bound the PCT for the limiting break size of any postulated LOCA event.

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* AREVA NP Inc. is an AREVA and Siemens company.

⊕ ATRIUM is a trademark of AREVA NP.

Table SBWB-64S-1

Event Times for Small Break LOCA
0.05 ft^2 Split Recirculation
Line Discharge SF-BATT
Mid-Peaked Axial 102% EPU 105% Flow

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Table SBWB-64S-2
Event Times for Small Break LOCA
0.05 ft^2 Split Recirculation
Line Discharge SF-BATT
Top-Peaked Axial 102% EPU 105% Flow

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Figure SBWB-64S-1
Upper Plenum Pressure for
0.05 FT2/PD MID SF-BATT 102P/105F EPU

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Figure SBWB-64S-2
Total Break Flow Rate for
0.05 FT2/PD MID SF-BATT 102P/105F EPU

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Figure SBWB-64S-3
Core Inlet Flow Rate for
0.05 FT2/PD MID SF-BATT 102P/105F EPU

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Figure SBWB-64S-4
Core Outlet Flow Rate for
0.05 FT2/PD MID SF-BATT 102P/105F EPU

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Figure SBWB-64S-5
Intact Loop Jet Pump Drive Flow Rate for
0.05 FT2/PD MID SF-BATT 102P/105F EPU

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Figure SBWB-64S-6
Intact Loop Jet Pump Suction Flow Rate for
0.05 FT2/PD MID SF-BATT 102P/105F EPU

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Figure SBWB-64S-7
Intact Loop Jet Pump Exit Flow Rate for
0.05 FT2/PD MID SF-BATT 102P/105F EPU

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Figure SBWB-64S-8
Broken Loop Jet Pump Drive Flow Rate
for 0.05 FT2/PD MID SF-BATT 102P/105F EPU

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Figure SBWB-64S-9
Broken Loop Jet Pump Suction Flow Rate for
0.05 FT2/PD MID SF-BATT 102P/105F EPU

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Figure SBWB-64S-10
Broken Loop Jet Pump Exit Flow Rate for
0.05 FT2/PD MID SF-BATT 102P/105F EPU

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Figure SBWB-64S-11
ADS Flow Rate for
0.05 FT2/PD MID SF-BATT 102P/105F EPU

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Figure SBWB-64S-12
HPCI Flow Rate for
0.05 FT2/PD MID SF-BATT 102P/105F EPU

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Figure SBWB-64S-13
LPCS Flow Rate for
0.05 FT2/PD MID SF-BATT 102P/105F EPU

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Figure SBWB-64S-14
Intact Loop LPCI Flow Rate for
0.05 FT2/PD MID SF-BATT 102P/105F EPU

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Figure SBWB-64S-15
Broken Loop LPCI Flow Rate for
0.05 FT2/PD MID SF-BATT 102P/105F EPU

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Figure SBWB-64S-16
Upper Downcomer Mixture Level for
0.05 FT2/PD MID SF-BATT 102P/105F EPU

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Figure SBWB-64S-17
Lower Downcomer Mixture Level for
0.05 FT2/PD MID SF-BATT 102P/105F EPU

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Figure SBWB-64S-18
Lower Downcomer Liquid Mass for
0.05 FT2/PD MID SF-BATT 102P/105F EPU

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Figure SBWB-64S-19
Intact Loop Discharge Line Liquid Mass for
0.05 FT2/PD MID SF-BATT 102P/105F EPU

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Figure SBWB-64S-20
Upper Plenum Liquid Mass for
0.05 FT2/PD MID SF-BATT 102P/105F EPU

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Figure SBWB-64S-21
Lower Plenum Liquid Mass for
0.05 FT2/PD MID SF-BATT 102P/105F EPU

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Figure SBWB-64S-22
Lower Plenum Mixture Level for
0.05 FT2/PD MID SF-BATT 102P/105F EPU

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Figure SBWB-64S-23
Relief Valve Flow Rate for
0.05 FT2/PD MID SF-BATT 102P/105F EPU

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Figure SBWB-64S-24
Hot Channel Inlet Flow Rate for
0.05 FT2/PD MID SF-BATT 102P/105F EPU

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Figure SBWB-64S-25
Hot Channel Outlet Flow Rate for
0.05 FT2/PD MID SF-BATT 102P/105F EPU

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Figure SBWB-64S-26
Hot Channel Coolant Temperature
at the Peak Power Node for
0.05 FT2/PD MID SF-BATT 102P/105F EPU

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Figure SBWB-64S-27
Hot Channel Quality
at the Peak Power Node for
0.05 FT2/PD MID SF-BATT 102P/105F EPU

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Figure SBWB-64S-28
Hot Channel Heat Transfer Coef.
at the Peak Power Node for
0.05 FT2/PD MID SF-BATT 102P/105F EPU

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Figure SBWB-64S-29
Hot Channel Cladding Temperatures
in the Peak Power Nodes for
0.05 FT2/PD MID SF-BATT 102P/105F EPU

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Figure SBWB-64S-30
Hot Channel Coolant Temperature
at the EOB Hot Node for
0.05 FT2/PD MID SF-BATT 102P/105F EPU

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Figure SBWB-64S-31
Hot Channel Quality
at the EOB Hot Node for
0.05 FT2/PD MID SF-BATT 102P/105F EPU

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Figure SBWB-64S-32
Hot Channel Heat Transfer Coef.
at the EOB Hot Node for
0.05 FT2/PD MID SF-BATT 102P/105F EPU

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Figure SBWB-64S-33
Hot Channel Clad Superheat
at the EOB Hot Node for
0.05 FT2/PD MID SF-BATT 102P/105F EPU

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Figure SBWB-64S-34
Cladding Temperatures for
0.05 FT2/PD Mid-Peaked SF-BATT 102P/105F EPU

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Figure SBWB-64S-35
Upper Plenum Pressure for
0.05 FT2/PD TOP SF-BATT 102P/105F EPU

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Figure SBWB-64S-36
Total Break Flow Rate for
0.05 FT2/PD TOP SF-BATT 102P/105F EPU

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Figure SBWB-64S-37
Core Inlet Flow Rate for
0.05 FT2/PD TOP SF-BATT 102P/105F EPU

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Figure SBWB-64S-38
Core Outlet Flow Rate for
0.05 FT2/PD TOP SF-BATT 102P/105F EPU

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Figure SBWB-64S-39
Intact Loop Jet Pump Drive Flow Rate for
0.05 FT2/PD TOP SF-BATT 102P/105F EPU

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Figure SBWB-64S-40
Intact Loop Jet Pump Suction Flow Rate for
0.05 FT2/PD TOP SF-BATT 102P/105F EPU

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Figure SBWB-64S-41
Intact Loop Jet Pump Exit Flow Rate for
0.05 FT2/PD TOP SF-BATT 102P/105F EPU

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Figure SBWB-64S-42
Broken Loop Jet Pump Drive Flow Rate for
0.05 FT2/PD TOP SF-BATT 102P/105F EPU

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Figure SBWB-64S-43
Broken Loop Jet Pump Suction Flow Rate for
0.05 FT2/PD TOP SF-BATT 102P/105F EPU

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Figure SBWB-64S-44
Broken Loop Jet Pump Exit Flow Rate for
0.05 FT2/PD TOP SF-BATT 102P/105F EPU

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Figure SBWB-64S-45
ADS Flow Rate for
0.05 FT2/PD TOP SF-BATT 102P/105F EPU

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Figure SBWB-64S-46
HPCI Flow Rate for
0.05 FT2/PD TOP SF-BATT 102P/105F EPU

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Figure SBWB-64S-47
LPCS Flow Rate for
0.05 FT2/PD TOP SF-BATT 102P/105F EPU

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Figure SBWB-64S-48
Intact Loop LPCI Flow Rate for
0.05 FT2/PD TOP SF-BATT 102P/105F EPU

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Figure SBWB-64S-49
Broken Loop LPCI Flow Rate for
0.05 FT2/PD TOP SF-BATT 102P/105F EPU

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Figure SBWB-64S-50
Upper Downcomer Mixture Level for
0.05 FT2/PD TOP SF-BATT 102P/105F EPU

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Figure SBWB-64S-51
Lower Downcomer Mixture Level for
0.05 FT2/PD TOP SF-BATT 102P/105F EPU

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Figure SBWB-64S-52
Lower Downcomer Liquid Mass for
0.05 FT2/PD TOP SF-BATT 102P/105F EPU

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Figure SBWB-64S-53
Intact Loop Discharge Line Liquid Mass for
0.05 FT2/PD TOP SF-BATT 102P/105F EPU

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Figure SBWB-64S-54
Upper Plenum Liquid Mass for
0.05 FT2/PD TOP SF-BATT 102P/105F EPU

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Figure SBWB-64S-55
Lower Plenum Liquid Mass for
0.05 FT2/PD TOP SF-BATT 102P/105F EPU

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Figure SBWB-64S-56
Lower Plenum Mixture Level for
0.05 FT2/PD TOP SF-BATT 102P/105F EPU

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Figure SBWB-64S-57
Relief Valve Flow Rate for
0.05 FT2/PD TOP SF-BATT 102P/105F EPU

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Figure SBWB-64S-58
Hot Channel Inlet Flow Rate for
0.05 FT2/PD TOP SF-BATT 102P/105F EPU

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Figure SBWB-64S-59
Hot Channel Outlet Flow Rate for
0.05 FT2/PD TOP SF-BATT 102P/105F EPU

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Figure SBWB-64S-60
Hot Channel Coolant Temperature
at the Peak Power Node for
0.05 FT2/PD TOP SF-BATT 102P/105F EPU

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Figure SBWB-64S-61
Hot Channel Quality
at the Peak Power Node for
0.05 FT2/PD TOP SF-BATT 102P/105F EPU

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Figure SBWB-64S-62
Hot Channel Heat Transfer Coef.
at the Peak Power Node for
0.05 FT2/PD TOP SF-BATT 102P/105F EPU

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Figure SBWB-64S-63
Hot Channel Cladding Temperatures
in the Peak Power Nodes for
0.05 FT2/PD TOP SF-BATT 102P/105F EPU

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Figure SBWB-64S-64
Hot Channel Coolant Temperature
at the EOB Hot Node for
0.05 FT2/PD TOP SF-BATT 102P/105F EPU

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Figure SBWB-64S-65
Hot Channel Quality
at the EOB Hot Node for
0.05 FT2/PD TOP SF-BATT 102P/105F EPU

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Figure SBWB-64S-66
Hot Channel Heat Transfer Coef.
at the EOB Hot Node for
0.05 FT2/PD TOP SF-BATT 102P/105F EPU

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Figure SBWB-64S-67
Hot Channel Clad Superheat
at the EOB Hot Node for
0.05 FT2/PD TOP SF-BATT 102P/105F EPU

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Figure SBWB-64S-68
Cladding Temperatures for
0.05 FT2/PD Top-Peaked SF-BATT 102P/105F EPU

ENCLOSURE 3

TENNESSEE VALLEY AUTHORITY
BROWNS FERRY NUCLEAR PLANT (BFN)
UNITS 1, 2, and 3

TECHNICAL SPECIFICATIONS (TS) CHANGES TS-431 AND TS-418
EXTENDED POWER UPRATE (EPU)

SUPPLEMENTAL RESPONSE TO REQUESTS FOR
ADDITIONAL INFORMATION

AREVA AFFIDAVIT

AFFIDAVIT

COMMONWEALTH OF VIRGINIA)
) ss.
CITY OF LYNCHBURG)

1. My name is Gayle F. Elliott. I am Manager, Product Licensing, for AREVA NP Inc. (AREVA NP) and as such I am authorized to execute this Affidavit.

2. I am familiar with the criteria applied by AREVA NP to determine whether certain AREVA NP information is proprietary. I am familiar with the policies established by AREVA NP to ensure the proper application of these criteria.

3. I am familiar with the AREVA NP information contained in Engineering Information Record 51-9047290-000, "Response to NRC RAI – Round 12 for Browns Ferry EPU: Supplemental to SBWB-64," dated April, 2007 and referred to herein as "Document." Information contained in this Document has been classified by AREVA NP as proprietary in accordance with the policies established by AREVA NP for the control and protection of proprietary and confidential information.

4. This Document contains information of a proprietary and confidential nature and is of the type customarily held in confidence by AREVA NP and not made available to the public. Based on my experience, I am aware that other companies regard information of the kind contained in this Document as proprietary and confidential.

5. This Document has been made available to the U.S. Nuclear Regulatory Commission in confidence with the request that the information contained in this Document be withheld from public disclosure. The request for withholding of proprietary information is made in accordance with 10 CFR 2.390. The information for which withholding from disclosure is

requested qualifies under 10 CFR 2.390(a)(4) "Trade secrets and commercial or financial information."

6. The following criteria are customarily applied by AREVA NP to determine whether information should be classified as proprietary:

(a) The information reveals details of AREVA NP's research and development plans and programs or their results.

(b) Use of the information by a competitor would permit the competitor to significantly reduce its expenditures, in time or resources, to design, produce, or market a similar product or service.

(c) The information includes test data or analytical techniques concerning a process, methodology, or component, the application of which results in a competitive advantage for AREVA NP.

(d) The information reveals certain distinguishing aspects of a process, methodology, or component, the exclusive use of which provides a competitive advantage for AREVA NP in product optimization or marketability.

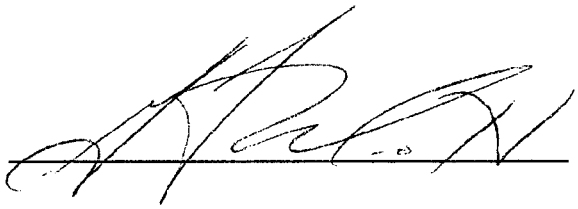
(e) The information is vital to a competitive advantage held by AREVA NP, would be helpful to competitors to AREVA NP, and would likely cause substantial harm to the competitive position of AREVA NP.

The information in the Document is considered proprietary for the reasons set forth in paragraphs 6(b) and 6(c) above.

7. In accordance with AREVA NP's policies governing the protection and control of information, proprietary information contained in this Document have been made available, on a limited basis, to others outside AREVA NP only as required and under suitable agreement providing for nondisclosure and limited use of the information.

8. AREVA NP policy requires that proprietary information be kept in a secured file or area and distributed on a need-to-know basis.

9. The foregoing statements are true and correct to the best of my knowledge, information, and belief.



SUBSCRIBED before me this 16th

day of April, 2007.

Sherry L. McFaden
NOTARY PUBLIC, COMMONWEALTH OF VIRGINIA
MY COMMISSION EXPIRES: 10/31/10

ENCLOSURE 4

TENNESSEE VALLEY AUTHORITY
BROWNS FERRY NUCLEAR PLANT (BFN)
UNITS 1, 2, and 3

TECHNICAL SPECIFICATIONS (TS) CHANGES TS-431 AND TS-418
EXTENDED POWER UPRATE (EPU)

SUPPLEMENTAL RESPONSE TO REQUESTS FOR
ADDITIONAL INFORMATION

SUPPLEMENTAL RESPONSE TO RAI QUESTION EEMB-118

NRC RAI EEMB-118 (Unit 1)

In the July 26, 2006 response, the licensee indicated that Unit 1 is currently performing restart modifications and that the final stress analysis results, which reflect the as-built configuration, are not available for most of the reactor coolant pressure boundary and balance-of-plant systems. Provide the schedule for completion of the piping system evaluation for Unit 1. Upon completion, provide the evaluation summary for piping systems and their supports including main steam, feedwater, recirculation, residual heat removal, and torus-attached piping systems. The information should include the calculated maximum stresses and fatigue usage factors, as necessary, for piping systems and their supports similar to those provided for the Units 2 and 3 extended power uprate (EPU) evaluation.

TVA Supplemental Response to RAI EEMB-118 (Unit 1)

TVA originally replied to RAI-10 question EEMB-118 by letter dated October 5, 2006 (ML062860267) and supplemented its response by letter dated December 21, 2006 (ML063560224), which included an evaluation summary for Unit 1 piping systems. The evaluation summary included calculated maximum stresses for piping systems similar to the information provided for the EPU application for BFN Units 2 and 3 in TVA's July 26, 2006, submittal (ML062200277). The following additional information is provided in response to an email request by the NRC staff.

For BFN Unit 1 restart, piping analyses models were generated to evaluate changes due to EPU temperature and pressure changes, seismic spectra changes, NRC Bulletin 79-14 walkdown changes, and piping and component replacement changes. The thermal and pressure data used in the analyses are from the operational modes calculation developed for each of the safety related systems for Unit 1. These data included the higher temperatures and pressures due to EPU.

After Unit 1 was shut down in 1985, the seismic spectra for BFN were changed. The new analyses model includes the later seismic spectra data. The pipe analysis results were compared against design criteria allowable limits and support design changes were made as needed to meet these limits.

The existing pipe supports were reviewed against the piping analysis output loads to determine acceptability. Using the as-built data, the support was then modeled and analyzed for the

new analysis loads. The support analysis results were compared against the design criteria allowable limits and support changes/modifications were made as needed to meet these limits.

The support modifications were issued by the engineering design organization to the construction organization using TVA's design change process. This resulted in the modification or replacement of approximately 75% of the safety-related large bore pipe supports. All Unit 1 Bulletin 79-14 program design changes are required to be complete prior to restart, including reconciliation of the final as-built configuration.

The subject design changes have been implemented; therefore, all piping and supports are in full compliance with BFN design criteria requirements.