

June 2, 2006

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: BROWNS FERRY NUCLEAR PLANT, UNITS 1, 2, AND 3 — REQUEST FOR
ADDITIONAL INFORMATION REGARDING THE EXTENDED POWER
UPRATE LICENSE AMENDMENT REQUEST (TS-418 AND TS-431)
(TAC NOS. MC3812, MC3743, AND MC3744)

Dear Mr. Singer:

By letters dated June 25, and June 28, 2004, as supplemented by letters dated August 23, 2004, February 23, April 25, June 6, and December 19, 2005, February 1 and 28, March 7, 9, 23, 31, April 13, May 5, 11, 16, and 17, 2006, the Tennessee Valley Authority (the licensee), submitted to the U.S. Nuclear Regulatory Commission (NRC), amendment requests for Browns Ferry Nuclear Plant (BFN), Units 1, 2, and 3. The proposed amendments would change the BFN operating licenses to increase the maximum authorized power level from 3293 megawatts thermal (MWt) to 3952 MWt for Unit 1 from 3458 MWt to 3952 MWt for Units 2 and 3. These changes represent an increase of approximately 20 percent for Unit 1 and 15 percent for Units 2 and 3 above the current maximum authorized power level.

The NRC staff finds that a response to the enclosed Request for Additional Information is needed before we can complete the review. This request was discussed with your staff on May 31, 2006, and it was agreed that a response would be provided by June 16, 2006. If you have any questions, please contact me at 301-415-2315.

Sincerely,

/RA/

Eva A. Brown, Project Manager
Plant Licensing Branch II-2
Division of Operating Reactor Licensing
Office of Nuclear Reactor Regulation

Docket Nos. 50-259, 50-260 and 50-296

Enclosure: Request for Additional Information

cc w/enclosure: See next page

June 2, 2006

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: BROWNS FERRY NUCLEAR PLANT, UNITS 1, 2, AND 3 — REQUEST FOR
ADDITIONAL INFORMATION REGARDING THE EXTENDED POWER
UPRATE LICENSE AMENDMENT REQUEST (TS-418 AND TS-431)
(TAC NOS. MC3812, MC3743, AND MC3744)

Dear Mr. Singer:

By letters dated June 25, and June 28, 2004, as supplemented by letters dated August 23, 2004, February 23, April 25, June 6, and December 19, 2005, February 1 and 28, March 7, 9, 23, 31, April 13, May 5, 11, 16, and 17, 2006, the Tennessee Valley Authority (the licensee), submitted to the U.S. Nuclear Regulatory Commission (NRC), amendment requests for Browns Ferry Nuclear Plant (BFN), Units 1, 2, and 3. The proposed amendments would change the BFN operating licenses to increase the maximum authorized power level from 3293 megawatts thermal (MWt) to 3952 MWt for Unit 1 from 3458 MWt to 3952 MWt for Units 2 and 3. These changes represent an increase of approximately 20 percent for Unit 1 and 15 percent for Units 2 and 3 above the current maximum authorized power level.

The NRC staff finds that a response to the enclosed Request for Additional Information is needed before we can complete the review. This request was discussed with your staff on May 31, 2006, and it was agreed that a response would be provided by June 16, 2006. If you have any questions, please contact me at 301-415-2315.

Sincerely,

/RA/

Eva A. Brown, Project Manager
Plant Licensing Branch II-2
Division of Operating Reactor Licensing
Office of Nuclear Reactor Regulation

Docket Nos. 50-259, 50-260 and 50-296

Enclosure: Request for Additional Information

cc w/enclosure: See next page

DISTRIBUTION: See next page

ADAMS Accession No.: ML061460137

NRR-106

OFFICE	LPL2-2/PM	LPL2-2/PM	LPL2-2/LA	EEB/BC
NAME	EBrown	MChernoff	BClayton	GWilson by memo
DATE	6/1/06	5/31/06	5/31/06	5/10/06
OFFICE	CVIB/BC	CPTB/BC(A)	IOLB/BC(A)	LPL2-2/BC
NAME	MMitchell by memo	TLiu by memo	NO'Keefe by memo	MMarshall
DATE	5/3/06	5/18/06	5/18/06	6/2/06

OFFICIAL RECORD COPY

SUBJECT: BROWNS FERRY NUCLEAR PLANT, UNITS 1, 2, AND 3 — REQUEST FOR
ADDITIONAL INFORMATION REGARDING THE EXTENDED POWER
UPRATE LICENSE AMENDMENT REQUEST (TS-418 AND TS-431)
(TAC NOS. MC3812, MC3743, AND MC3744)

Distribution

PUBLIC

LPL2-2 R/F

RidsOgcRp

RidsAcrsAcnwMailCenter

RidsNrrPMEBrown

RidsNrrPMMChernoff

BClayton (hard copy)

RidsNrrDorlLpl2-2

RidsNrrDorlDpr

RidsNrrDeeb (GWilson)

RidsNrrDirslolb (NO'Keefe)

DDuvigneaud

RPelton

KMartin

SJones

JTatum

AStubbs

OChopra

RidsNrrDciCvib

MKhanna

TLiu

RMcNally

RidsRgn2MailCenter (MWidmann)

RidsNrrDcaCptb

REQUEST FOR ADDITIONAL INFORMATION

EXTENDED POWER UPRATE (EPU)

TENNESSEE VALLEY AUTHORITY (TVA)

BROWNS FERRY NUCLEAR PLANT (BFN), UNITS 1, 2 AND 3

DOCKET NOS. 50-259, 50-260 AND 50-296

EEEE

8. In a recent incident, a nuclear power station operator was requested by the local Reliability Council to roll back generator power output to the pre-extended power uprate (EPU) level because adequate post-trip voltages at the safety buses could not be supported if the generation was at the EPU level. In view of the above, please provide a discussion on how BFN EPU power levels have been co-ordinated with the area Reliability Council to assure that tripping of these units at the EPU level will not cause inadequate post-trip voltages at the safety-related buses.
9. State the differences between pre- and post-EPU Megavolt-ampere reactive (MVAR) capability for the BFN generators and the obligation of the BFN units to supply MVARs to the transmission system in order to assure adequate post-trip voltages at the safety buses.
10. In Section 10.3.1.1 of NEDC-33101P regarding Environmental Qualification (EQ), it is stated that 1) normal temperatures are expected to increase slightly, but remain bounded by normal temperatures used in the EQ analysis, 2) the post-accident peak temperature and pressure do not significantly increase for EPU, and 3) the long-term post-accident temperatures inside containment increase, however the increase was determined not to adversely effect the qualification of safety-related electrical equipment. Specify the temperature and pressure before and after EPU and demonstrate that the increase is within the design margin of qualification of the electrical equipment.
11. In Section 6.2 of NEDC-33101P regarding dc power, it is stated that the load addition for control logic relay associated with on-site power system changes are with existing margins. Please specify the amount of additional load on the dc system as a result of EPU and demonstrate that the additional load is within the existing design margin.

CVIB

6. In the response to Nuclear Regulatory Commission (NRC) Request EMCB-A.3, it was stated that.

the BWRVIP [Boiling Water Reactor Vessel and Internal Project]-25 report requires an EVT-1 examination from below the

Enclosure

core plate, or UT [ultrasonic testing] from above the core plate, of 50% of the holddown bolts. If cracking is detected, the remaining 50% of the bolts will be inspected. Inspections for Unit 2 and Unit 3 have been extremely difficult to perform because of poor accessibility and high radiation conditions with fuel in an operating reactor pressure vessel. Presently, a VT-3 examination of accessible holddown bolts has been the best possible examination that can be performed for an operating RPV [reactor pressure vessel] to verify that the bolt is still performing its design function. Unit 1 performed an EVT-1 examination from below the core plate of 50% of the rim holddown bolts prior to restart since access below the core plate was available.

Based on the response to NRC Request EMCB-A.3, provide a discussion regarding the intention to either inspect the core plate holddown bolts in accordance with the BWRVIP inspection guidelines, install the core plate wedges, or develop an alternative to the inspections identified in BWRVIP-25 and submit it to the staff for review and approval prior to the period of extended operation.

7. In the response to NRC Request EMCB-A.4, it was stated that there is no inspection currently required for the grid beam and beam-to-beam crevice slot. However, the NRC staff's Safety Evaluation for BWRVIP-26 dated December 7, 2000, states that the threshold fluence level for irradiation-assisted stress-corrosion cracking is 5×10^{20} n/cm².

Address the inspection activities that will be performed on the critical top guide components in the refueling outage following power uprate. This discussion should address enhanced visual testing of the top guide grid beams and the conformance of these tests in accordance with Service Information Letter (SIL) 554 following the sample selection and inspection frequency of BWRVIP-47 for the control rod drive guide tubes. Additionally the discussion should address the inspection percentage and time frame for the total population of cells. Selection of the cells should be discussed including intentions to bias the cell selection to the highest fluence areas in the top guide.

CPTB

Additional information is required to clarify the evaluation of EPU physical modifications and conditions on the renewed operating license. It is understood that the License Renewal Application (LRA) was decoupled from the EPU application, but the effects of the planned power uprate on the LRA were evaluated and the results were presented in the enclosure to TVA letter dated August 3, 2004. In this document, the operating characteristics that potentially affect the identified aging mechanisms were identified to verify the LRA remained valid. It is known that the configuration considered in the LRA scope and aging management review (AMR) table is the configuration that will exist at restart for BFN Unit 1. It is also recognized that the configuration identified in the LRA includes the physical changes that are identified in Appendix F of the LRA to be completed prior to restart for BFN Unit 1. The currently planned configuration changes that will exist as a result of the proposed EPU are identified in the EPU applications submitted by letters dated June 25 and June 28, 2004, as supplemented, and it is understood that the EPU is expected to coincide with restart. Since the EPU is decoupled from

the LRA, it is not clear to the staff if these planned physical changes and conditions identified in the EPU application are still bounded by the LRA scope, AMR tables and AMP scope or if these EPU changes have been or will be evaluated separately for license renewal aging management as part of either the EPU application or in a 10 CFR 50.59 evaluation reflected in the annual update.

1. Provide a discussion on how the structures, systems and components that were included within the scope of the LRA are going to be impacted by the EPU modifications and conditions. Specifically, provide the following information:
 - a) Confirm the timing of the planned EPU physical changes to components within scope of license renewal and clarify how and where these physical changes have been or will be evaluated for license renewal aging management. If all planned EPU physical changes will be in place at restart and, thus, are bounded by the aging management review in the LRA, identify these specific physical changes and clarify how and where they are evaluated in the LRA. If certain planned EPU physical changes have not been evaluated for aging management in the LRA, clarify how and where they are or will be evaluated.
 - b) Considering that the LRA and EPU applications were decoupled, clarify how and where the operating conditions that will exist as a result of EPU have been, or will be, evaluated for license renewal aging management. If these new operating conditions are bounded by the aging management review in the LRA, identify these specific operating conditions and clarify how and where they are evaluated in either the LRA or EPU. If certain planned EPU conditions have not been evaluated for aging management in the LRA, clarify how and where they are or will be evaluated. For example, clarify if the conclusions on operational characteristics reached in TVA letters dated January 28, August 3, and August 5, 2004, concerning effects of the EPU on the LRA still remain valid or clarify if these changes are to be addressed as part of the EPU evaluation.
 - c) Where additional components, materials, environments and aging effects/mechanisms are identified as a result of the EPU applications that were not included in the LRA, identify those specific components for each system and clarify how the aging management review was or will be performed and how the aging management program scope was or will be expanded. If the existing LRA AMR tables or AMP scope do not bound the new EPU components, materials, environments and aging effects/mechanisms, submit new AMR tables and programs as appropriate.

IOLB

1. During a conference call on April 25, 2006, TVA stated that the change in plant parameter values associated with EPU conditions could affect the timing of actions provided in the Emergency Operating Instructions (EOIs) and Abnormal Office Instructions (AOIs). Describe any changes resulting from the EPU on the available time and the actual time it takes for these operator actions. Provide the times for both current conditions and proposed EPU conditions. The scope of action times to be addressed should be those credited in the safety analyses in the Updated Final Safety Analysis Report, Chapter 14, Plant Safety Analysis.
2. Discuss how TVA will validate that times available for the proposed EPU, will be adequate for operators to reliably perform the timing of actions provided in the EOIs and AOIs.

SBPB

14. The response provided in the March 7, 2006 submittals to RAI SPLB-A.5 stated that:

the turbine and turbine control system design changes for EPU are in progress and the specific control setpoints have not been established. The setpoints will be adjusted to ensure that the turbine will not exceed 120% of rated speed due to overshoot.

Provide a discussion addressing to what extent the proposed EPU will affect the existing turbine overspeed protection capability, including a discussion of turbine overshoot during a loss of electrical load and supporting analyses that are credited, the effects of turbine modifications that will be completed, and post-modification testing that will be completed to confirm that the analytical results are correct.

Mr. Karl W. Singer
Tennessee Valley Authority
cc:

Mr. Ashok S. Bhatnagar, Senior Vice President
Nuclear Operations
Tennessee Valley Authority
6A Lookout Place
1101 Market Street
Chattanooga, TN 37402-2801

Mr. Larry S. Bryant, Vice President
Nuclear Engineering & Technical Services
Tennessee Valley Authority
6A Lookout Place
1101 Market Street
Chattanooga, TN 37402-2801

Brian O'Grady, Site Vice President
Browns Ferry Nuclear Plant
Tennessee Valley Authority
P.O. Box 2000
Decatur, AL 35609

Mr. Robert J. Beecken, Vice President
Nuclear Support
Tennessee Valley Authority
6A Lookout Place
1101 Market Street
Chattanooga, TN 37402-2801

General Counsel
Tennessee Valley Authority
ET 11A
400 West Summit Hill Drive
Knoxville, TN 37902

Mr. John C. Fornicola, Manager
Nuclear Assurance and Licensing
Tennessee Valley Authority
6A Lookout Place
1101 Market Street
Chattanooga, TN 37402-2801

Mr. Bruce M. Aukland, Plant Manager
Browns Ferry Nuclear Plant
Tennessee Valley Authority
P.O. Box 2000
Decatur, AL 35609

Mr. Masoud Bajestani, Vice President
Browns Ferry Unit 1 Restart
Browns Ferry Nuclear Plant
Tennessee Valley Authority
P.O. Box 2000
Decatur, AL 35609

BROWNS FERRY NUCLEAR PLANT

Mr. Robert G. Jones, General Manager
Browns Ferry Site Operations
Browns Ferry Nuclear Plant
Tennessee Valley Authority
P.O. Box 2000
Decatur, AL 35609

Mr. Scott M. Shaeffer
Browns Ferry Unit 1 Project Engineer
Division of Reactor Projects, Branch 6
U.S. Nuclear Regulatory Commission
61 Forsyth Street, SW.
Suite 23T85
Atlanta, GA 30303-8931

Mr. Larry S. Mellen
Browns Ferry Unit 1 Project Engineer
Division of Reactor Projects, Branch 6
U.S. Nuclear Regulatory Commission
61 Forsyth Street, SW.
Suite 23T85
Atlanta, GA 30303-8931

Mr. Glenn W. Morris, Manager
Corporate Nuclear Licensing
and Industry Affairs
Tennessee Valley Authority
4X Blue Ridge
1101 Market Street
Chattanooga, TN 37402-2801

Mr. William D. Crouch, Manager
Licensing and Industry Affairs
Browns Ferry Nuclear Plant
Tennessee Valley Authority
P.O. Box 2000
Decatur, AL 35609

Senior Resident Inspector
U.S. Nuclear Regulatory Commission
Browns Ferry Nuclear Plant
10833 Shaw Road
Athens, AL 35611-6970

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

Chairman
Limestone County Commission
310 West Washington Street
Athens, AL 35611