

August 17, 2006

Mr. Karl W. Singer  
Chief Nuclear Officer and  
Executive Vice President  
Tennessee Valley Authority  
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SUBJECT: BROWNS FERRY NUCLEAR PLANT, UNIT 1 - WITHDRAWAL OF LICENSE  
AMENDMENT REQUEST TO REVISE DIESEL GENERATORS ALLOWED  
OUTAGE TIME (TAC NO. MC5254)

Dear Mr. Singer:

By letter dated December 6, 2004, Tennessee Valley Authority (TVA, the licensee) proposed a change to the Technical Specifications (TSs) to revise the allowed outage time (AOT) from 7 days to 14 days for the Emergency Diesel Generators (EDGs) for Browns Ferry Nuclear Plant (BFN), Unit 1. Your license amendment request was treated as risk-informed, following the guidance of Regulatory Guide (RG) 1.174, "An Approach for Using Probabilistic Risk Assessment in Risk-Informed Decisions on Plant-Specific Changes to the Licensing Basis," and RG 1.177, "An Approach for Plant-Specific, Risk-Informed Decisionmaking: Technical Specifications." Based on its review of your submittal, the U. S. Nuclear Regulatory Commission (NRC) staff found that additional information was needed to complete its review. The request for additional information (RAI) was provided by letter to you dated August 30, 2005. You submitted a response to the NRC staff's request by letter dated October 28, 2005. Subsequently, by letter dated August 4, 2006, you withdrew the amendment request.

Upon its review of the information you provided in your amendment request and RAI response, the NRC staff concluded that insufficient information was provided to support continued review of your submittal. The NRC staff noted the following deficiencies in your submittal. Information was not submitted regarding the risk impact of the proposed change associated with external events and internal fires, as set forth in RG 1.174. In the original submittal, TVA stated that the risk metrics provided represented "total" risk, and compared these to the total risk metrics in RG 1.174. In the letter dated October 28, 2005, TVA identified that only internal events risk is included in their risk metrics, but did not provide any additional information regarding the external events risk impact. Although a quantitative analysis of external events and internal fire risk may not be required, depending on the change in risk and baseline risk values, either a quantitative or a qualitative assessment should be provided when applying the guidance of RG 1.174.

Furthermore, it was not clear how external events risk and internal fire risk have been taken into consideration in the current licensing basis for the Units 2 and 3 technical specifications. An amendment request was previously approved for Units 2 and 3 (Amendment Nos. 259 and 218, dated August 2, 1999, as supplemented September 23, 1999), granting a similar extension of

the EDG AOT to 14 days. TVA, in its response to the NRC RAI, evaluated the proposed change using RG 1.174 and RG 1.177, but did not provide either a quantitative or qualitative evaluation of external events or internal fire risk.

An adequate justification regarding the risk impact of Unit 1 restart on the previously granted EDG AOT extension for Units 2 and 3 was not provided. The previously granted license amendment was based on the shutdown status of Unit 1, and the resulting availability of Unit 1 EDGs to support Units 2 and 3. The impact of Unit 1 restart was not included in TVA's submittal. In its response to the RAI, TVA provided baseline risk metrics for Units 2 and 3 only, and did not identify the change in risk for a 14-day EDG AOT assuming Unit 1 operation. TVA stated that the acceptance guidelines of the regulatory guides were met, but failed to provide the specific results and computational bases of the analyses. Further, the information provided identifies that the baseline risk of Units 2 and 3 decreases when Unit 1 is operating, which is not what would be intuitively expected.

TVA has assumed the availability of all seven remaining EDGs during an extended EDG AOT to support their risk analyses. The proposed amendment would have continued to allow two EDGs to be inoperable when all three units are operating, and would have allowed up to five EDGs to be inoperable when Unit 3 is shut down. TVA was requested to identify administrative controls of their configuration risk management program which would assure the assumptions in the risk analyses were met. TVA stated that they considered it unnecessary to account for multiple inoperable EDGs due to the low frequency of unplanned maintenance. Appropriate controls on EDG unavailability are necessary to assure the assumptions of the risk analyses are met during extended AOTs. Alternatively, the risk analyses may be revised to reflect the availability of EDGs consistent with the existing TSs.

The NRC staff also concluded that TVA did not adequately demonstrate that the fourth key principle of risk-informed decision making, identified in RG 1.174 and RG 1.177, was satisfied. Specifically, TVA did not adequately justify that the proposed change to EDG AOT results in an acceptably small increase in plant risk. This lack of adequate basis is the result of:

1. An incomplete scope of assessment of the core damage frequency and large early release frequency impact of the proposed 14-day AOT, and
2. An inadequate quality basis provided for the probabilistic risk assessment (PRA) model used to assess the impact of the proposed AOT change.

With respect to the incomplete scope of assessment, the significant deficiencies involved (1) the failure to address fire and external events risk, (2) the failure to adequately address the impact of Unit 1 restart on Units 2 and 3, and (3) the lack of configuration control of the remaining operable diesel generators during an extended 14-day outage.

With respect to PRA quality, one element required of a risk-informed licensing action is that TVA demonstrate that the risk assessment model is of sufficient quality to support the requested change. During the week of January 23, 2006, the NRC staff conducted an audit of the PRA models at BFN in order to disposition certain quality issues related to TVA's application for extended power uprate (EPU) at all three units. While the risk model was found sufficient to provide general risk insights applicable for a non risk-informed EPU upgrade, the audit revealed substantial problems with the BFN Unit 1 PRA model that raised questions about the capability

of the model to support risk-informed licensing applications such as an EDG AOT change. The weaknesses identified in the BFN Unit 1 PRA model included:

1. The human reliability analysis has not adequately defined events and inconsistent treatment of important parameters that bear directly on the final results. The probabilities of human error appear to generally be lower than expected, which may be a result of misunderstandings resulting from the inadequate definitions.
2. No bases could be identified for some important system success criteria related to operations at the higher power level, specifically for operation of primary safety relief valves and credit for core cooling from the control rod drive system.
3. The documentation was found to be inconsistent with the actual model in several instances, and responsible licensee personnel were unsure as to whether the model or its documentation was correct.
4. The model has undergone recent revisions to correct errors since the original license amendment request submittal, indicating to the staff that the PRA model is in a developmental status, rather than a completed, production status.
5. The model has been revised, resulting in non-trivial changes to the baseline results, but a revised risk analysis has not been provided to support this license amendment request.

RG 1.174, Section 2.2, states that the PRA used to support licensing basis changes be of sufficient quality commensurate with the application for which it is intended. The issues identified at the PRA audit raise questions about the adequate quality of the PRA model that was used to support the requested licensing action. In section 2.2 of RG 1.174, the staff indicates that one element of an acceptable PRA quality program could include peer reviews and industry PRA certification programs.

TVA has stated that no peer review of the Unit 1 PRA model has been performed, nor is one necessary, due to the similarities to the Unit 2 and 3 models, which were subject to a peer review process. The Unit 1 PRA model was assembled based on the Unit 2 and 3 models, with substantial upgrades to meet requirements contained in the American Society of Mechanical Engineers PRA Standard and to enhance certain technical aspects of the model. Based on the findings of the audit, the NRC staff is unable to conclude that TVA has ensured technical acceptability and sufficient quality of the PRA model used to support this license amendment request. The staff notes that a Unit 1 PRA peer review might have identified necessary corrections for some of the quality issues identified by the staff audit. The NRC staff also concluded that, due to the extent of changes incorporated into the Unit 1 PRA, additional quality review of the Unit 1 PRA model is necessary.

All eight EDGs at BFN are shared between Units 1, 2, and 3. Since BFN Unit 1 was in an indefinite nonoperational status, NRC staff approval of Amendment Nos. 259 and 218 for BFN Units 2 and 3 was based on treating the facility as a two-unit plant, each with four EDGs available for service. However, with the proposed restarting of Unit 1, the same eight EDGs will be shared between the three units. Since all of the EDGs are shared (or can be shared) between Units 1, 2, and 3, your license amendment request should consider the AOT of all

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eight EDGs together for a three-unit plant. As noted in the safety evaluation for Amendment Nos. 259 and 218, prior to returning BFN Unit 1 to operation, TVA will provide additional justification for extending EDG AOTs for operating three units. Operation of three units with the EDG AOTs extended from 7 to 14 days is not within the BFN current licensing basis.

You may revise the application to address the concerns identified in this letter and resubmit the application at any time. The Commission has filed the enclosed Notice of Withdrawal of Application for Amendment to Facility Operating License with the Office of the Federal Register for publication.

If you have any questions, please contact me at (301) 415-4041.

Sincerely,

***/RA by L. Raghavan for/***

Margaret H. Chernoff, Project Manager  
Plant Licensing Branch II-2  
Division of Operating Reactor Licensing  
Office of Nuclear Reactor Regulation

Docket No. 50-259

Enclosure: Notice of Withdrawal

cc w/encl: See next page



UNITED STATES NUCLEAR REGULATORY COMMISSIONTENNESSEE VALLEY AUTHORITYBROWNS FERRY NUCLEAR PLANT, UNIT NO. 1DOCKET NO. 50-259NOTICE OF WITHDRAWAL OF APPLICATION FORAMENDMENT TO FACILITY OPERATING LICENSE

The U.S. Nuclear Regulatory Commission (the Commission) has granted the request of the Tennessee Valley Authority (the licensee), to withdraw its application for proposed amendment to Facility Operating License No. 50-259 issued to the licensee for operation of the Browns Ferry Nuclear Plant, Unit No. 1, located in Limestone County, Alabama.

The proposed amendment would have revised the Technical Specifications to increase the emergency diesel generator allowed outage time.

The Commission had previously issued a Notice of Consideration of Issuance of Amendment published in the FEDERAL REGISTER on January 18, 2005 (70 FR 2898). However, by letter dated August 4, 2006, the licensee withdrew the proposed change.

For further details with respect to this action, see the application for amendment dated December 6, 2004, as supplemented October 28, 2005, and the licensee's letter dated August 4, 2006, which withdrew the application for license amendment. Documents may be examined, and/or copied for a fee, at the NRC's Public Document Room (PDR), located at One White Flint North, Public File Area O1 F21, 11555 Rockville Pike (first floor), Rockville, Maryland. Publicly available records will be accessible electronically from the Agencywide Documents Access and Management Systems (ADAMS) Public Electronic Reading Room on the internet at the NRC Web site, <http://www.nrc.gov/reading-rm.html>. Persons who do not

have access to ADAMS or who encounter problems in accessing the documents located in ADAMS should contact the NRC PDR Reference staff by telephone at 1-800-397-4209, or 301-415-4737 or by email to [pdr@nrc.gov](mailto:pdr@nrc.gov).

Dated at Rockville, Maryland, this 17th day of August, 2006.

FOR THE NUCLEAR REGULATORY COMMISSION

*/RA/*

Margaret H. Chernoff, Project Manager  
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