May 3, 2005

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 No. 50-260
Tennessee Valley Authority	)	

BROWNS FERRY NUCLEAR PLANT (BFN) UNIT 2 - SUPPLEMENT TO TECHNICAL SPECIFICATION (TS) CHANGE TS 452 – REVISION TO LOW PRESSURE EMERGENCY CORE COOLING SYSTEM ALLOWED OUTAGE TIME

In Reference 1, TVA submitted a request for an emergency TS change (TS 452) to license DPR-52 for BFN Unit 2. The proposed change revises the current Unit 2 low pressure Emergency Core Cooling System (ECCS) injection/spray seven day allowed outage time (AOT) to 14 days. The purpose of increasing the AOT is to provide additional flexibility for preventive or corrective maintenance. This letter provides additional information which was verbally requested by NRC to support the review of the requested change.

The enclosure to this letter provides a qualitative discussion to support TVA’s position that the associated risk from the operational transient and unnecessarily using shutdown cooling with only three RHR subsystems operable is judged to be greater than conducting the repair in the present plant condition. In addition, enclosed are the results of TVA’s use of the zero maintenance PSA model to establish the plant’s baseline risk and the estimated risk increase associated with the addition seven days of allowed outage time.

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

There are no regulatory commitments associated with this submittal. If you have any questions about this submittal, please contact me at (256) 729-2636.

Sincerely,

Original signed by:

T. E. Abney
Manager of Licensing
and Industry Affairs

References:

1. TVA letter, T.E. Abney to NRC, dated April 26, 2005, "Browns Ferry Nuclear Plant (BFN) Unit 2 – Technical Specification (TS) Change TS 452 – Revision to Low Pressure Emergency Core Cooling System Allowed Outage Time".

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Enclosure 1

Browns Ferry Nuclear Plant (BFN) Unit 2
Technical Specification (TS) Change TS 452
Revision to Emergency Core Cooling System (ECCS)
Allowed Outage Time

Supplemental Information

This enclosure provides the results of TVA's use of the zero maintenance PSA model to establish the plant's baseline risk and the estimated risk increase associated with the addition of seven days of allowed outage time. In addition, enclosed is a qualitative discussion to support TVA's position that the associated risk from the operational transient and unnecessarily using shutdown cooling with only three RHR subsystems operable is judged to be greater than conducting the repair in the present plant condition.

Risk Assessment

The proposed change revises the current Unit 2 low pressure Emergency Core Cooling System (ECCS) injection/spray seven day allowed outage time (AOT) to 14 days. TVA's used a zero maintenance PSA model to establish the plant's baseline risk and the estimated risk increase associated with the addition seven days of allowed outage time.

The magnitude of increase of the core damage frequency (CDF) and large early release frequency (LERF) for the out of service configuration is defined as the incremental CDF, or incremental LERF. As shown below, the incremental CDF is the difference in the "configuration-specific" CDF and the baseline (or the zero maintenance) CDF. [Note CDF is generally expressed on a yearly basis (e.g. 1×10^{-6} per year)].

$$ICDF = CDF_{CS} - CDF_{BASE}$$

$$ILERF = LERF_{CS} - LERF_{BASE}$$

The configuration-specific CDF is the annualized risk rate with the unavailabilities of the out-of-service Structures, Systems and Components (SSCs) set to one. The configuration-specific CDF also considers the zero maintenance model (i.e., the unavailability of the out-of-service SSCs is set to one, and the maintenance unavailability of the remaining SSCs is set to zero). This more closely reflects the actual configuration of the plant during the maintenance activity. The following is the Unit 2 zero maintenance model results:

Unit 2 $CDF_{ZM\text{-}BASE}$ (Zero Maintenance) = 8.21E-7
Unit 2 $LERF_{ZM\text{-}BASE}$ (Zero Maintenance) = 2.01E-7

The configuration specific (CS) CDF and LERF with RHR pump 2A being out of service is

Unit 2 $CDF_{RHR\ 2A}$ = 2.09E-06
Unit 2 $LERF_{RHR\ 2A}$ = 1.31E-06

The incremental core damage probability (ICDP) is the product of incremental CDF and duration.

ICDP = ICDF * Duration
ILERP = ILERF * Duration

The results are shown below:

Equipment Out of Service	Zero Maintenance Base CDF	Configuration Specific CDF	Change	Outage (days)	ICDP	RG 1.174 Criteria
RHR PUMP 2A	8.21E-07	2.09E-06	1.27E-06	14	4.87E-08	<1E-06

Equipment Out of Service	Zero Maintenance Base LERF	Configuration Specific LERF	Change	Outage (days)	ILERP	RG 1.174 Criteria
RHR PUMP 2A	2.01E-07	1.31E-06	1.11E-06	14	4.25E-08	<1E-07

Based on the above assessment the risk associated with the RHR pump 2A being out of service for 14 days is negligible.

Transient and Shutdown Risk

The RHR system is not normally used during power operations. The probability of an initiating event occurring during the period of the increased allowed outage time, which would result in a plant ongoing through an operational transition that would require RHR to be used, is very low. As quantified above, the risk is low and generally within the range of risks encountered during the plant's normal work control level.

As discussed in RIS 2005-01, the staff acknowledged that transition and shutdown risks are not negligible. The transition from power operations to shutdown conditions involves some risk, even with all equipment available. The risk originates from several sources, including manual operator actions, placing equipment in service that is not normally operated during power operations, and the possibility for high-low pressure system interfaces.

In addition, in the lower temperature ranges of Mode 3, the RHR system is used in shutdown cooling mode for decay heat removal. The risk associated with the 2A RHR pump being out of service during shutdown conditions is driven by the demand for RHR pumps and heat exchangers to perform shutdown cooling functions. Having one of the four available RHR pump/heat exchangers out of service places an increased demand on the availability of the remaining RHR trains, thus increasing the risk associated with this activity. However, while this risk may increase, the BFN Technical Specifications would still be satisfied with the 2A RHR pump being out of service. Limiting Condition for Operation 3.4.7 requires two of the four RHR shutdown cooling systems to be operable in Mode 3. In Mode 3, one RHR shutdown cooling subsystem can provide the required cooling. The second subsystem is required to be operable for redundancy.

While not specifically quantified for BFN, the transition risk from power operations to shutdown added to the risk from using shutdown cooling with only three RHR subsystems operable is judged to be greater than conducting the repair in the present plant condition (Mode 1).