



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

October 7, 1994

TVA-BFN-TS-351

10 CFR 50.90

U.S. Nuclear Regulatory Commission  
ATTN: Document Control Desk  
Washington, D.C. 20555

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 SPECIFICATION (TS) NO. 351 - DIESEL GENERATOR  
SURVEILLANCE REQUIREMENTS**

In accordance with the provisions of 10 CFR 50.4 and 50.90, TVA is submitting a request for an amendment (TS-351) to licenses DPR-33, DPR-52 and DPR-68 to change the Technical Specifications for Units 1, 2 and 3. The proposed change revises the surveillance requirements for plant operation with an inoperable diesel generator.

TVA and NRC met on September 22, 1994 to discuss the wording and intent of diesel generator technical specification surveillance requirements. During the meeting, TVA and the Staff agreed that the wording of the BFN diesel generator surveillance requirement was ambiguous and should be clarified. In addition, the applicable Bases sections are being revised to provide additional background information.

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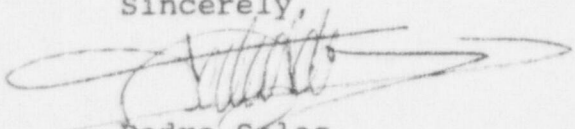
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TVA has determined that there are no significant hazards considerations associated with the proposed change and that the change is exempt from environmental review pursuant to the provisions of 10 CFR 51.22(c)(9). The BFN Plant Operations Review Committee and the BFN Nuclear Safety Review Board have reviewed this proposed change and determined that operation of BFN Units 1, 2 and 3 in accordance with the proposed change will not endanger the health and safety of the public. Additionally, in accordance with 10 CFR 50.91(b)(1), TVA is sending a copy of this letter and enclosures to the Alabama State Department of Public Health.

Enclosure 1 to this letter provides the description and evaluation of the proposed change. This includes TVA's determination that the proposed change does not involve a significant hazard consideration, and is exempt from environmental review. Enclosure 2 contains copies of the appropriate TS and bases pages marked-up to show the proposed change. Enclosure 3 forwards the revised TS and bases pages that incorporate the proposed change.

TVA requests that the revised TS be made effective within 30 days of NRC approval. If you have any questions about this change, please telephone me at (205) 729-2636.

Sincerely,

  
Pedro Salas  
Manager of Site Licensing

Enclosures  
cc: See page 3

Subscribed and sworn to before me  
on this 7th day of October 1994.

Barbara A. Blanton  
Notary Public

My Commission Expires 10-06-98

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cc (Enclosures):

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ENCLOSURE 1

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

PROPOSED TECHNICAL SPECIFICATION (TS) CHANGE TS-351  
DESCRIPTION AND EVALUATION OF THE PROPOSED CHANGE

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I. DESCRIPTION OF THE PROPOSED CHANGE

TVA is revising Units 1 and 2 TS Surveillance Requirement 4.9.B.3 and Unit 3 TS Surveillance Requirement 4.9.B.2 to more closely reflect the requirements of Improved Standard Technical Specifications (ISTS) for BWR/4s (NUREG-1433), Section 3.8.1, AC Sources - Operating, Condition B for plant operation with an inoperable diesel generator.

The specific changes are described below.

1. Units 1 and 2, TS page 3.9/4.9-9, Surveillance Requirement 4.9.B.3.

Current Surveillance Requirement:

"When one of the units 1 and 2 diesel generators is found to be INOPERABLE, all of the remaining diesel generators shall be demonstrated to be OPERABLE within 24 hours, and power availability for the associated boards shall be verified within 1 hour and at least once per 8 hours thereafter."

Proposed Surveillance Requirement:

"When one of the Units 1 and 2 diesel generators is inoperable, power availability for the associated boards shall be verified within 1 hour and at least once per 8 hours thereafter."

And

Determine OPERABLE Units 1 and 2 diesel generators are not inoperable due to common cause failure within 24 hours.

Or

The remaining Units 1 and 2 diesel generators shall be demonstrated to be OPERABLE within 24 hours."

2. Unit 3, TS page 3.9/4.9-8, Surveillance Requirement 4.9.B.2.

Current Surveillance Requirement:

"When one unit 3 diesel generators is found to be inoperable, all of the remaining unit 3 diesel generators shall be demonstrated to be OPERABLE within 24 hours, and power availability for the associated boards shall be verified within 1 hour and at least once per 8 hours thereafter."

Proposed Surveillance Requirement:

"When one of the Unit 3 diesel generators is inoperable, power availability for the associated boards shall be verified within 1 hour and at least once per 8 hours thereafter."

And

Determine OPERABLE Unit 3 diesel generators are not inoperable due to common cause failure within 24 hours.

Or

The remaining Unit 3 diesel generators shall be demonstrated to be OPERABLE within 24 hours."

3. Units 1 and 2, TS page 3.9/4.9-21, addition to 4.9 Bases:

"The intent of Surveillance Requirement 4.9.B.3 is to ensure that all Units 1 and 2 diesel generator inoperabilities, except those inoperabilities deliberately induced for the purpose of routine testing or maintenance, are investigated for common cause failure. Deliberately making a diesel generator inoperable for routine testing or maintenance does not introduce a common cause failure. This surveillance requirement also provides an allowance to avoid unnecessary testing of otherwise OPERABLE diesel generators. If it can be determined that the cause of the inoperable diesel generator does not exist on the remaining diesel generators, then the remaining diesel generators need not be demonstrated OPERABLE. According to Generic Letter 84-15, 24 hours is a reasonable time to confirm the OPERABLE diesel generators are not affected by the same problem as the inoperable diesel generators."

4. Unit 3, TS page 3.9/4.9-20, addition to 4.9 Bases:

"The intent of Surveillance Requirement 4.9.B.2 is to ensure that all Unit 3 diesel generator inoperabilities, except those inoperabilities deliberately induced for the purpose of routine testing or maintenance, are investigated for common cause failure. Deliberately making a diesel generator inoperable for routine testing or maintenance does not introduce a common cause failure. This surveillance requirement also provides an allowance to avoid unnecessary testing of otherwise OPERABLE diesel generators. If it can be determined that the cause of the inoperable diesel generator does not exist on the remaining diesel generators, then the remaining diesel generators need not be demonstrated OPERABLE. According to Generic Letter 84-15, 24 hours is a reasonable time to confirm the OPERABLE diesel generators are not affected by the same problem as the inoperable diesel generators."

5. Corrects the capitalization of the term "inoperable" on the affected Units 1 and 2 TS pages in order to conform with the current TS Definitions section.

## II. REASON FOR THE PROPOSED CHANGE

TVA and NRC met on September 22, 1994 to discuss diesel generator technical specification surveillance requirements. The overall purpose of the technical specification surveillance requirements is to maximize long term diesel generator availability and reliability. The wording of the current surveillance requirement is ambiguous in that it does not explicitly state whether or not the specified actions are required if a diesel generator is deliberately made inoperable for maintenance. During the TVA/NRC meeting, it was agreed that the wording of the BFN diesel generator surveillance requirements was ambiguous and should be clarified.

If a diesel generator is made inoperable for normal surveillance testing or maintenance, the current surveillance requirement could be interpreted to require the remaining Units 1 and 2 (or Unit 3) diesel generators be started in order to demonstrate their operability. These diesel generator starts increase the wear on the diesel generators and decrease their long term reliability and availability. Therefore, TVA is proposing a revision to the surveillance requirement in order to eliminate the necessity for diesel generator starts when a diesel generator is deliberately made inoperable for maintenance or testing. In addition, the applicable Bases section is being revised to provide additional background information.

### III. SAFETY ANALYSIS

#### A. Design Considerations

Normal station power is from the unit station service transformers connected between the generator breaker and main transformer of each unit. Auxiliary power is available through the two common station service transformers and cooling tower transformers which are fed from two 161-kV lines supplying the 161-kV switchyard, one line each from the Athens and Trinity substations. Historically, this has proven a very reliable source of power. Table 3.1.1-1 of the BFN Individual Plant Examination reflected this low annual loss of offsite power initiating event frequency ( $4.40 \times 10^{-2}$ )<sup>1</sup>.

As described in Section 8.5.3 of the BFN Updated Final Safety Analysis Report, the standby AC supply and distribution system for Units 1 and 2 consists of four diesel generators, four 4.16-kV shutdown boards, four 480-V shutdown boards and other supporting equipment. The standby AC supply and distribution system for Unit 3 is separate from that of Units 1 and 2. The Unit 3 system consists of four diesel generators (3A, 3B, 3C, and 3D), four 4.16-kV shutdown boards, two 480-V shutdown boards and other supporting equipment. Two of the Unit 3 diesels are required to support common equipment (Standby Gas Treatment and Control Room Emergency Ventilation Systems). The attached figure shows the arrangement of the overall auxiliary power system.

Thus, a total of eight diesel generators, (four for Units 1 and 2, and four for Unit 3) are provided as a standby power supply to be used on loss of the Normal Auxiliary Power System. All AC loads necessary for the safe shutdown of the plant under accident or non-accident conditions are fed from this distribution system.

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<sup>1</sup> TVA letter to NRC, dated September 1, 1992, Response to Generic Letter (GL) 88-20 - "Individual Plant Examination for Severe Accident Vulnerabilities - 10 CFR 50.54(f)"

This system is inherently flexible due to its cross-connection capability. There are four possible 4-kV supplies to each Units 1 and 2 shutdown board. The first alternate is from the other shutdown bus. The second alternate is from the diesel generator and the third alternate is from the Unit 3 diesel generator via a Unit 3 shutdown board. There are also three possible 4-kV supplies to each Unit 3 shutdown board. The first alternate is from the bus tie board, which is currently unavailable. The second alternate is from the diesel generator. The Units 1 and 2 diesel generators cannot supply power to Unit 3 shutdown boards. However, they may be paralleled with a Unit 3 diesel for backfeed operation.

Each diesel generator normally supplies one division or train of the Engineered Safeguards System (ESS) and are assigned primarily to one 4-kV shutdown board. These diesel generators are highly reliable (currently 99.5%) and have a high availability (currently 97.6%) and the probability of a loss of offsite power occurring on one unit concurrent with a design basis accident is extremely low. This high reliability has allowed BFN to avoid the accelerated diesel generator testing requirements specified in Technical Specification Table 3.9.A. The BFN accelerated testing requirements are based on Generic Letter 84-15 and Regulatory Guide 1.108, Revision 1.

However, if a loss of offsite power and a design basis event events did occur simultaneously, the safety design basis for the Standby AC Power System is for three of the Units 1 and 2 diesel generators, paralleled with the three respective Unit 3 diesel generators, to supply all required long term (greater than 10 minutes) loads for the safe shutdown and cooldown of all three units. Thus, having a diesel generator in an inoperable condition does not, by itself, constitute a loss of ESS equipment function or redundancy.

The diversity, reliability and flexibility of the electrical system at BFN is recognized in the current BFN licensing basis and is reflected in the plant Technical Specifications. Units 1 and 2 Limiting Condition for Operation (LCO) 3.9.B.3 allows continued reactor power operation for 7 days, with one of the four Units 1 and 2 diesel generators inoperable, provided that two offsite power sources are available, all of the Core Spray, Residual Heat Removal (RHR) (Low Pressure Coolant Injection and containment cooling) systems, and the remaining Units 1 and 2 diesel generators are operable.



Similarly, Unit 3 LCO 3.9.B.2 allows continued reactor power operation for 7 days, with one of the four Unit 3 diesel generators inoperable, provided that two offsite power sources are available, all of the Core Spray, RHR systems, and the remaining Unit 3 diesel generators are operable. The 7 day completion time is part of the original licensing basis for BFN and is considered acceptable based on the number of remaining AC sources, the low probability of a Design Basis Accident occurring during this time, and the need to allow a reasonable time for repairs, maintenance, or testing. This provision is not affected by the proposed Technical Specification amendment.

In order to ensure a highly reliable power source remains with one diesel generator inoperable, it is prudent to demonstrate the availability of the required offsite circuits on a frequent basis. Demonstration of the availability for the associated boards within one hour and every eight hours thereafter is considered an acceptable timeframe to ensure the reliability of this power source because of the number of remaining AC sources, the low probability of a Design Basis Accident occurring during this time, and the need to allow a reasonable time for repairs, maintenance, or testing. This provision is also not affected by the proposed Technical Specification amendment.

In this situation (one diesel generator inoperable), it is also prudent to address the issue of the operability of the remaining Units 1 and 2 (or Unit 3) diesel generators. If the diesel generator inoperability was deliberately induced in order to support normal surveillance testing or maintenance, it is reasonable to conclude that the remaining Units 1 and 2 (or Unit 3) diesel generators can be considered operable if they are within the required surveillance testing frequency and there is no reason to suspect they are inoperable. Normal surveillance testing or maintenance does not introduce a common mode failure.

If the diesel generator inoperability was not induced in order to support normal surveillance testing or maintenance and the possibility of a common failure mode existed, it would be prudent to demonstrate the operability of the remaining Units 1 and 2 (or Unit 3) diesel generators. Demonstration of the availability for the remaining Units 1 and 2 (or Unit 3) diesel generators within 24 hours is considered an acceptable timeframe to ensure the reliability of this power source because of the number of remaining AC sources, the low probability of a Design Basis Accident occurring during this time, and the need to allow a reasonable time for testing.

**B. Improved Standard Technical Specifications**

One of the objectives of this proposed Technical Specification is to make the wording of the BFN Technical Specifications consistent with the wording of the Improved Standard Technical Specifications (ISTS) for this diesel generator surveillance requirement. NUREG-1433 transmitted the ISTS for BWR/4s. Section 3.8.1 provides the requirements for electrical power systems, specifically AC Sources during plant operation. In summary, an inoperable diesel would necessitate the following actions under ISTS:

- 1) Verify correct breaker alignment and indicated power availability for each offsite circuit within 1 hour and once per 8 hours thereafter.

AND

- 2) Determine the remaining operable diesel generators are not inoperable due to common cause failure within 24 hours.

OR

- 3) Verify each diesel generator starts from standby conditions and achieves steady state voltage and frequency within the prescribed acceptance criteria within 24 hours.

The intent is that all diesel generator inoperabilities be investigated for common cause failures. The guidance contained in ISTS for operating with an inoperable diesel generator is met by the proposed Surveillance Requirement.

**IV. NO SIGNIFICANT HAZARDS CONSIDERATION DETERMINATION**

TVA has concluded that operation of Browns Ferry Nuclear Plant (BFN) Units 1, 2 and 3 in accordance with the proposed change to the technical specifications does not involve a significant hazards consideration. TVA's conclusion is based on its evaluation, in accordance with 10 CFR 50.91(a)(1), of the three standards set forth in 10 CFR 50.92(c).

**A. The proposed amendment does not involve a significant increase in the probability or consequences of an accident previously evaluated.**

The proposed change revises the surveillance requirements for plant operation with an inoperable diesel generator. Diesel generator operation is not a precursor to any design basis accident or transient analyzed in the Browns Ferry Updated Final Safety Analysis Report. Therefore, this change does not increase the probability of any previously evaluated accident.

The proposed change will eliminate the requirement for unnecessary diesel generator starts and the incumbent diesel generator wear when a diesel generator is made inoperable for planned maintenance and testing. Thus, the proposed change will result in an increase in the reliability and availability of the diesel generators. Therefore, this change does not increase the consequences of any previously evaluated accident.

**B. The proposed amendment does not create the possibility of a new or different kind of accident from any accident previously evaluated.**

The proposed change to the surveillance requirements for plant operation with an inoperable diesel generator does not involve a modification to plant equipment. No new failure modes are introduced. There is no effect on the function of any plant system and no new system interactions are introduced by this change.

Therefore, the proposed amendment does not create the possibility of a new or different kind of accident from any accident previously evaluated.

C. The proposed amendment does not involve a significant reduction in a margin of safety.

The proposed change will eliminate the requirement for unnecessary diesel generator starts and the incumbent diesel generator wear. Thus, the proposed change will result in an increase in the reliability and availability of the diesel generators. Since the ability of the diesel generators to perform their safety function will not be degraded, the proposed amendment does not involve a reduction in a margin of safety.

V. ENVIRONMENTAL IMPACT CONSIDERATION

The proposed change does not involve a significant hazards consideration, a significant change in the types of or significant increase in the amounts of any effluents that may be released offsite, or a significant increase in individual or cumulative occupational radiation exposure. Therefore, the proposed change meets the eligibility criteria for categorical exclusion set forth in 10 CFR 51.22(c)(9). Accordingly, pursuant to 10 CFR 51.22(b), an environmental assessment of the proposed change is not required.

FIGURE - AUXILIARY POWER SYSTEM

