



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

AUG 13 1991

O. J. "Ike" Zeringue
Vice President, Browns Ferry Operations

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

Gentlemen:

In the Matter of
Tennessee Valley Authority

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

BROWNS FERRY NUCLEAR PLANT (BFN) - UNIT 2 - RESPONSE TO NRC SAFETY
EVALUATION (SE) ON THE CONFORMANCE OF BFN PLANT WITH THE STATION BLACKOUT
RULE (SBO) (10 CFR 50.63)

Reference: NRC letter to TVA dated July 11, 1991, Safety Evaluation
on the Conformance of BFN with the Station Blackout Rule
(TAC NOs. 68517, 68518, and 68519)

This letter provides the requested response to the referenced letter, which transmitted the SE regarding BFN's compliance to the SBO Rule (10 CFR 50.63). In the referenced letter, the NRC Staff concluded that BFN Units 1 and 3 are not in conformance with 10 CFR 50.63. NRC requested that TVA submit a revised response for Unit 3 no later than December 31, 1991, and for Unit 1, no later than 24 months before the scheduled restart date. With regard to BFN Unit 2, NRC concluded that the information and schedule for implementing necessary procedure changes submitted by TVA conforms with the SBO rule. However, this conclusion is contingent upon TVA's satisfactory resolution of recommendations detailed in the SE. In this regard, NRC requested that TVA address each of the staff's recommendations for Unit 2 and provide an implementation schedule, as applicable. Additionally, 10 CFR 50.63(C)(4) requires TVA to submit an implementation schedule within 30 days after receipt of the staff's regulatory assessment (i.e., SE).

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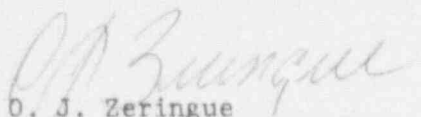
With respect to the revised SBO submittals for Units 1 and 3, TVA will submit a revised response for each unit on a schedule that meets NRC's requested time frames.

Enclosure 1 contains TVA's response to each of the staff's recommendations. Enclosure 1 also addresses NRC's question on the heat-up values used in answering questions during the Advisory Committee on Reactor Safety meetings. These questions were related to environmental impact upon solid-state equipment due to an SBO event and concurrent loss of ventilation.

Enclosure 2 provides the commitments contained in this submittal. If you have any questions, please contact Patrick P. Carrier, at (205) 729-3566.

Very truly yours,

TENNESSEE VALLEY AUTHORITY


D. J. Zeringue

Enclosures

cc (Enclosures):

NRC Resident Inspector
Browns Ferry Nuclear Plant
Route 12, Box 637
Athens, Alabama 35609-2000

Mr. Thierry M. Ross, Project Manager
U.S. Nuclear Regulatory Commission
One White Flint, North
11555 Rockville Pike
Rockville, Maryland 20852

Mr. B. A. Wilson, Project Chief
U.S. Nuclear Regulatory Commission
Region II
101 Marietta Street, NW, Suite 2900
Atlanta, Georgia 30323

ENCLOSURE 1

RESPONSE TO NRC'S STATION BLACKOUT RULE(SBO)
SAFETY EVALUATION (SE) ON BFN UNIT 2

The following provides TVA's response to each of NRC's request/recommendations contained in the July 11, 1991 letter and enclosed SE:

1) NRC's Request:

In accordance with 10 CFR 50.63(C)(4), provide a schedule for BFN's implementation of the appropriate loss of all ac power procedure(s) that either have been revised or will be revised in order to comply with the SBO Rule. (Reference: Page 2 of NRC's July 11, 1991 letter)

TVA's Response:

TVA committed in the April 18, 1989 SBO submittal to revise the appropriate loss of all ac power procedure(s) for BFN Unit 2 within one year of the issuance of the Staff SE to include:

- 1) Load shedding guidance to ensure 4-hour coping for the Class 1E batteries,
- 2) the manual transfer of the switchyard breaker closure loads needed for power restoration, and
- 3) requirements to open the doors to the unit preferred motor generator set rooms needed for SBO.

BFN Procedure O-AOI-57-2 "Station Blackout" has been revised to incorporate Item 3. O-AOI-57-2 will be revised to implement the requirements of Items 1 and 2 by May 30, 1992.

Additionally, TVA committed to revise procedure(s) to ensure adequate coolant inventory and to identify applicable reactor vessel depressurization requirements. Emergency Operating Instruction 2-EOI-1&2 has been revised to incorporate these requirements.

2) NRC'S Recommendation for Units 1, 2, & 3:

The licensee should verify and confirm that an SBO on all three units envelopes (particularly with respect to station battery adequacy) each single and double unit SBO combination (assuming a loss of offsite power on all three units). (Reference: SE Section 2.1-Station Blackout Duration)

TVA's Response:

TVA's evaluation envelopes the single and double unit SBO combinations that could occur.

3) NRC's Recommendation for Unit 2 only:

The licensee should verify the adequacy of the dc power supply for the turbine emergency bearing oil pump, the generator emergency seal oil pump, and for the control and field flashing of the EDGs during an SBO. (Reference: SE Section 2.2.2 - Class 1E Battery Capacity)

TVA's Response:

Emergency Oil Pumps

During an SBO dc power supply for these pumps is provided by battery 4 (nonclass 1E). TVA's evaluation takes no credit for battery 4 to mitigate an SBO event and no calculations have been performed to determine the length of time battery 4 will be available. These pumps are not safety-related and are not required to mitigate an SBO event. The switchyard controls (which are normally supplied from battery 4) are manually transferred to battery 2 during an SBO event for ac power restoration.

Control and field flashing of the diesel generator

TVA's analysis does not consider that ac power will be restored by the diesel generators. Therefore, dc power is not needed for control and field flashing of the EDGs.

4) NRC's Recommendation for Unit 2 only:

The licensee should use a higher initial temperature in areas like the HPCI and RCIC rooms and assess the equipment operability in these rooms to ascertain if they are capable of withstanding a temperature of at least 135 degrees Fahrenheit. The licensee should consider a more conservative initial control room temperature for the heat-up calculation based on a value representing the maximum temperature experienced in the control room (with proper documentation). If the maximum experienced temperature is not known, an initial temperature of an average value between the maximum control room HVAC system design temperature and 104 degrees Fahrenheit, assumed initial temperature for non-HVAC areas, is considered by the staff to be conservative enough for a control room heat-up evaluation. The licensee should also use a higher heat generation rate which is approximately 240 watts (W) per person, as recommended by the American Society of Heating, Refrigerating, and Air Conditioning Engineering (ASHRAE) handbook, for the control room occupant in temperature calculations. In addition, the licensee should reevaluate the drywell heat-up with an assumed leak rate of 61 gpm (as recommended by NUMARC 87-00) and verify that containment integrity will not be jeopardized. (Reference: SE Section 2.2.4 - Effects of Loss of Ventilation)

NRC also requested that TVA address the heat-up values used in answering questions during the ACRC meetings, concerning environmental impact upon solid-state equipment due to an SBO event and concurrent loss of ventilation.

TVA's Response:

TVA will evaluate the recommended input data (i.e., initial RCIC/HPCI room temperature, drywell leakage rate, heat load per person), and utilize it in the associated calculations, as applicable. This re-evaluation is expected to be complete by December 6, 1991.

The following addresses NRC's question concerning the ambient temperature used in the torus area to calculate the HPCI/RCIC room temperatures (used in answering questions during the ACRS meetings). Specifically, the ACRS questioned the calculation that used the normal ambient temperature for the torus room of 80 degrees F. Additionally, the ACRS pointed out that the torus provides the heat sink during SBO (i.e., blowdown path and steam from the HPCI and RCIC turbines) that would result in higher than normal torus room temperature. TVA agreed and performed a calculation (MD-N2999-910025) to determine the HPCI and RCIC SBO temperatures with an initial torus room temperature of 130 degrees F. The torus room initial temperature discrepancy will be addressed for the remaining calculations as part of TVA's resolution to SE Section 2.2.4. With the exception of the higher torus room temperature, TVA calculated the new values using the same methodology and input values as used initially. However, these temperatures are based on HPCI and RCIC room initial air temperatures corresponding to the average normal temperatures given by TVA's 10 CFR 50.49 EQ Program. NUMARC 87-00 indicates a value of 104 degrees F should be used unless adequate justification for a lower value is provided.

5) NRC's Recommendation for Unit 2 only:

The licensee should re-evaluate the containment isolation valves (CIVs) according to the exclusion criteria given in Regulatory Guide (RG) 1.155. The licensee should list in appropriate procedures the CIVs which are either normally-closed and fail as-is upon loss of ac power or are normally-open and fail as-is upon loss of ac power, and cannot be excluded by the criteria given in RG 1.155, and identify the actions necessary to ensure that these valves are fully closed, if necessary. The staff's position is that valve closure needs to be confirmed by position indication (local, mechanical, remote, process information, etc.). (Reference: SE Section 2.2.5-Containment Isolation)

TVA's Response:

TVA will re-evaluate the bases for the previous SBO responses related to this recommendation by December 6, 1991.

6) NRC's Recommendation for Unit 2 only:

The licensee should verify that SBO equipment is covered by an appropriate QA program consistent with the guidance of RG 1.155. (Reference: SE Section 2.5-Quality Assurance and Technical Specifications)

TVA's Response:

Non-safety related HPCI and RCIC valves and condensate storage tanks required for SBO are covered under a program consistent with the requirements of RG 1.155. Remaining SBO equipment is covered by an appropriate QA program consistent with RG 1.155 guidance except for Motor Generator (MG) set testing. Routine testing of this function is scheduled for implementation by October 30, 1991.

7) NRC's Recommendation for Unit 2 only:

The licensee should implement an EDG reliability program which meets the guidance of RG 1.155, Section 1.2. If an EDG reliability program currently exists, the program should be evaluated and adjusted in accordance with RG 1.155. Confirmation that such a program is in place or will be implemented should be included in the documentation supporting the SBO submittal that is to be maintained by the licensee. (Reference: SE Section 2.6 - EDG Reliability Program)

TVA's Response:

As previously stated in TVA's May 4, 1990 submittal, an EDG target reliability of 0.975 was chosen for BFN and is being maintained. An actual BFN diesel generator reliability of 0.995 was identified in the May 4, 1990 submittal. TVA's existing EDG Reliability Program will be revised to meet the guidance of RG 1.155, Section 2, by October 30, 1991.

Clarification to Section 2.2.2 of SE

Section 2.2.2 states that: "The operator is required to load shed each battery until a current of 180 amps (A) is reached." This sentence should be revised to read: "For Unit 2 operation, the operator is required to load shed each battery until a current of 120 A is reached for batteries 2, 3, and 195 A for battery 1."

The required load shed was determined in the SBO battery analysis. This analysis was contained in a supplemental package provided to NRC as requested during the October 25, 1990 telecon. The 180 A value was the value used for calculation in five of the six cases studied. The actual required ammeter readings are reduced by 60 A to offset the potential ammeter inaccuracy. The corresponding load ammeter reading shown in the SBO battery analysis is 120 A. For the Unit 1 battery, considering Unit 2 only operation, the ammeter reading is 195 A including offset.

ENCLOSURE 2
SUMMARY LIST OF COMMITMENTS

1. With respect to the revised SBO submittals for Units 1 and 3, TVA will submit a revised response for each unit on a schedule that meets NRC's requested time frames.
2. O-AOI-57-2 will be revised to implement the requirements of Items A and B below, by May 30, 1992.
 - A) load shedding guidance to ensure 4-hour coping for the Class 1E batteries, and
 - B) the manual transfer of the switchyard breaker closure loads needed for power restoration.
3. TVA will evaluate the recommended input data (i.e., initial RCIC/HCIC room temperature, drywell leakage rate, heat load per person), and apply to the associated calculations, as applicable. This re-evaluation is expected to be complete by December 6, 1991. The torus room initial temperature discrepancy will be addressed for the remaining calculations as part of TVA's resolution to SE Section 2.2.4.
4. TVA will re-evaluate the bases for the previous SBO responses related to the recommendation contained in SE Section 2.2.5, by December 6, 1991.
5. SBO equipment is covered by an appropriate QA Program, consistent with RG 1.155 guidance except for MG set testing. Routine testing of this function is scheduled for implementation by October 30, 1991.
6. TVA's existing EDG Reliability Program will be revised to meet RG 1.155 guidance by October 30, 1991.