



Tennessee Valley Authority, 1101 Market Street, Chattanooga, Tennessee 37402

MAY 06 1991

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	)	50-296

BROWNS FERRY NUCLEAR PLANT (BFN) - PROGRAM FOR RESOLVING CONDUIT AND  
CONDUIT SUPPORTS ISSUE PRIOR TO THE RESTART OF UNITS 1 AND 3

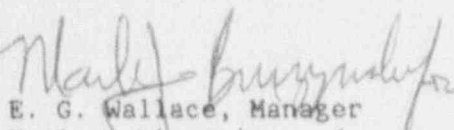
Reference: TVA letter, dated January 9, 1991, Plans for the Return to  
Service of BFN Units 1 and 3

As part of the referenced letter, TVA committed to provide the NRC Staff with the action plan for dispositioning the conduit and conduit supports issue at BFN Units 1 and 3. Enclosure 1 to this letter provides a summary of this issue, a review of the Unit 2 resolution, a discussion of lessons learned, and a description of how this issue will be resolved on Units 1 and 3. This submittal is provided for informational purposes only. No NRC action is specifically requested.

A summary list of commitments contained in this letter is provided in Enclosure 2. If you have any questions, please telephone Joesph E. McCarthy, Unit 3 Licensing Manager, at (205) 729-3604.

Very truly yours,

TENNESSEE VALLEY AUTHORITY

  
E. G. Wallace, Manager  
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Enclosures  
cc: See page 2

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U.S. Nuclear Regulatory Commission

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**ENCLOSURE 1**  
**BROWNS FERRY NUCLEAR PLANT (BFN) - UNITS 1 AND 3**  
**CONDUIT AND CONDUIT SUPPORTS CORRECTIVE ACTION PLAN**

ISSUE SUMMARY

Concerns regarding the adequacy of conduit and conduit supports were originally raised in NRC Inspection Report 83-09, dated April 18, 1983. The inspection identified a concern regarding the construction practice for the installation of field routed electrical conduit supports not being in accordance with the applicable General Construction Specification. Conduit supports which did not meet the field routing criteria were identified. Therefore, the adequacy of conduits to perform their safety function after a design basis earthquake could not be assured.

The following is a summary of the more significant TVA/NRC correspondence which documents the resolution of this issue. This summary is provided in order to assist the NRC Staff if additional detailed historical information is required.

By letter dated July 31, 1986, NRC requested TVA provide background information and a description of the corrective actions for the BFN conduit qualification program. TVA submitted the requested background information and a description of TVA's corrective action program by letter, dated April 8, 1987. Supplemental programmatic information and a copy of the interim criteria for conduit and conduit supports was provided by TVA letter, dated May 27, 1988. NRC approved the interim operability criteria for conduits in a Safety Evaluation, dated July 26, 1988. By letter dated August 23, 1988, TVA responded to the Safety Evaluation open items and concerns.

Monitoring and evaluation of TVA's corrective actions is documented in:

- Inspection Report 88-13, dated October 3, 1988,
- Inspection Report 88-38, dated April 19, 1989,
- Inspection Report 89-21, dated June 15, 1989,
- Inspection Report 89-29, dated September 20, 1989, and
- Inspection Report 89-42, dated February 26, 1990.

TVA responded to the open items in Inspection Report 88-13, by letter, dated January 18, 1989. The acceptability of TVA's program to evaluate the adequacy of conduits and conduit supports for Unit 2 was documented in Section 2.2.2.3 of NUREG-1232, Volume 3, Supplement 1, dated October 24, 1989, and in the same section of Supplement 2, dated January 23, 1991. By letter dated April 16, 1991, TVA notified NRC that the conduit support modifications required to satisfy the interim operability criteria for Unit 2 restart were complete.

REVIEW OF THE UNIT 2 RESOLUTION OF CONDUIT AND CONDUIT SUPPORTS

In order to resolve the concern regarding the adequacy of conduit and conduit supports, TVA implemented an interim seismic qualification program. This program reviewed the conduit and conduit supports required for Unit 2 operation, which were installed prior to May 1984. After May 1984, engineered conduit support drawings were utilized for conduit support installation. The engineered conduit support drawings were produced in accordance with seismic design criteria and did not require re-inspection.

**ENCLOSURE 1 (CONTINUED)**  
**BROWNS FERRY NUCLEAR PLANT (BFN) - UNITS 1 AND 3**  
**CONDUIT AND CONDUIT SUPPORTS CORRECTIVE ACTION PLAN**

The interim conduit and conduit support evaluation program at BFN involved the walkdown and evaluation of approximately 100 miles of conduit and 20,000 supports. Trained and experienced walkdown personnel visually reviewed each conduit and conduit support and made a determination (using good engineering judgement) of the seismic adequacy of the installed configuration. If, in the evaluators opinion, the adequacy of the commodity being evaluated was questionable, a discrepancy was written for further evaluation.

The inspection required to return Unit 2 to service covered the majority of the conduits at the BFN site. This inspection included common plant areas and the specific areas of the Reactor Building which contained conduits required to achieve hot shutdown of Unit 2 in the event of a design basis earthquake. All conduits and conduit supports in these areas were inspected regardless of the conduits safety classification or unit. The common plant areas inspected were:

- 1) Diesel Generator Building,
- 2) Intake Pumping Station and associated tunnels,
- 3) Control Bay,
- 4) Off Gas Treatment Building, and the
- 5) Standby Gas Treatment Building.

Initially, the conduit and conduit supports were evaluated against the requirements of the original TVA General Construction Specification. Subsequently, TVA initiated a full-scale shaker table test to develop a more realistic acceptance criteria. Each discrepancy was evaluated against this new criteria.

In June 1986, the Seismic Qualification Utility Group (SQUG) along with the Senior Seismic Review Advisory Panel (SSRAP) decided to include cable tray and conduit systems in the scope of the program for the resolution of Unresolved Safety Issue (USI) A-46, Verification of Seismic Adequacy of Mechanical and Electrical Equipment in Operating Reactors. The program to resolve USI A-46 is based on screening criteria and data gathered from previous earthquakes. This program has been accepted in principle by NRC as documented in Generic Letter 87-02, dated February 19, 1987.

TVA's identified discrepancies were compared to this seismic experience data base. All outliers were corrected by modifications or were addressed by other ongoing qualification programs. At the conclusion of these activities, 430 modifications were required to bring Browns Ferry Unit 2 into compliance with the interim criteria. Approximately 230 of these modifications were in the Reactor Building. As documented in NUREG-1232, Volume 3, Supplement 2, the following Unit 2 post-restart actions remain open:

- 1) TVA will evaluate and upgrade, as needed, the aluminum conduit and supports qualified to the interim criteria against the Unresolved Safety Issue (USI) A-46 program guidelines, and
- 2) TVA will evaluate and upgrade, as needed, the steel conduit and supports qualified to the interim criteria against the Unresolved Safety Issue (USI) A-46 program guidelines.

ENCLOSURE 2  
BROWNS FERRY NUCLEAR PLANT - UNITS 1 AND 3  
SUMMARY OF COMMITMENTS

TVA's interim program for the seismic qualification of the remaining Units 1 and 3 conduit and conduit supports will consist of engineering evaluations of these commodities with a focus on the attributes which resulted in modifications on the Unit 2 program. The resolution of identified discrepancies will be implemented prior to the restart of Units 1 and 3, respectively.

TVA's final program for the seismic qualification of the remaining Units 1 and 3 conduit and conduit supports will be an evaluation and upgrade, as needed, of the Units 1 and 3 aluminum and steel conduit and supports against the USI A-46 program guidelines.

ENCLOSURE 1 (CONTINUED)  
BROWNS FERRY NUCLEAR PLANT (BFN) - UNITS 1 AND 3  
CONDUIT AND CONDUIT SUPPORTS CORRECTIVE ACTION PLAN

DISCUSSION OF LESSONS LEARNED FROM UNIT 2 CONDUIT AND CONDUIT SUPPORTS

TVA's program for the resolution of conduit support discrepancies resulted in modifications for the following generic attributes:

- Conduit Overspan Conditions
  - Between supports
  - Cantilevers
  - In-line junction boxes
- Support Deficiencies
  - Unistrut frames and welds
  - Angle frames
  - Multiple cantilever supports
- Hardware Deficiencies

The conduit itself was determined to be of rugged construction and no modifications to conduit were required.

DESCRIPTION OF THE UNITS 1 AND 3 PROGRAM FOR CONDUIT AND CONDUIT SUPPORTS

TVA's interim program for the seismic qualification of the remaining Units 1 and 3 conduit and conduit supports will consist of engineering evaluations of these commodities with a focus on the attributes which resulted in modifications in the Unit 2 program. These inspections will include the Units 1 and 3 drywells and the areas of the Reactor Building which were not included in the Unit 2 program. Discrepancies will be evaluated against the criteria and seismic experience database used in the Unit 2 program. The resolution of identified discrepancies will be implemented prior to the restart of Units 1 and 3, respectively.

TVA's final program for the seismic qualification of the remaining Units 1 and 3 conduit and conduit supports will be in accordance with the Unit 2 post-restart commitments. TVA will evaluate and upgrade, as needed, the Units 1 and 3 aluminum and steel conduit and supports against the USI A-46 program guidelines. When the generic resolution of USI A-46 is issued, TVA may evaluate the implementation the final program for the seismic qualification of conduit in lieu of the interim qualification.