TENNESSEE VALLEY AUTHORITY

CHATTANOOGA, TENNESSEE 374

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NOV 29 1990

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) - ANTICIPATED TRANSIENT WITHOUT SCRAM (ATWS) - RESPONSE TO NRC FOLLOWUP ITEMS RECEIVED DURING ATWS INSPECTION

References:
1. Letter from S. Black (NRC) to O. D. Kingsley dated January 22, 1989, "Compliance with Rule 10 CFR 50.62 Relating to Alternate Rod Injection and Reactor Pump Trip Systems"
2. Letter from J. M. Taylor (NRC) to G. J. Beck (BWROG) dated September 20, 1990, "Response to BWROG Appeal on ATWS Diversity"
3. Boiling Water Reactor Owner's Group Licensing Topical Report NEDE-31096-P-A

This letter provides a schedule for implementing an alternate rod injection design that is in full compliance with the ATWS Rule including equipment/manufacturing diversity. This letter also responds to inspector followup items opened during the NRC inspection of BFN's implementation of the ATWS Rule (10 CFR 50.62) during the week of October 29 - November 2, 1990.

BACKGROUND

NRC stated in Reference 1 that the manufacturer/equipment diversity issue was the only area that BFN's ATWS design was not in full compliance with the ATWS Rule. NRC stated that if analog trip units (ATUs) by a different manufacturer were used in the Alternate Rod Injection (ARI) System and the Reactor Protection System (RPS), sufficient diversity would exist between the ATWS ARI System and the RPS.

NRC's letter dated September 20, 1990, (Reference 2) documented NRC Executive Director for Operations denial of the BWROG's appeal of the NRC diversity position. Based on NRC's rejection of the BWROG appeal TVA will provide manufacturer diverse ARI consistent with the NRC's interpretation of the ATWS Rule.

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During the ATWS implementation inspection, NRC opened the following inspector followup items:

1. NRC requested a submittal on the docket indicating the schedule for implementation of the ARI ATU diversity issue.

2. BFN's ARI modification testing results do not explicitly agree with the control rod insertion times stipulated by Reference 3. NRC has requested that TVA provide a technical justification for the variance.

3. NRC requested that TVA provide a description of the functional testing which will be performed to verify ARI valve operation during future outages.

RESPONSE

The following provides TVA's response to each of the items listed above in the order presented:

1. A contract has been awarded to General Electric (GE) to provide replacement ARI ATUs. The purchase specification clearly stipulates that the ATUs are to be diverse from the existing BFN Rosemount ATUs to ensure compliance with the ATWS Rule. Delivery of the ATUs onsite is scheduled for March 1, 1991. TVA will install the ATUs prior to Unit 2 Cycle 7 startup. Additionally, TVA will install similarly diverse ATUs in the ARI systems for Units 1 and 3 prior to their respective restart dates.

2. The NRC safety evaluation report (SER) (Reference 1) prepared for the BFN Unit 2 ATWS design endorsed the BWROG's Licensing Topical Report NEDE-31096-P-A. NEDE-31096-P-A Section 3.2 specifies that control rod motion begin within 15 seconds and be complete within 25 seconds. The basis for this ARI insertion time requirement is found in Section 3.3.1 of the report which specifies that the requirement ensures that the scram discharge volume (SDV) will not fill completely causing a hydraulic lock to occur before all control rods complete rod motion. The NRC SER endorses this basis which also allows for deviations based upon plant-specific calculations to determine the actual fill rate of the SDV.

   TVA has performed BFN-specific calculations to document the fill time for the SDV as 34.5 seconds. This provides BFN with an additional conservative time margin for completion of control rod insertion prior to the SDV filling. However, the additional margin is not utilized to comply with the ATWS Rule because all control rods were shown by test data in conjunction with GE analysis to have completed their full travel within 25 seconds. The only ARI test deviation to be addressed is the fact that not all of the control rods had begun moving within the required 15 second timeframe (i.e., approximately 70% of the control rods had begun motion within 15 seconds). This deviation allows slightly more fission process heat to be generated prior to core shutdown. This variance is acceptable

based on the thermal/hydraulic analysis performed to validate NEDE-31096-P-A Section 3.2.1. This evaluation indicates that core shutdown within 60 seconds is adequate to ensure mitigation of the ATWS event without undue stress on the capabilities of the pressure suppression pool (PSP) (i.e., pool temperature does not exceed 110 degrees F for the event). Since all rods have completed their full travel in 25 seconds, the total amount of heat added to the PSP is insignificant when compared to that added for the 60 second case. Therefore, it was concluded that the test results complied with the requirements of the NRC SER and the BWROG topical report.

3. During the ATWS inspection NRC questioned TVA plans to periodically test the solenoid valves to verify ARI valve operation. Currently, the solenoid valves do not have local or remote indication of valve position. Although there is no regulatory requirement to install valves with position indication, TVA plans to provide a means of positive indication of ARI valve position before Unit 2 Cycle 7 startup. Additionally, TVA plans to provide a means of positive indication of ARI valve position for Units 1 and 3 prior to their respective startup dates. The appropriate Unit 2 plant instruction will be revised to require once per cycle functional testing of the ARI solenoid valves to verify that the valves fully energize and open when required. This instruction will be revised prior to the Unit 2 Cycle 7 startup. The appropriate plant instructions will be revised for Units 1 and 3 prior to their respective restart dates.

SUMMARY

The BFN ATWS design is functional and meets 10 CFR 50.62 with the exception of manufacturer diverse ATUs. The system is capable of mitigating an ATWS event for Unit 2 during Cycle 6. The change to implement manufacturing diversity will be completed during the next outage.

The enclosure summarizes the commitments contained in this submittal. If you have any questions, please telephone Patrick P. Carier, BFN Site Licensing, (205) 729-3566.

Very truly yours,

TENNESSEE VALLEY AUTHORITY

E. G. Wallace, Manager
Nuclear Licensing and
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Enclosure
cc: See page 4

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ENCLOSURE

COMMITMENT SUMMARY

1. TVA will install manufacturer diverse ATUs prior to Unit 2 Cycle 7 startup.

2. TVA will install similarly diverse ATUs in the ARI systems for Units 1 and 3 prior to their respective restart dates.

3. TVA plans to provide a means of positive indication of the valve position prior to Unit 2 Cycle 7 startup.

4. TVA plans to provide a means of positive indication of the valve position for Units 1 and 3 prior to their respective startup dates.

5. TVA will revise the appropriate Unit 2 plant instruction to require once-per-cycle functional testing of the ARI solenoid valves prior to the Unit 2 Cycle 7 startup.

6. TVA will revise the appropriate Unit 1 and Unit 3 plant instructions to require once-per-cycle functional testing of the ARI solenoid valves prior to their respective restart dates.