



UNITED STATES
NUCLEAR REGULATORY COMMISSION
WASHINGTON, D. C. 20555

ENCLOSURE 2

SAFETY EVALUATION BY THE OFFICE OF NUCLEAR REACTOR REGULATION

SUPPORTING AMENDMENT NO. 189 TO FACILITY OPERATING LICENSE NO. DPR-52

TENNESSEE VALLEY AUTHORITY

BROWNS FERRY NUCLEAR PLANT, UNIT 2

DOCKET NO. 50-260

1.0 INTRODUCTION

By letter dated June 4, 1990, Tennessee Valley Authority (TVA or the licensee) submitted a request to change the Technical Specifications (TS) for Browns Ferry Nuclear Plant (BFN), Unit 2. The proposed TS amendment would replace the current Reactor Water Cleanup (RWCU) system high temperature detection instruments in TS Tables 3.2.A, 4.1.A, and 3.7.A. with new temperature loops. The new temperature loops would consist of environmentally qualified resistance temperature detectors (RTDs) and IEEE class-1E qualified analog trip units (ATUs). In addition, the Bases Section 3.2 would be modified to describe the locations of the RTDs.

2.0 BACKGROUND AND DISCUSSION

The RWCU system functions to maintain high reactor water purity to limit chemical and corrosive action, thereby limiting fouling and deposition from occurring on heat transfer surfaces of the Reactor Coolant System (RCS). The system also removes corrosion products to limit impurities available for activation by neutron flux and the resulting radiation from deposition of corrosion products. The RWCU system provides continuous purification of a portion of the recirculation flow. The RWCU system also provides a means of removing reactor water during plant heatup operations.

Upon indication of high temperature in the RWCU system spaces, the RWCU system automatically isolates the reactor coolant pressure boundary by closure of two RWCU suction line isolation valves, and closure of the RWCU return line valve. Such isolation is needed to preclude a radioactive release in the case of a line break.

The licensee stated in its application for amendment dated June 4, 1990, that an analysis of High Energy Line Break (HELB) in the reactor building had identified certain pipe breaks which could not be automatically detected and isolated in a reasonable timeframe using the presently installed temperature switches. The breaks identified were RWCU pipe critical cracks in the main steam valve vault, as well as in RWCU pump rooms, RWCU pipe trench, and the RWCU heat exchanger room. The proposed changes to the TS reflect a plant modification aimed at replacing the existing non-environmentally qualified temperature switches with environmentally qualified temperature loops to improve timeliness of detection and isolation of line breaks.

3.0 EVALUATION

The four existing temperature switches located in the floor drains in the backwash receiving room will be abandoned and replaced by four RTDs located in RWCU pump rooms A and B. The four temperature switches located in the RWCU pipe trench and the four located in the RWCU heat exchanger rooms are being replaced by the same number of RTDs at each location. Additionally, four RTDs are being added to the main steam valve vault, where no temperature switches were located previous to this modification.

The new RTD/ATU temperature loops were chosen by TVA to decrease the time needed to close the RWCU valves. The setpoints for the new RTD/ATU temperature loops are set above the maximum expected room temperature to avoid spurious actuation due to ambient conditions, and below the analytical limits for timeliness in detecting a pipe break. The logic arrangement does not change from that of the temperature switches, i.e., high temperature signals from one of two RTDs in each of two divisions in a given area are required to produce a RWCU primary isolation signal (one-out-of-two taken twice). With this logic the licensee states that the failure of a single RTD, ATU, or power feed will not prevent isolation nor produce a spurious isolation.

The licensee has stated in its amendment request that the new devices do not alter or affect the function or isolation of the valves. The modifications were made to ensure a quicker means of detecting RWCU pipe breaks and provide more accurate temperature measurement. The NRC has analyzed and approved designs at Boiling Water Reactor (BWR) plants with such ATUs (NEDO-21617, Analog Transmitter/Trip Unit System for Engineered Safeguard Sensor Trip Input.)

The changes to the TS proposed by the licensee are necessary to reflect the replacement of the temperature switches with the RTD/ATU loops. The requirements pertaining to the function and surveillance of these devices have not been changed. The NRC staff finds the TS changes acceptable. A summary of the individual changes with each basis for approval follows:

1. Replacement of the RWCU system temperature switches on TS Tables 3.2.A and 4.2.A by the new ATU instrumentation is acceptable. Such devices have been approved by the NRC in the past and perform the same function as the former temperature switches. Additionally, the new devices are environmentally and IEEE-qualified.
2. Deletion of Note 14 from Table 3.2.A is acceptable. The note applies to the temperature switches that are being deleted from the table.
3. Revision of Bases Section 3.2 is appropriate as described by the licensee. The revised Bases describe the locations of the RTDs.

4. The Notes on Table 3.7.A are being revised to indicate that the new RTD/ATU temperature loops actuate Group 3 primary containment isolation valves. The NRC staff agrees with the licensee's proposal to provide isolation in the event that high temperatures are indicated in the RWCU pump rooms 2A and 2B, the RWCU heat exchanger room, the main steam valve vault, or in the space near the pipe trench containing RWCU piping.

4.0 ENVIRONMENTAL CONSIDERATION

This amendment involves a change to a requirement with respect to the installation or use of a facility component located within the restricted area as defined in 10 CFR Part 20 and changes to the surveillance requirements. The staff has determined that the amendment involves no significant increase in the amounts, and no significant change in the types, of any effluents that may be released offsite, and that there is no significant increase in individual or cumulative occupational radiation exposure. The Commission has previously issued a proposed finding that this amendment involves no significant hazards consideration and there has been no public comment on such finding. Accordingly, the amendment meets the eligibility criteria for categorical exclusion set forth in 10 CFR 51.22(c)(9). Pursuant to 10 CFR 51.22(b), no environmental impact statement nor environmental assessment need be prepared in connection with the issuance of the amendment.

5.0 CONCLUSION

The Commission made a proposed determination that the amendment involves no significant hazards consideration which was published in the Federal Register (55 FR 50312) on July 25, 1990, and consulted with the State of Alabama. No public comments were received, and the State of Alabama did not have any comments.

The staff has concluded, based on the considerations discussed above, that: (1) there is reasonable assurance that the health and safety of the public will not be endangered by operation in the proposed manner, (2) such activities will be conducted in compliance with the Commission's regulations, and (3) the issuance of the amendments will not be inimical to the common defense and security nor to the health and safety of the public.

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Dated: February 6, 1991