



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

ENCLOSURE 2

SAFETY EVALUATION BY THE OFFICE OF NUCLEAR REACTOR REGULATION

SUPPORTING AMENDMENT NO. 185 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 July 6, 1990, the licensee, Tennessee Valley Authority (TVA), proposed changes to the Technical Specifications (TS) for Browns Ferry Nuclear Plant Unit 2 (BFN2). The proposed amendment will revise (1) the Automatic Depressurization System (ADS) initiation and high drywell pressure bypass timer names and setpoints, (2) the number of ADS valves required to be operable prior to startup, (3) ADS limiting conditions for operation (LCO) with inoperable valves, and (4) the ADS bases.

2.0 EVALUATION

The ADS high drywell pressure bypass timer was added to meet the requirements of NUREG-0737, Item II.K.3.18 and provide for automatic actuation of the ADS for certain Loss of Coolant Accident (LOCA) events where a high drywell pressure does not exist (e.g., pipe breaks outside containment). Automatic actuation eliminates the need for manual operator action to assure adequate core cooling. The BFN2 TS settings for the ADS initiation timer and the ADS high drywell pressure bypass timers are being revised. The changes resulted from review of the calculation for the ADS high drywell pressure bypass timer function and a recalculation of the accuracy of the ADS initiation timer.

TVA replaced the Yarway columns for the reactor water level instruments which were located inside the containment with the instrumentation outside the containment. The change eliminates the correction factor or bias of the reactor low level setpoint for the ADS assumed in the setpoint determination for the original ADS high drywell pressure bypass timer. The bias was the result of the high drywell temperature effect associated with water leg columns.

The new bypass timer setpoint was assessed by General Electric (GE) using data from the previous Browns Ferry bypass timer analyses and data from similar plants. The assessment took into account differences between the original calculation assumptions and the current plant configuration. These differences include four ADS valves (versus three in earlier analyses), no water leg column bias, and a higher uncertainty in the ADS timer (due to installation of new

9101150240 910109  
PDR ADOCK 05000260  
PDR

timer hardware). The licensee's assessment concluded that for an ADS high drywell pressure bypass timer analytical limit of 360 seconds, the peak cladding temperature (PCT) is not expected to exceed 1500°F. The estimated PCT based upon the previous timer setpoint was 1424°F.

The licensee's assessment did not include a specific Appendix K calculation to evaluate the new bypass timer setting. However, based upon our experience with similar calculations, the Browns Ferry plant design, and the assumptions discussed by the licensee, the NRC staff agrees that the licensee's less rigorous analysis is reasonably conservative. Since the assessment results indicate a large margin between the expected PCT (less than 1500°F) and the 10 CFR 50.46 acceptance criteria of 2200°F, the setting for the bypass timer is acceptable.

The ADS timer has been replaced. The new ADS timer has a higher uncertainty. Therefore, a time delay of 130 seconds was used in the bounding analysis referred above.

The LCO for the ADS currently requires only four valves to be operable prior to startup. A single failure or loss of a 250V DC reactor motor operated valve (MOV) board during a high pressure coolant injection (HPCI) line break could make two ADS valves inoperable. Analyses have shown that reactor depressurization with two ADS valves and no high pressure coolant injection system will result in exceeding the PCT of 2200°F. The bounding analysis confirms that four ADS valves are sufficient to mitigate the accident and that the PCT will not be exceeded even in the event of a single failure (loss of a DC reactor MOV board during a HPCI line break). The proposed LCO requires six ADS valves to be operable before startup. A minimum of four valves would be available even with the worst single failure. Thus, the proposed LCO is acceptable.

## 2.1 Technical Specification Changes

- (1) TS Table 3.2.B, remarks for the function "Instrument Channel-Reactor Low Water Level" (LS-3-58A-D) and "Instrument Channel Drywell High Pressure" (PIS-64-57A-D) -- The term "105 second delay timer" is changed to "ADS timer". Since the ADS timer setting is changed, the 105 second timer terminology is not correct. The proposed change to "ADS timer" is acceptable.

In Remark #2, the term "12½ minute delay timer" is changed to "ADS high drywell pressure bypass timer" to reflect the change from the 12½ minute setting. This is acceptable.

- (2) Table 3.2.B on Page 3.2/4.2-17 is relocated to Page 3.2/4.2-22a with necessary changes in the ADS timer's trip settings. The allowable values of less than or equal to 115 seconds for ADS timer and less than or equal to 322 seconds for ADS high drywell pressure are within the analyzed values of 130 seconds and 360 seconds and, hence, are acceptable.
- (3) Table 4.2.B on Page 3.2/4.2-45 -- The old timer settings of 105 seconds and 12½ minutes are deleted in the proposed version. This is acceptable.

- (4) Page 3.2/4.2-66, Bases 3.2 -- The proposed changes to the bases are acceptable, because they reflect the changes required by the new timer settings.
- (5) LCO and Bases 3.5.G.1, 2, 3 -- The current LCO requires only four of the six ADS valves to be operable. The proposed change requires all six ADS valves to be operable. This is more conservative and is supported by the bounding analysis, and is therefore acceptable. The proposed change allows one ADS to be inoperable for 14 days if the HPCI, the core spray and the low pressure coolant system (LPCI) systems are operable. This is acceptable. The proposed bases accurately reflect the specification and equipment changes and are acceptable.

### 3.0 ENVIRONMENTAL CONSIDERATION

This amendment involves changes to requirements with respect to the installation or use of facility components 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.

### 4.0 CONCLUSION

The Commission made a proposed determination that the amendment involves no significant hazards consideration which was published in the Federal Register (55 FR 36351) on September 5, 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.

Principal Contributor: G. Thomas

Dated: January 9, 1991

AMENDMENT NO. 185 FOR BROWNS FERRY UNIT 2 - DOCKET NO. 50-260  
DATED: January 9, 1991

Distribution

Docket File

NRC PDR  
Local PDR  
BFN Reading File  
S. Varga  
G. Lainas  
F. Hebdon  
S. Black  
M. Krebs  
T. Ross  
D. Moran  
B. Mozafari  
OGC  
D. Hagan  
E. Jordan  
G. Hill (4)  
Wanda Jones  
J. Calvo  
G. Thomas  
ACRS(10)  
GPA/PA  
OC/LFMB