SUMMARY REPORT
REFUELING TEST PROGRAM
BROWNS FERRY NUCLEAR PLANT
UNIT 2 - CYCLE 3

ABSTRACT

The second Browns Ferry Nuclear Plant Unit 2 refueling outage was conducted from April 27, 1979, through June 1, 1979. This report summarizes those refueling tests performed at the conclusion of the outage as a result of commitments made by the TVA to the NRC.

I. INTRODUCTION

On April 27, 1979, Browns Ferry Nuclear Plant Unit 2 was removed from service for its second refueling outage. During this outage 268 fuel assemblies (7x7 design) were replaced by new assemblies (36 of 8x8 design and 232 of 8x8R design). Five strings of power range incore detectors were also replaced.

The startup tests identified in the Final Safety Analysis Report (FSAR) were addressed, and those which involve areas which were affected by the outage and its activities were included in the refueling test program. The refueling test instructions were prepared by the Results Supervisor, reviewed and recommended for approval by the Plant Operations Review Committee (PORC), and finally approved by the Plant Superintendent. The Master Refueling Instruction (MRTI) coordinated and documented all test activities from fuel loading to the completion of the program. This instruction provided guidance for the sequence of events, and control points for satisfactory test completion and review before power ascension.

I. INTRODUCTION (Continued)

The successful implementation of this testing program ensures that the Unit 2 refueling outage has created no conditions or system characteristics which could adversely affect the safe operation of the plant.

Test documents and data referenced in this report are filed at the plant and are available for inspection upon request.

Test summaries are provided only for those tests to which TVA was committed by technical specifications or by our letter to Mr. Thomas A. Ippolito dated May 16, 1979.

II. REFUELING TEST SUMMARY

1. Fuel Loading RTI-3

Incore shuffling of fuel began on May 4, 1979, and was completed on May 15, 1979. Core verification via video tape recording revealed that all fuel assemblies were in the proper location, but that 16 assemblies were misoriented and 2 were not properly seated. These items were corrected and reverification performed as required.

2. Full Core Shutdown Margin RTI-4

The full core shutdown margin was determined during the reactor criticality following the outage. The shutdown margin determination was in acceptable agreement with the predicted value of 1.26% calculated by General Electric. The actual shutdown margin was 1.953% $\Delta k/k$ compared to the technical specification minimum required value of 0.38% $\Delta k/k$.

II. REFUELING TEST SUMMARY (Continued)

3. Control Rod Drive System RTI-5

The following control rod drive (CRD) system tests were performed before and/or after completion of fuel loading:

a. A functional test of each CRD to check rod position indication, rod-to-drive coupling, and insert/withdraw speed.

b. A continuous-in friction test of each CRD to check for drive line friction.

In addition, all Unit 2 control rods were scram timed at rated vessel pressure. All criteria were satisfied.

4. Core Power Distribution RTI-18

Acceptable TIP uncertainty was verified by comparing symmetric TIP pairs. The total uncertainty was found to be less than the 9% criterion. Gross TIP signal symmetry comparisons between symmetric TIP pairs verified that no deviations exceeded the 25% criteria.

5. Core Performance and Process Computer

Core performance parameters were monitored throughout the startup program. Proper operation of the process computer was verified by comparing results with the offline computer calculations at power levels of 25% and 98%. In each case there was good agreement between the two methods. All observed core performance parameters were within the required limits.

III. CONCLUSION

All refueling test items to which TVA was committed have been satisfactorily completed.