FINAL REFUELING TEST REPORT

Unit 3 Cycle 7

Dates Performed: 08-11-95 through 12-14-95

Deficiencies: There were 30 Test Deficiencies.

Remarks: Test results indicate that BFN Unit 3 systems are capable of meeting their design functions and that power operation can be safely and efficiently continued. In addition, all required restart program commitments have been accomplished as necessary to continue rated power operation.

Prepared By:

William R Hazel 12-20-95

Originator Date

Recommend Approval:

[signature], 12/21/95

PORC Chairman Date

Submitted By:

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Responsible Supervisor Date

Approved By:

[signature], 12/22/95

Plant Manager Date

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FINAL REFUELING TEST REPORT
UNIT 3 CYCLE 7

I. POWER HISTORY

Performance of the required testing to support fuel load and subsequent reactor startup began with the initiation of testing in 3-TI-73A Backup Control Panel Test on August 11, 1995. Section 7.1, RCIC Testing on Auxiliary Boiler Steam of 3-TI-188 Reactor Core Isolation Cooling was performed on October 10 and 11, 1995. Fuel loading per 0-TI-147 Fuel Loading was begun on October 18, 1995 and was completed on October 29, 1995. CRD testing with fuel loaded was begun per 0-TI-299 Control Rod Drive System Testing After Refueling and 3-TI-20 Control Rod Drive System Testing and Troubleshooting on November 1 after installation of the reactor head had been performed. During this testing, CRDs 22-07 and 06-31 were found to have abnormal levels of friction. 3-TI-73A Backup Control Panel Test was completed on November 3, 1995. After completion of vessel assembly and drywell head installation, the ILRT was successfully completed on November 7, 1995. 3-TI-190 Thermal Expansion Test ambient temperature walkdowns were performed on November 8, 1995. 0-TI-135 Process Computer and Core Performance was started on November 8, 1995. Reactor pressure vessel hydrostatic testing, 3-TI-132 Reactor Recirculation System Testing and PMT-271 Piping Vibration Qualification Testing were completed on November 11, 1995. Drywell head removal and vessel disassembly began upon completion of these tests. 0-TI-135 Process Computer and Core Performance was completed on November 14, 1995. After correction of mis-aligned fuel support pieces for CRDs 22-07 and 06-31, fuel was reloaded into these and adjacent fuel cells and 0-TI-147 was completed. Testing of CRDs 22-07 and 06-31 per 0-TI-299 and 3-TI-20 was successfully completed on November 15, 1995 at which time the vessel assembly and drywell head installation sequence was started. With the completion of all work to resolve open items for 3-TI-190 ambient temperature walkdowns and 3-TI-20 on November 17, 1995, all reactor restart pre-requisite work per 3-TI-319 Master Refueling Test Instruction had been accomplished. The Restart Prerequisite Checklist and management assessment per Appendices B and C of 3-TI-270 were completed to close out the open vessel phase of the Browns Ferry 3 restart program.

Following completion of all prerequisites, rod withdrawal for reactor startup and the shutdown margin demonstration began at 0921 and the reactor was critical with a 128 second period at 1203 on 11/19/95. At 1315 the verification of core shutdown margin was completed per 3-SI-4.3.A.1, Reactivity Margin Test. 3-TI-149, Reactor Water Level Measurements was initiated prior to heatup and continued throughout the test plateau. Rod withdrawals continued for vessel heatup to 150 psig for performance of the intermediate temperature inspections per 3-TI-190 System Thermal Expansion and to begin preparations to place the reactor feed pumps in service. 0-TI-136 APRM Calibration was performed during the heatup and when bypass valves were opened at 150 psig. After resolving a problem with the vessel head vent piping under the drywell head and other

minor interference concerns, heat up continued to 250 psig for main steam relief valve (MSRV) testing. MSRV testing was completed at 2045, on November 20, 1995 per 3-SI-4.6.D.2. The reactor feed pump trip systems were tested per 3-TI-338, Main Feed Pump Steam Supply Isolation Valve and Feed Pump Speed Limiter Testing on November 19, 1995 for the 3A RFPT, on November 20, 1995 for the 3C RFPT, and on November 21, 1995 for the 3B RFPT.

After resolving mechanical problems with the reactor feed pumps, reactor heatup was resumed at 1720 on November 21, 1995, and 855 psig, 530 °F was reached at 1957. 3-TI-190 System Thermal Expansion rated temperature inspections were performed at this time. After resolving interference concerns identified by the 3-TI-190 walkdowns, rated conditions were established. A management assessment per 3-TI-270, Appendix D was performed and the mode switch was placed in the run mode at 1738 on November 22, 1995. A satisfactory test mode hot quick start was performed per 3-TI-189 HPCI System Testing at 0900 on November 23, 1995. 3-TI-130 Main Steam Pressure Control Testing, Section 7.1 Bypass Control was completed satisfactorily at 1808 on November 23, 1995.

The main turbine reached 1800 RPM for the first time at 0443 on November 24, 1995. 0-TI-135, Process Computer and Core Performance testing was initiated. A satisfactory RCIC test mode hot quick start was performed per 3-TI-188 RCIC System Testing at 2138 on November 24, 1995. A satisfactory HPCI test mode cold quick start was performed per 3-TI-189 at 2330 on November 24, 1995. The unit 3 generator breaker was closed for the first time at 1835 on November 25, 1995. The main turbine was tripped at 1900 due to high vibration. A satisfactory RCIC test mode cold quick start was performed per 3-TI-188 at 2301 on November 25, 1995. The main turbine was returned to 1800 RPM after performance of an initial balance shot at 0150 on November 26, 1995.

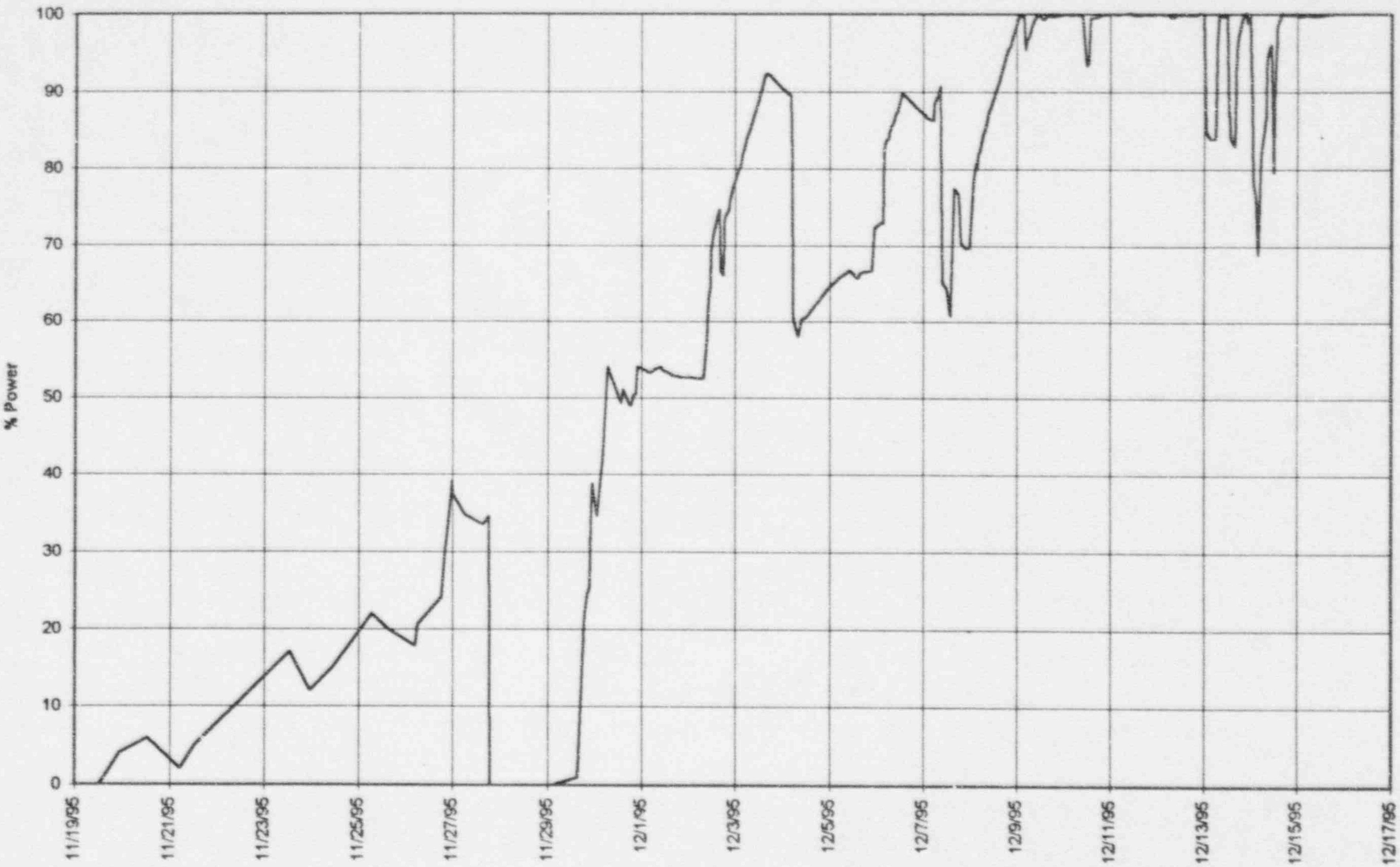
The Unit 3 generator breaker was closed again at 02:18 on November 26, 1995 and load increased to 130 MWe. The generator breaker was opened at 0305 and re-closed at 0338 after resolving a generator amps indication problem. 0-TI-135 testing was completed and 3D Monicore placed in service at 0430. The generator breaker was reopened at 1010. Browns Ferry Unit 3 was re-connected to the grid at 1231 on November 26, 1995. A management assessment per 3-TI-270, Appendix E was performed prior to exceeding 35% power. With power increased to 39.1%, CRD Scram Time Testing was started per 0-TI-299 at 0120 and completed at 1805, on November 27, 1995. After reducing power to 25% and generator load to 50 MWe, a manual scram was inserted at 1858 to support performance of 3-TI-186 , CRD System Scram Discharge Volume.

After performing various maintenance items, the reactor was taken critical at 0206 on November 29, 1995. Reactor heatup and pressurization was performed to establish 150 psig reactor pressure with approximately one bypass valve open to perform RCIC and HPCI testing per 3-TI-188 and 3-TI-189. After performing controller response demonstrations, a RCIC hot quick start was performed in the test mode at 0622 and a HPCI hot quick start was performed in the test mode at 0950. Reactor startup continued and the generator breaker was re-closed at 1922 on November 29, 1995. On November 30, 1995, reactor power was increased to 54% and the last set of data in this test plateau was taken for 3-TI-149, Reactor Water Level Measurements. Also on November 30, 1995 LPRM calibrations began per 3-SI-4.1.B-3. Following completion of the LPRM calibrations, Rod Block Monitor Testing per 3-TI-253, and reset of the APRM HiHi trip to 118% per 3-SI-4.2.C-1(A-F) were performed. The Heatup to 55% Power Test Plateau Report review and approval and management assessment per Appendix F of 3-TI-270 were completed on December 1, 1995.

Power increase above 55% was begun at 0910 on December 2, 1995 with 1000 MWe output being reached at 1515 on December 3, 1995. Data taking for 3-TI-149 Reactor Water Level Measurements and 3-TI-338, Main Feed Pump Steam Supply Isolation Valve and Feed Pump Speed Limiter Testing were also started during this power ascension. While operating at 89% power on December 4, 1995, 0-TI-137, Core Power Distribution test was initiated. Following performance of 0-TI-137 on December 4, 1995, reactor power was reduced to 60.4% to support testing per 3-TI-131, Feedwater System Tuning, which began at 0825. Feedwater system testing was terminated at 0913 due to abnormal operation of the feedwater control system. Additional feedwater system testing was performed on December 4 and 5, which determined that the 'C' RFPT control linkage needed to be repaired. Control system adjustments were also made to the 'A' RFPT control on December 5. With the 'C' reactor feed pump out of service for repairs, power increase to 86% power was started at 2159 on December 5, 1995. The 'C' RFP was returned to service at 0605 on December 7, 1995 and power was returned to 65% at 0937 to resume testing per 3-TI-131. At 1300 on December 7, 1995, feed pump control and feedwater level control system testing per 3-TI-131 was satisfactorily completed. 3-TI-132, Recirculation System Tuning was started at 1715 and completed satisfactorily at 1850. After reducing reactor power back down to 70%, 3-TI-130, Main Steam Pressure Control testing was started at 1950 on December 7 and satisfactorily completed at 0120, on December 8, 1995. Following completion of 3-TI-130, a ramp up in power was initiated. During the power increase, 3-TI-82, Drywell Temperatures was performed on December 8, 1995 with reactor thermal power at 2974 MWth (90.3%).

100% reactor power (with 1126 MWe) was achieved on Unit 3 at 0133 on December 9, 1995. At 1003, 3-TI-174, Recirculation Flow Control Calibration was initiated. 3-TI-24 Determination of Main Steam Line and Primary Containment Leak Detection Radiation Monitors Alarm and Trip Setpoints was completed at 1339. While operating at 100% power on December 9 and 10, 1995, 0-TI-135, Process Computer and Core Performance and 0-TI-137 Core Power Distribution was performed. Due to grid power requirements, Unit 3 maintained 100% power until 0000 on December 13, 1995, when power was reduced to 85% power to continue testing. 3-TI-131 Feedwater System Tuning was performed beginning at 0235, followed by 3-TI-130 Main Steam Pressure Control which completed at 0618. Power was returned to 100% until 1215, when power was reduced to 85% to allow performance of a reactor vessel injection test per 3-TI-188 Reactor Core Isolation System Testing. After 3-TI-188 was completed, power was returned to 100%. At 0005, on December 14, 1995 power was reduced to 95% and a recirculation flow control runback was performed per 3-TI-132 Recirculation System Tuning, resulting in a final reactor power of 88.3%. Power was further reduced to 76% prior to initiating the HPCI automatic vessel injection startup, per 3-TI-189 High Pressure Core Spray System. After HPCI was secured at 0238, all restart test program testing was complete. After reducing power to 70% to work on "A" RFP valves, increase to 100% power was initiated at 0500, December 14, 1995.

Power Ascension Histograph



Refuel Test Program Summary Table

OPEN VESSEL TESTING

Procedure	Procedure Title	Dates Performed	JTG Approval	Total TD's	Open TD's
3-TI-20/0-TI-299	CONTROL ROD DRIVE SYSTEM	11/1/95-11/15/95	11/17/95	1	0
0-TI-135	PROCESS COMPUTER	11/8/95-11/14/95	11/17/95	0	0
3-TI-188	REACTOR CORE ISOLATION COOLING SYSTEM	10/10-11/95	11/17/95	1	0
3-TI-190	SYSTEM EXPANSION	11/8/95 11/17/95	11/17/95	7	0
3-TI-73A	SHUTDOWN FROM OUTSIDE CONTROL ROOM	8/11/95 11/3/95	11/17/95	3	0
3-TI-132	RECIRCULATION SYSTEM TUNING	11/11/95	11/17/95	0	0
PMT-271	VIBRATION TESTING	11/11/95	11/17/95	1	0
0-TI-147	FUEL LOADING AND IN-CORE SHUFFLE	10/18/95-11/15/95	11/17/95	0	0

Refuel Test Program Summary Table

PHASE II PLATEAU - HEATUP TO 55% POWER

Procedure	Procedure Title	Dates Performed	JTG Approval	Total TD's	Open TD's
3-SI-4.3.A.1	REACTIVITY MARGIN TEST	11/19/95	12/1/95	0	0
3-TI-20/0-TI-299	CONTROL ROD DRIVE SYSTEM	11/27/95	12/1/95	1	0
3-TI-149	WATER LEVEL MEASUREMENTS	11/19/95 11/30/95	12/1/95	1	0
3-TI-136	AVERAGE POWER RANGE MONITOR (CONSTANT HEATUP)	11/19/95 11/22-24/95	12/1/95	0	0
0-TI-135	PROCESS COMPUTER	11/24/95- 11/26/95	12/1/95	3	0
3-TI-188	REACTOR CORE ISOLATION COOLING SYSTEM	11/23-25/95 11/29/95	12/1/95	1	0
3-TI-189	HIGH PRESSURE COOLANT INJECTION SYSTEM	11/24-25/95 11/29/95	12/1/95	1	0
3-TI-190	SYSTEM EXPANSION	11/23/95	12/1/95	3	0
3-TI-130	PRESSURE REGULATOR	11/19-20/95	12/1/95	0	0
3-TI-338	FEED PUMP SPEED LIMITER TESTING	11/19-21/95	12/1/95	0	0

NOTE: Reactor Water Cleanup System Check Valve Testing performed by TI-183 on Unit 2 was performed by 3-SI-4.7.A.2.g-3/3a and 3/3b for Unit 3

Refuel Test Program Summary Table

PHASE III PLATEAU - 55% TO 100% POWER

Procedure	Procedure Title	Dates Performed	JTG Approval	Total TD's	Open TD's
3-TI-149	WATER LEVEL MEASUREMENTS	12/3-8/95	12/14/95	0	0
0-TI-135	PROCESS COMPUTER	12/9-10/95	12/14/95	1	0
3-TI-188	REACTOR CORE ISOLATION COOLING SYSTEM	12/13/95	12/14/95	0	0
3-TI-189	HIGH PRESSURE COOLANT INJECTION SYSTEM	12/14/95	12/14/95	1	0
3-TI-130	PRESSURE REGULATOR	12/7,8,13/95	12/14/95	1	0
3-TI-131	FEEDWATER SYSTEM	12/7,13/95	12/15/95	1	0
3-TI-132	RECIRCULATION SYSTEM TUNING	12/7,14/95	12/14/95	0	0
3-TI-174	RECIRCULATION FLOW CALIBRATION	12/9-10/95	12/14/95	2	0
3-TI-82	DRYWELL TEMPERATURES	12/8/95	12/14/95	0	0
3-TI-137	CORE POWER DISTRIBUTION	12/4-10/95	12/14/95	1	0
3-TI-338	FEED PUMP SPEED LIMITER TESTING	12/2-9/95	12/14/95	0	0

II. RESULTS

3-TI-73A Backup Control Panel Test:

Testing of the control and indication on the Backup Control System's panels 3-25-31, 3-25-32 and 3-25-658 per 3-TI-73A was initially performed in separate test sections as required to meet BTRD and PMT test requirements between August 11 and October 26, 1995. Section 7.4 for System 256, ECCS Analog Trip Unit Inverters, was performed as part of 3-PMT-BF-256.003 without any test deficiencies. Section 7.12 for System 085, CRD was performed as part of an RTP test, without any test deficiencies. Section 7.9 was performed for System 070, RBCCW as part of the System 70 SPOC test program, without any test deficiencies. Section 7.11 for System 043, Sample System, as part of 3-PMT-BF-043.027 for DCN W19433 Stage 2, without any test deficiencies. Section 7.5 for System 071, RCIC was performed as part of an RTP test. Two test deficiencies were generated and cleared with work orders: work order 95-19548-00 repaired annunciator window 22, RCIC STEAM LINE DRAIN POT HIGH LEVEL, of 3-XA-55-3C and work order 95-19465-00 repaired 3-XI-71-45 TURB OUTBD BRG OIL TEMP HIGH. Section 7.6 and 7.7 for System 1, Main Steam, was performed for BTRD requirements and as part of 3-PMT-BF-1.049. A test deficiency on annunciator 3-XA-55-3C, BACKUP SW EMER POSN was generated and cleared by work request 292554. Section 7.8 for System 003, Feedwater and Section 7.10 for System 024, Raw Cooling Water were the only remaining portions of 3-TI-73A not previously completed per the above sequence of tests. These two test sections were performed as a PM with work order 95-07499-00 on November 3, 1995 without any test deficiencies.

3-TI-188 Reactor Core Isolation Cooling Testing:

Section 7.1, RCIC Testing on Auxiliary Boiler Steam of RCIC per this section of 3-TI-188 consisted of starting up the RCIC system per 3-SI-4.5.F.1.e on Auxiliary Steam and demonstrating that the Control room and Backup Control Panel RCIC flow controllers are stable in response to 10% step changes in manual and automatic modes of operation.
The initial attempt to perform this test on November 10, 1995 was terminated due to a combination of difficulties in completing ECI-0-071-GOV003 and a trip of the gland seal condenser condensate pump. One Test Deficiency was written when the RCIC flow computer point was discovered to be inoperable The RCIC flow computer point was placed in service by the ICS support group. On November 11, 1995, the RCIC system successfully demonstrated satisfactory (slow, stable) performance of the Control Room and Backup Control Panel flow controllers.

Testing of RCIC per section 7.2 of 3-TI-188 began on November 23, 1995 by starting up the RCIC system per 3-SI-4.5.F.1.d on reactor steam at rated pressure. After demonstrating that the RCIC flow controller was stable in the manual and automatic modes of operation, the initial attempt to perform a hot quick start in the test mode failed. A test deficiency was written and RCIC was declared inoperable per Technical Specifications. After tuning the system, the control system response demonstration was repeated and a successful hot quick start in the CST test mode was performed on November 24, 1995, with a start time of 15.0 seconds. This hot quick start allowed closing the test deficiency and returning RCIC to operable status. A test mode cold quick start was successfully performed on November 25, 1995, with a start time of 14.1 seconds.

Testing per Section 7.3 on November 29, 1995 consisted of starting up the RCIC system per 3-SI-4.5.F.1.e on reactor steam at 150 psig, demonstrating that the RCIC flow controller was stable in manual and automatic modes of operation, and performance of a hot quick start in the test mode with a start time of 6.16 seconds.

Testing of RCIC per section 7.4 of 3-TI-188 was the final demonstration that the system was fully operational. The test was initiated on December 13, 1995 by using the ECCS logic test box to simulate a reactor low low level signal at 14:38 to auto start the RCIC system in the normal reactor vessel injection configuration. A start time of 19.85 seconds was recorded, with a final pump flow of 625 gpm at 1070 psig discharge pressure. No oscillatory response was observed during the automatic system startup or during the flow steps performed with the Control Room flow controller in automatic. Flow steps were also performed with the Backup Control Panel's RCIC flow controller, and no oscillatory response was observed during this testing. All Level 1 and Level 2 test acceptance criteria for this test section were met and no test deficiencies were written.

0-TI-147, Fuel Loading And In-Core Shuffle

Fuel loading began at 12:32 on October 18 and completed on October 29 at 01:40 hours. During CRD friction testing it was discovered that two fuel support pieces were not seated properly and had to be repostioned. A partial unload / reload was performed on November 13 and 14, 1995 to correct the alignment of fuel support pieces at cells 22-07 and 06-31, a total of 17 fuel assemblies were affected.

The core was completely loaded to exactly reflect the final design configuration (including proper bundle identification number, location, orientation, and seating) while maintaining subcriticality. The SRMs responded as expected and all remained operable during the entire loading operation. There were no Test Deficiencies.

0-TI-299 / 3-TI-20, Control Rod Drive System Testing After Refueling

These tests confirm that the Control Rod Drive System was fully functional. The first phase of testing was performed prior to reactor startup and began with the coupling check verification performed by use of the plant surveillance 3-SI-4.3.B.1.b. One Test Deficiency was to document the inability to perform the coupling check for CRD 22-07 on 11/2/95. A successful coupling check was performed on CRD 22-07 on 11/3/95 and the Test Deficiency closed. Continued investigation into operational problems with this CRD determined that the fuel support piece was mis-aligned. After correcting this mis-alignment, normal operation for CRD 22-07 was confirmed per 0-TI-299 and 3-TI-20 on November 15, 1995.

Rod Position Information System (RPIS) verification and insert and withdrawal timing were performed by 3-TI-20 Control Rod Drive System Testing and Troubleshooting.

Only limited differential pressure friction testing was performed during the open vessel phase of CRD testing. A combination of notch time variation evaluation and random selection was used to select 19 rods to be tested by differential pressure friction testing. The notch time screening process found that CRD 06-31 should be differential pressure friction tested per 3-TI-20. Four additional CRDs were chosen for differential pressure friction testing due to having the comparatively highest rod notch speed deviations, and no friction problems were detected with these rods. Investigation into the high notch time variation and subsequent verification of high friction on CRD 06-31 determined that the fuel support piece was mis-aligned. After correcting this mis-alignment, normal operation for CRD 06-31 was confirmed per 0-TI-299 and 3-TI-20 on November 15, 1995.

The second phase of testing ensured that the control drive system could meet the Technical Specification requirements for scram timing and verified that the LPRMs were properly configured. All 185 control rods were given individual scram signals and scram times measured on November 27, 1995.

Test Deficiency (TD) No. 1 against 3-SI-4.3.C was written to document problems encountered with control rod 18-43. The RPIS probe for this control rod did not indicate control rod positions 06, 16, 26, 36, or 46. This does not affect the performance of the control rod but did affect the data reduction for the analysis of the control rod scram insertion time. This TD was closed by using conservative numbers based on the combined pulses to complete the data reduction. The analysis results concluded that all acceptance criteria and Technical Specification requirements had been met.

Proper LPRM hookup was verified for all LPRMs as required by 0-TI-299 except for LPRM string 24-33 detectors B & D which are bypassed due to hardline failures and will not be available this cycle.

3-TI-190 Thermal Expansion Test:

Satisfactory performance of the inspections of 3-TI-190 demonstrated that the selected critical systems are free and unrestricted with regard to thermal expansion and that suspension components, pipe supports and snubbers are functioning in their specified manner. All Acceptance Criteria were satisfied either by initial verification or by test deficiency resolution.

Ambient Temperature Inspection

The ambient temperature walkdowns were completed on November 8, 1995. Each deficiency was documented on a Test Deficiency Evaluation/Resolution (TDE/R) form included as Appendix H of the test procedure. Each TDE/R was then evaluated by Site Engineering to determine if the condition was acceptable or if corrective action was required. Test Deficiency 1 was written to include 41 TDE/R's where clearance to adjacent structures or equipment was less than 1/8 inch: 27 were evaluated by Site Engineering as being acceptable based on the predicted direction and amount of thermal movement; insulation re-work was required at 10 locations and 4 locations were re-evaluated at the intermediate temperature prior to heatup to rated temperature. PER BFPER951738 were initiated to document the "accept as is" disposition.

Test Deficiency 2 was written to include 10 supports which appeared to be outside the range of the design baseline position: 5 supports were found to be within the correct baseline condition, and work requests were initiated to reset the remaining 5 supports. Of the 5 supports to be reset, one was reset, one was found to be within the design range and the work request closed, and the remaining three supports were found to be correctly set, however there was an error in the baseline set point stated on the support drawings. Potential Drawing Discrepancies (PDD's) were initiated to correct the drawings. PER BFPER951738 were initiated to document the "accept as is" and "DCN" dispositions.

Test Deficiency 3 covered a flexible conduit trapped between the 3-PCV-1-30 insulation and an angle support. This condition was corrected by re-work of the insulation. Test Deficiency 4 addressed conduit 3-PC-198-I (to vacuum breaker 3-CKV-010-0511) which was touching an un-insulated MSRV discharge line. This discrepancy was corrected by re-work of the conduit. Test Deficiency 5 was written to document the inaccessibility of the head vent piping during the inspection period. The head vent piping was inspected on November 17, 1995 after the drywell head was reinstalled. Test Deficiency 6 documented a wedge which was found in support 3-47B400-84. The wedge was not interfering with the loading of the spring can and was removed and the baseline setting verified to be within the design limits. This deficiency was the only Level 1 Deficiency. Test Deficiency 7 was written on 10 supports with missing or illegible scales, since test personnel were unable to verify the baseline settings. Engineering evaluation determined that seven of the supports were correctly set and that three supports needed to be reset. During rework of support 47B400-120 and 47B465-517, it was determined that the scales were painted over and with better lighting, the baseline settings were verified to be within specification so no additional work was performed. The third support, 47B452-1458 was reset.

Intermediate Temperature Inspection

The intermediate temperature inspection was performed on November 19, 1995 and a total of 22 potentially deficient conditions were identified for evaluation by Site Engineering. The RPV Head Vent piping appeared to be bound up at the support under the drywell head. This support was repaired, and all other deficiencies were resolved for the intermediate temperature plateau as "accept as is" on November 20, 1995. Test Deficiency #8 documents the deficiencies found and BFPER951738 (written due to the ambient inspection results) was revised to include the "accept as is" resolution to the intermediate temperature deficiencies.

Rated Temperature Inspection

The rated temperature inspection was started on November 21, 1995 and completed on November 22, 1995, with 31 potentially deficient conditions identified for evaluation by Site Engineering. Site Engineering requested an additional inspection of all main steam and feedwater piping in the drywell due to an apparent discrepancy between the actual thermal expansion and the predicted thermal expansion. No abnormal indications were observed during this supplemental inspection. Two test deficiencies were written: #9 for support movement and clearance deficiencies, and #10 for the inability to maintain temperature greater than 530 °F during the entire inspection period. BFPER951738 was again revised to include the "accept as is"resolution to the rated temperature deficiencies.

0-TI-135 Process Computer and Core Performance:

Process computer testing was performed during all three phases of the startup program. During the Open Vessel Phase, this test loaded and verified the cycle dependent data for unit 3 cycle 7. This was performed on the unit 3 3-D Monicore Alpha computer on November 8, 1995 and the unit 3 off-line/backup Alpha computer on November 14, 1995. During the Heatup to 55% Power Test Phase, this test verified the capability of the process computer to monitor plant conditions and to evaluate core performance parameters. While operating at approximately 20% power from November 24, through 26, 1995, this test performed the following:

1. Verified no changes occurred to the installed BOC case since initial installation.
2. Verified that the control rod position log agreed with Panel 3-9-5 indications.
3. Verified that the LPRM readings log agreed with Panel 3-9-14 indications within 3 units.
4. Restarted 3D Monicore after the turbine generator was placed on-line.
5. Verified that the 3D Monicore core power and flow log and the ICS NSSS heat balance calculation of core thermal power agreed with a manual heat balance within ± 2%.
6. Verified that the exposure and power distribution logs were reasonable compared to the Cycle Management Report data.
7. Verified that the 3D Monicore calculation of thermal limits for minimum critical power ratio (MCPR), maximum average planar linear heat generation rate (MAPLHGR), and maximum linear heat generation rate (LHGR) agreed within ± 2% of a qualified backup calculation and that MCPR occurred in the same location.

The ICS LPRM readings log agreed with LPRM readings from panel 3-9-14 within 3 units for all LPRMs except 08-17A and 32-09C. Differences in readings of these LPRMs resulted in Test Deficiency number 1 being written. The LPRMs were repaired, Test Deficiency number 1 was closed and the LPRM readings log was considered operable.

Test Deficiency number 2 was written during the Heatup to 55% phase of 3-TI-135 because 3D Monicore would not restart without the generator megawatt indication being substituted. Oscillations in this input at the low power condition were such that the 3D Monicore efficiency checks failed, thereby preventing 3D Monicore from starting. This Test Deficiency was closed during Phase 3 of the test program by recalibrating the megawatt indicator. Test Deficiency number 3 was also written during the Heatup to 55% phase of TI-135 because differences were noted in the Load Line calculation, Core Flow calculation, and Sub-Cooling calculation between the 3D Monicore heat balance and the ICS heat balance. These calculations have since been compared again at higher power levels and no problems were noted. These original differences were due to differences in the methods that the two codes use to calculate the

substitute core flow at low power conditions. The core flow/drive flow correlation at this power and flow condition was below the lowest drive flow presently in the computer database. A software change request [BFN SSR 95-077] was implemented and tested during Phase 3 of the test program which corrected the calculational method used at low power and the Test Deficiency was closed. The 3D Monicore core thermal power calculation and the ICS core thermal power calculation were compared to the core thermal power calculated by a manual heat balance and agreed within 0.4% (allowable range was ± 2%).

Exposure and power distribution logs were checked against the cycle management report and found acceptable. The location and value of thermal limits for minimum critical power ratio (MCPR), maximum average planar linear heat generation rate (MAPLHGR), and maximum linear heat generation rate (LHGR) were compared to calculations performed by the qualified backup method and were in the same location and within 0.35% (allowable range was ± 2%). Based on these results, the 3D Monicore thermal limits calculations were considered operable.

Phase 3 of 0-TI-135 was conducted while at approximately 100% power on December 9 and 10, 1995 and performed the following testing:

1. Verified that the LPRM failure status log, LPRM deviations log, LPRM exposure corrections log, and LPRM exposure values log were consistent and reasonable.
2. Verified that the 3D Monicore core power and flow log and the ICS NSSS heat balance calculation of core thermal power agreed with a manual heat balance within ± 2% (test value was ± 0.2%).
3. Verified that the 3D Monicore calculation of thermal limits for minimum critical power ratio (MCPR), maximum average planar linear heat generation rate (MAPLHGR), and maximum linear heat generation rate (LHGR) agreed within ± 2% of a qualified backup calculation and that MCPR occurred in the same location. The thermal limits were in the same location and were found to be within 0.5%.

Test Deficiency number 4 was written because 3D Monicore (non-adaptive) gave results which did not provide 10% margin to thermal limits. The resolution to this Test Deficiency was "accept-as-is". This condition has no impact on acceptance criteria and does not affect the test results. 3D Monicore produces very conservative results when the calculational mode is non-adaptive. Non-adaptive mode is not normally used at higher power levels since the LPRM adaptive mode more closely represents the true core conditions. A procedure validation comment was written for this procedure step and the Test Deficiency was closed.

Based on these results, the 3D Monicore thermal limits calculations were considered operable and the process computer performance is considered acceptable, indicating that the plant's computer systems are ready to support Unit 3 full power operations.

3-TI-132 Reactor Recirculation System Testing:

Testing of the Recirculation System was performed on November 11, 1995 and consisted of observing system performance under steady state conditions to develop base line characteristics. After the reactor vessel hydrostatic test, Recirculation system motor generator speed was adjusted to approximately 30% and system performance was observed and evaluated. Motor generator set speed was then increased to approximately 40% speed. Step changes ranging from 2% to 10% were introduced into the Recirculation System flow controller by the operator and system response was evaluated. Flow was also increased to 50% and 60% motor generator set speeds, where steady state system performance only was observed and evaluated. No test deficiencies were written for the open vessel section of this test.

During the 55 to 100% Power Phase of the test program on December 7, 1995, additional testing was performed by inserting ±2% and ±10% Motor Generator set speed changes at 40, 55, and 75 percent motor generator set speed. In addition, with the reactor initially operating at 94.8% power on December 14, 1995, a reactor recirculation flow runback to was performed by reducing the Recirculation System Master Controller to 65%, resulting in a final reactor power of 88.3%. No test deficiencies were written. The analysis of the transient data obtained from the ICS indicated that all process variables that exhibit oscillatory responses met the Level 1 test criteria that the Decay Ratio must be less than 1.0 and also the Level 2 test criteria that the Decay Ratio must be less than or equal to 0.25.

PMT-271 Piping Vibration Qualification Testing:

PMT-271 was written to accomplish the post modification testing requirements of Scoping Document 271 for DCN W17545A Recirculation Piping Replacement and DCN W17701A Piping Support Modifications, which removed the interconnection between the recirculation loops and replaced the recirculation loop discharge headers with a different piping configuration. After the reactor pressure vessel hydrostatic test and before reactor startup, with both reactor recirculation pumps operating at 60% of rated speed, a walkdown of the entire reactor recirculation system inside the drywell was performed. During the walkdown, three sets of vibration data were taken with a portable vibration analyzer at various

representative points in the recirculation system piping. The simultaneous manual trip of both recirculation pumps and the restart of the loop B reactor recirculation pump were also observed. Test Deficiency No. 1 was written to document that the A reactor recirculation system pump start would not be observed. The scoping document and test were changed to make the observation of the second pump start optional based on the observations made during the start of the B pump.

3-SI-4.3.A.1, Reactivity Margin Test

This test is performed in conjunction with the initial in-sequence critical to demonstrate that the reactor can be made subcritical with a margin of at least 0.38% ΔK/K with the strongest control rod fully withdrawn and at the most reactive time in core life. It also verifies that the actual critical rod configuration is within 1.0% ΔK of the predicted critical rod configuration. Rod withdrawal for reactor startup and the shutdown margin demonstration began at 09:21 on 11/19/95. The reactor was critical with a 128 second period at 12:03 on 11/19/95. Criticality data was collected when rod 26-31 (the last rod in RWM group 8) was withdrawn to position 08, with a moderator temperature of 144 °F. The following results were obtained:

1. The unit 3 cycle 7 shutdown margin was calculated to be 1.3398% ΔK/K. This meets the requirements of technical specification 4.3.A.1, which requires a minimum shutdown margin of 0.38% ΔK/K.
2. The difference between the predicted and actual critical rod configuration was determined to be 0.022% ΔK. This meets the requirements of technical specification section 3.3.D, which requires that the difference between the predicted and actual critical rod patterns be no greater than 1.0% ΔK.

All test acceptance criteria were successfully demonstrated and should be considered fully acceptable in meeting the criteria of technical specifications 4.3.A.1, 3.3.D, and 4.3.D, and FSAR section 13.10.2.2. There were no test deficiencies.

0-TI-136, APRM Calibration

Initial data was collected on November 19, 1995 during the heatup from 212° F to 261° F and reactor power was calculated using the constant heatup rate method. No adjustment was made to the APRMs after this performance since all APRMs were conservative and within 7% of calculated power. Subsequent performances on November 19, 22 (two performances), 23 and 24, 1995 used the bypass valve position method and gains were adjusted to make the APRM readings more consistent and accurate. No problems or difficulties were encountered, and no test deficiencies were written

3-TI-149, Reactor Water Level Measurements

The purpose of this test is to collect sufficient data to ensure the instrumentation used to monitor reactor water level operated correctly during increases from 0 psig reactor pressure to 100% power and to perform a check of the substitute core flow calculated based on recirculation flow to the measured core flow. This was achieved by recording readings for RPV narrow range compensated, wide range, fuel zone range, floodup range, and the narrow range uncompensated level indicators; and by comparing these readings to both those of like calibration and to all others based on predicted readings taking into account off-calibration conditions. Data for this test were collected at the following conditions between November 19 and December 8, 1995:

Reactor Pressure (psig)	Reactor Power (%)	Core Flow (Mlbm/hr)
0	0	37.8
43	1	35.2
170	2.6	37.3
261	4.4	39.5
400	1	34.6
700	1	32.9
914	2	33.3
930	13.4	36.5
953	24.0	37.1
963	33.7	42.9
968	42.5	59.6
1000	53.3	59.0
999	78.2	74.9
1010	87.1	90.3
1004	95.7	90.9

The results were evaluated against and met the following acceptance criteria:

1. The uncompensated narrow range level instruments should agree within 3 inches of each other. During heatup, the uncompensated narrow range instruments are broken into two groups. The instruments within each group should agree within three inches of the other instruments in that group.
2. The compensated narrow range instruments should agree within 3 inches
3. The wide range instruments should agree within 10 inches.
4. The determined actual levels for all designated instruments should agree within 10 inches after correcting for off calibration and off normal conditions.
5. The value of measured core flow should be within 5% of the calculated value of core flow. This criteria was not satisfied for all test conditions, indicating the need to revise the correlation used by the integrated computer system. Test Deficiency No. 1 was written against the failure of this acceptance criteria during phase 2 testing. The substitute core flow (based on recirculation drive flow) was less than the core flow measured by instrumentation. The cause of the discrepancy was determined to be that the relationship between total core flow and recirculation drive flow is different for BFN unit 3 and BFN unit 2. The BFN unit 2 relationship was utilized during Unit 3 restart due to the lack of the appropriate data for unit 3. With the completion of 3-TI-174 and 3-TI-149 sufficient data was collected to characterize the relationship for unit 3 and revise the WTC/WDC constants in the integrated computer system data base. This was accomplished by BFN-SSR-95-077.

Based on the data collected, the level instrumentation is responding as expected and is adequate for full power operation. In addition, the substitute core flow correlation used by the process computer was updated based on the collected data.

3-TI-338, Main Feed Pump Steam Supply Isolation Valve and Feed Pump Speed Limiter Testing

The purpose of Section 7.1 of 3-TI-338, Main Feed Pump Steam Supply Isolation Valve and Feed Pump Speed Limiter Testing is to demonstrate the ability of the RFPT trip system for each feed pump to close the high and low pressure stop valves of the respective RFPT. Testing was performed from November 19 to 21, 1995 while the reactor was critical and maintaining between 150 and 250 psig pressure. The test was completed satisfactorily and no test deficiencies were generated.

The purpose of Section 7.2 of 3-TI-338, Main Feed Pump Steam Supply Isolation Valve and Feed Pump Speed Limiter Testing was to demonstrate that the individual reactor feed pump turbine speed limiters will prevent total feedwater flow from exceeding the maximum feedwater flow assumed in the Unit 3 core reload analysis if a feedwater control system failure gave all three reactor feed pump turbines a maximum flow demand signal. The test developed a total feedwater flow versus reactor feed pump turbine speed curve, using data gathered between 60 to 100% power, from December 2 and 9, 1995. This curve was extrapolated to the turbine speed that occurs at the Motor Gear Unit's high speed stop (5650 RPM), with a resultant predicted maximum flow of 17.6 Mlb/hr. This value is below the reload analysis limit of 19.56 Mlb/hr, and therefore meets the level 2 test criteria.
No test deficiencies were written.

3-TI-189, High Pressure Coolant Injection Testing

Testing of the HPCI System per Section 7.1 of 3-TI-189 began on November 23, 1995 by starting up the HPCI System per 3-SI-4.5.E.1.d(dp) on reactor steam at rated pressure. During the initial attempt to perform this test, a test deficiency was written when the HPCI turbine speed was observed to be oscillatory. The cause of the oscillations was discovered to be the EG-R compensating needle valve being set at 3/4 turn open. The needle valve was reset to the nominal value of 1/4 turn open and testing demonstrated that the HPCI flow controller was stable in the manual and automatic modes of operation. A test mode hot quick start was performed on November 23, 1995 with a start time of 19.4 seconds. This hot quick start allowed closing the test deficiency. A test mode cold quick start was successfully performed on November 24, 1995, with a start time of 18.8 seconds.

Testing per Section 7.2 on November 29, 1995 started up the HPCI system per 3-SI-4.5.E.1.e on reactor steam at 150 psig and demonstrated that the HPCI flow controller was stable in manual and automatic modes of operation. A hot quick start was performed in the test mode with a start time of 19.1 seconds. All Level 1 and Level 2 test acceptance criteria for these test sections were met.

Testing of HPCI per section 7.3 of 3-TI-189 was the final demonstration that the system was fully operational. Test Deficiency number 2 was written to document the use of the ICS system instead of a VOM to measure the EGM voltage, as required in the test prerequisites. This Test Deficiency was closed with no further action required. The test was initiated at 0226 on December 14, 1995 by using the ECCS logic test box to simulate a reactor low low level signal to initiate the HPCI automatic vessel injection startup, with the reactor operating at 76% power. A start time of 19.2 seconds was recorded, with a final pump flow of 5087 gpm at 1040 psig discharge pressure. No oscillatory response was observed during the automatic system startup or the subsequent flow steps performed with the flow controller in automatic. All Level 1 and Level 2 test acceptance criteria for this test section were satisfied.

3-TI-130, Main Steam Pressure Control

Testing of the bypass valve control per Section 7.1 of 3-TI-130 Main Steam Pressure Control Test began at 1415 on November 23, 1995 with the insertion of pressure regulator setpoint step changes of 2, 4 and 6 psi into both the A and B pressure regulators. Maximum reactor pressure change observed was 9 psi. Maximum neutron flux difference observed was 3 %. Simulated pressure regulator failure testing was performed with both pressure regulators in control and with pressure regulator setpoint bias values of up to 3.0 psi difference between regulators. The maximum variation observed during the simulated failure of a regulator with a 3 psi difference between the two regulators was a reactor pressure change of 7 psi and a neutron flux change of 3.4 %. Steady state variation in the controlled parameters was observed to be at the acceptable limit value of 1.5%. All criteria applicable to this part of 3-TI-130 were met. No test deficiencies were written.

Testing of the turbine control valve and bypass valve control under turbine loaded conditions per Section 7.2 of 3-TI-130 Main Steam Pressure Control Test began at 1950 on December 7, 1995 with the turbine control valves at approximately 31% open. Pressure regulator setpoint step changes of 2, 4 and 6 psi were inserted into both the A and B pressure regulators with both the control valves and with the bypass valves (load limited condition) controlling reactor pressure. Maximum reactor pressure change observed was 1 psi and maximum neutron flux difference observed was 5.5%. Simulated pressure regulator failure testing was performed on both pressure regulators, with control valves or

bypass valves in control and with pressure regulator setpoint bias values of up to 3.0 psi difference between regulators. The maximum variation observed during the simulated failure testing was a reactor pressure change of 7 psi and a neutron flux change of 7 %. Peak reactor pressure and peak neutron flux values observed during this test had large margins to the required 10 psi and 7.5% power margins to the scram setpoints for these variables. Steady state variations in the controlled parameters were observed to be less than the acceptable limit value of 1.5%. All acceptance criteria were met.

Testing of the turbine control valve control per Section 7.3 of 3-TI-130 Main Steam Pressure Control Test began December 13, 1995 with the turbine control valves at approximately 38% open. Pressure regulator setpoint step changes of 2, 4 and 6 psi were inserted into both the A and B pressure regulators. Maximum reactor pressure change observed was 1 psi and maximum neutron flux difference observed was 7%. Simulated pressure regulator failure testing was performed on the B pressure regulator with pressure regulator setpoint bias values of up to 3.0 psi difference between regulators. The maximum variation observed during the simulated failure of the B regulator was a reactor pressure change of 6 psi and a neutron flux change of 6.5 %. The simulated failure of the A pressure regulator was not performed due to failure of Pressure Test Board A56 and Test Deficiency 1 was written. Based on the acceptable performance of the A pressure regulator failure during Section 7.2, the acceptable performance of the pressure control system throughout this test and the fact that a turbine shutdown would be required to allow repair of the test board, the simulated failure test of the A pressure regulator will not be performed for Section 7.3, and the Test Deficiency was closed as "Accept as is". Peak reactor pressure and peak neutron flux values observed during this test had large margins to the required 10 psi and 7.5% power margins to the scram setpoints for these variables. Steady state variations in the controlled parameters were observed to be less than the acceptable limit value of 0.5%. All acceptance criteria were met.

0-TI-137, Core Power Distribution

This test calculates the total uncertainty associated with the TIP system, checks the core power distribution and gross TIP symmetry, and verifies the proper hookup of the TIP system. The data from these TIP sets is compared statistically using the computer program TI137 to determine the total average TIP uncertainty. In addition, gross TIP symmetry and core power distribution are checked by comparing symmetric traces from the TIP sets and by examining the normalized full power adjusted TIP readings. The computer program TI137 also calculates the percent difference for each symmetric TIP pair to determine if any asymmetries exist. A total of three full TIP data sets (OD-1s) were taken between December 4 and 10, 1995: the first test was performed at approximately 89% rated core

thermal power and determined that three pairs of TIP channels were incorrectly connected; after the process computer software was modified to account for the swapped TIP tubes, Sections 7.4 and 7.5 were re-performed at 66% power and Sections 7.6 and 7.7 were performed at approximately 99% power.

When this test was initially performed with core thermal power at 89% on December 4, 1995, the total average TIP uncertainty for the first TIP run was determined to be 11.04%. Gross symmetry checks were well above the acceptance criteria of 25% for two of the symmetric pairs and were much greater than average for four additional symmetric pairs. Based on review of the TIP traces it appeared that TIP channels A5&A6, A8&A9, and D6&D7 were swapped. Appendix 4, Mis-connected TIP Guideline, was performed to confirm that these channels were swapped. Test Deficiency number 1 and BFPER951816 were written to document the condition. A modification was made to the process computer software to compensate for the mis-connected TIP channels. The software change is documented in software services request number BFN-SSR-95-075. After the software modification was performed, Sections 7.4 and 7.5 were re-performed at 66% core thermal power on December 5, 1995. The total average TIP uncertainty for this TIP set was 1.52%. Gross symmetry checks were well within the acceptance criteria of 25% (the largest percent difference was 2.79%).

Sections 7.6 and 7.7 were performed with the core thermal power at 99% on December 9 through 10, 1995. The total average TIP uncertainty for this TIP set was determined to be 1.477%. Gross symmetry checks were well within the acceptance criteria of 25% (the largest percent difference was 2.66%).

The average value of the total average TIP uncertainty from the two successful TIP sets was calculated to be 1.499%, well within the acceptance criteria of 9.0%.

<u>3-TI-131, Feedwater Level Control System</u>

Feedwater System Tuning per <u>3-TI-131</u>, Feedwater System Tuning began at 0825 on December 4, 1995 with the reactor operating at 60% power. Reactor Feed Pump Turbine 'C' control was found to be unacceptable and an investigation into the cause of the control problems was begun. After performing additional testing on December 4 and 5, 1995, it was determined that the 'C' RFPT steam control valve linkage required repairing and the RFPT was removed from service at 0325 on December 5, 1995. 'C' RFPT was returned to service at 0605 on December 7, 1995 and testing per <u>3-TI-131</u> was resumed at 0949 at 65% power. Testing of the three RFPT control systems was completed at 1115 and Test Deficiency Number 1 was written as a result of the evaluation of the feed pumps' responses

to flow demand changes. RFP A and B failed to meet the rise time Level 2 criteria of 2.5 seconds (with test values of 3.0 and 4.4 seconds respectively). RFP C failed the Level 2 overshoot criteria of 15% at 21.5%. The Test Deficiency was closed as "accept as is" due to the fact that these criteria are typically not met during Unit 2 testing and as Level 2 criteria, they are optimum performance recommendations, not indications of unacceptable performance. Testing of the Master Feedwater Level Controller was satisfactorily completed at 1300 on December 7, 1995.

Feedwater control system verification testing was performed on December 13, 1995 at 0235 at 85% power. This portion of testing ensures that the settings chosen at lower power provide satisfactory performance at higher power levels. Level changes were inserted to check the response and stability of the system. All test criteria were met.

3-TI-82, Drywell Temperatures

The purpose of this test is to verify the ability of the drywell (DW) atmosphere cooling system to maintain design temperature conditions in the drywell during reactor power operation. The test was performed on December 8, 1995 with reactor thermal power at 2974 MWth (90.3%) and with two DW Cooler Fans (A5 and B5) out of service. Bulk Volumetric Average DW temperature was measured to be 106.8 °F, which correlates to a value of 133 °F at the design RBCCW temperature of 100 °F (acceptance criteria 150 °F). The DW Cooler Heat Load was determined to be 2.899 Mbtu/hr with a Site Engineering maximum limit of 5.19 Mbtu/hr. All zone temperatures were observed to be less than the maximum values specified by Site Engineering. All acceptance criteria was met and there were no test deficiencies.

3-TI-174, Recirculation Flow Control Calibration

This test is performed with the reactor at or near rated power and flow conditions to demonstrate that the core flow instrumentation is accurately reflecting total jet pump flow. This test makes use of empirically-determined flow coefficients for the four double-tapped jet pumps to allow determination of effective flow coefficients for all twenty jet pumps based on their individual single-tap measured pressure differentials. The effective flow coefficients are then used to calculate all jet pump flows, which are summed to calculate total core flow. This test also calculates Gain Adjustment Factors (GAFs) for the APRM/RBM loop proportional amplifiers to verify that they are accurately correlated to core flow, and calculates jet pump riser and nozzle plugging parameters to allow detection of possible flow obstructions within the jet pump

assemblies. The initial test was performed on December 9, 1995, at 99.8% power and 103.0 Mlb/hr indicated core flow. After adjusting the gain on 3-FM-68-47, the second test was performed on December 10, 1995, at 99.1% power and 102.5 Mlb/hr indicated core flow. The results/acceptance criteria verification for each test performance were as follows for the first / second performance of the test:

1. On panel 3-9-5, 3-XR-68-50, Total Core Flow (red pen) indicated 103.0 Mlb/hr, and core flow on the NSSS Heat Balance indicated 102.8 Mlb/hr. Both failed to agree with the calculated core flow of 99.69 Mlb/hr within the required tolerance of ± 3.0 Mlb/hr. This condition was documented on TD-1. / Total Core Flow (red pen) indicated 102.5 Mlb/hr, core flow on the 3D Monicore Power/Flow log indicated 102.6 Mlb/hr and both agreed with the calculated core flow of 102.3 Mlb/hr within the required tolerance.
2. The APRM/RBM loop proportional amplifiers 3-FQ-68-5 and 3-FQ-68-81 had calculated GAFs of 1.018 and 1.034, respectively. The GAF value for 3-FQ-68-81 fell outside the acceptable range of between 0.975 and 1.025. This condition was documented on TD-1. Additionally, when the cover was removed from 3-FQ-68-81 to obtain test data, the flow bias signal was momentarily shorted and an RPS half scram resulted. WR C285302 was initiated to correct the wiring problem and to recalibrate this amplifier. / The APRM/RBM loop proportional amplifiers 3-FQ-68-5 and 3-FQ-68-81 had calculated GAFs of 1.024 and 1.027, respectively. The GAF value for 3-FQ-68-81 again fell outside the acceptable. This condition was documented on TD-1. Additionally, when the cover was removed from 3-FQ-68-81 to obtain test data, the flow bias signal was momentarily shorted and an RPS half scram resulted. WR C285302 was previously written to correct the wiring problem and to recalibrate this amplifier.
3. The single tap loop proportional amplifiers 3-FM-68-45 and 3-FM-68-47 had calculated GAFs of 0.9951 and 0.9502, respectively. The GAF for 3-FM-68-47 was outside of the acceptable range of between 0.975 and 1.025, and WR #C323109 was initiated to recalibrate this amplifier. This condition was documented on TD-1. / The single tap loop proportional amplifiers 3-FM-68-45 and 3-FM-68-47 had calculated GAFs of 1.010 and 0.996, respectively which were both within the acceptable range of 0.975 to 1.025.
4. Jet pump loop flow variation is the fractional difference between the calculated loop flow derived from summing all ten jet pump flows and the flow calculated by extrapolating from the two calibrated jet pump flows only. It is essentially a measure of how representative the calibrated jet pumps are of all jet pumps. Jet pump loop flow variation for loops A and B were 0.49% and 0.24%, respectively. This is less than the maximum allowable variation of 3.0% specified by the procedure. / Jet pump loop flow variation for loops A and B were 0.60% and 0.02%, respectively.

5. The value of the jet pump riser plugging parameter calculated for the ten risers ranged from 0.4% to 6.5%. These are all less than the maximum allowable value specified in the procedure as 10%. / The value of the jet pump riser plugging parameter calculated for the ten risers ranged from 0.8% to 5.6%.
6. The value of the jet pump nozzle plugging parameter calculated for the ten jet pump pairs ranged from 0.6% to 4.4%. All pairs were less than the maximum expected value of 10% specified in the procedure. / The value of the jet pump nozzle plugging parameter calculated for the ten jet pump pairs ranged from 0.0% to 4.3%.

TD-1 from the December 9, 1995 performance was closed based on the results obtained in the December 10 test performance. After adjustment of the gain on 3-FM-68-47 per WR C323109, all total core flow and total jet pump loop flow instrumentation was verified to read correctly. TD-1 from the December 10 1995 performance was closed based on initiation of WR C285302 to recalibrate 3-FQ-68-81. New gain settings for the recirc pump proportional amplifiers were calculated based on the results of 3-TI-174, and recalibration was performed for both 3-FQ-68-81 and 3-FQ-68-5 per WO 95-23013-00 on December 12, 1995. Data recorded per this WO indicates that the APRM/RBM flow biased instrumentation is now adjusted to function properly at rated conditions. All acceptance criteria were satisfied.

III. CONCLUSION

All testing defined within the BFN Unit 3 Power Ascension Test Program has been satisfactorily completed with no open test deficiencies. All tests met their performance criteria or had TDs which were dispostioned satisfactorily. These test results demonstrate that BFN Unit 3 systems are capable of meeting their design functions and that power operation can be safely and efficiently continued. There are no known deficiencies that could be detrimental to continued plant operation.

IV. APPENDIX

1. Power Ascension Program Unit 3 Cycle 7 test Deficiency Summary

Appendix
Power Ascension Program Unit 3 Cycle 7
Test Deficiency Summary

TEST PROCEDURE	TD#	TEST PLATEAU	TEST DEFICIENCY DESCRIPTION	OPEN/ CLOSED	REMARKS
3-TI-20/ 0-TI-299	1	I Open Vessel	Unable to perform coupling check per 3-SI-4.3.B.1.b on CRD 22-07 due to inability to withdraw.	Closed	Coupling check performed satisfactorily after fuel support piece reseated.
	2	II HU to 55%	RPIS indication problems during SI-4.3.C Scram Timing Test	Closed	Scram response time determined from conservative evaluation of available RPIS indications
3-TI-73A	1	I Open Vessel	RCIC Steam Line Drain Pot Level High annunciator not clear (3-XA-55-3C, Window 22	Closed	WO 95-1954800 to troubleshoot and correct, no retest required.
	2	I Open Vessel	Light 3-XI-71-45 Turb Outbd Brg Oil Temp High did not extinguish	Closed	WO 95-1946500 to trouble shoot and correct. Retest per 7.5.69-86 of TI
	3	I Open Vessel	3-XA-55-3C window 10, Backup SW Emer Posn did not alarm	Closed	WR C292554 to troubleshoot, correct and retest.
3-TI-82	0	III 55-100%			
3-TI-130	0	II H/U-55%			
	1	III 55-100%	Pressure Test Board failed during confirmatory testing before 'A' Regulator failure test	Closed	Accept as is due to testing already performed and turbine shutdown required for repair
3-TI-131	1	III 55-100%	'A' and 'B' RFPs failed rise time and 'C' RFP failed overshoot level 2 criteria	Closed	Accept as is due to Level 2 criteria are optimum system performance recommendations, system operation is satisfactory
3-TI-132	0	I Open Vessel			
	0	III 55-100%			
0-TI-135	1	II HU to 55%	LPRM readings on panel 3-9-14 not in agreement with ICS reading on 2 LPRM's	Closed	Corrected by WR C320034
	2	II HU to 55%	3D Monicore would not restart due to oscillations in the generator megawatt indication and/or a low value for recirc pump motor power	Closed	WR C285293 / 319981 recalibrated instruments and eliminated problem
	3	II HU to 55%	Differences in Load Line, Core Flow, and Sub-cooling calculations of process computer versus manual heat balance calculations	Closed	Software change BFN-SSR-95-077 was generated and installed to correct problem
	4	III 55-100%	Did not have required margin in non-adaptive case of 3D Monicore	Closed	Accept as is as TD does not affect test results, mode is most conservative mode in 3D Monicore
0-TI-136	0	II HU to 55%			

Appendix
Power Ascension Program Unit 3 Cycle 7
Test Deficiency Summary

TEST PROCEDURE	TD#	TEST PLATEAU	TEST DEFICIENCY DESCRIPTION	OPEN/ CLOSED	REMARKS
0-TI-147	0	I Open Vessel			
3-TI-149	1	II HU to 55%	Substitute core flow (calculated from recirc flow) not within 5% of measured core flow	Closed	Gain adjustment and Software change per BFN-SSR-95--077 corrected indication problem
	0	III 55-100%			
3-TI-174	1	III 55-100%	Calculated core flow does not agree with indicated core flow and flow bias signal was low	Closed	Gain was adjusted by WR 285302. See TD 1 against second test run.
	1*	III 55-100%	GAF for APRM/RBM loop proportional amp. out of tolerance.	Closed	GAF's adjusted by WO 95-23013-00
3-TI-188	1	I Open Vessel	RCIC Flow not indicating on ICS	Closed	Computer point restored
	2	II HU to 55%	RCIC failed to meet 30 second start time for a rated pressure hot quick start	Closed	Test criteria met after controls adjusted.
	0	III 55-100%			
3-TI-189	1	II HU to 55%	Oscillatory response	Closed	Stable response achieved after adjustment of EGR needle valve
	2	III 55-100%	ICS computer used to read EGM voltage instead of VOM	Closed	Accept as is as no impact on test results
3-TI-190	1	I Open Vessel	Less than 1/8" clearance at 41 locations	Closed	WO 95-03072-10 notched insulation at 5 locations. WO 94-20459-06 notched insulation at 4 locations. Remaining locations acceptable per SE Calc CD-Q3999-950538R0
	2	I Open Vessel	Baseline setting not within design range on 10 supports	Closed	WO 95-21588-00 corrected one support. WO 95-21638-00 corrected one support. Design drawings on 3 supports corrected by DCN D-39001A, 39002A and 39003A. 5 Supports determined acceptable per SE Calc CD-Q3999-950538R0
	3	I Open Vessel	Flex conduit trapped between mirror insulation and support	Closed	Corrected by WR C165234
	4	I Open Vessel	Conduit touching MSRV line F	Closed	Corrected by WR C165298
	5	I Open Vessel	RPV head vent piping inaccessible for ambient temperature inspection	Closed	Inspection repeated after DW head reinstalled

* TD was written against second / separate performance of test.

Appendix
Power Ascension Program Unit 3 Cycle 7
Test Deficiency Summary

TEST PROCEDURE	TD#	TEST PLATEAU	TEST DEFICIENCY DESCRIPTION	OPEN/ CLOSED	REMARKS
3-TI-190, cont.	6	I Open Vessel	Support 47B400-84 had wedge installed, unable to verify baseline setting	Closed	Baseline verified after wedge removed.
	7	I Open Vessel	Unable to verify baseline settings on 10 supports due to missing table/load plates	Closed	3 supports set or verified correctly set by WO 95-20580-00, 95-21587-00 and 95-21669-00. 7 supports dimensions and settings evaluated by SE and determined acceptable per Calc CD-Q3999-950538R0
	8	II HU to 55%	21 supports did not move as predicted at intermediate temperature and one location clearance less that 1/8"	Closed	20 supports and 1 clearance problem determined acceptable per SE Calc CD-Q3999-950570R0. 1 support on head vent piping shimmed per WO 95-17260-01
	9	II HU to 55%	28 supports did not move as predicted at rated temperature and two location clearance less than 1/8"	Closed	28 supports and 2 clearance problems determined acceptable per SE Calc CD-Q3999-950548R0
	10	II HU to 55%	RPV and piping temperatures did not remain within the desired range during the entire inspection period	Closed	Determined acceptable per SE Calc CD-Q3999-950548R0
PMT-271	1	I Open Vessel	Rx Recirc Pump A not restarted after pump trip due to operational considerations	Closed	SE evaluated available data and determined that this test condition was not needed. PMT scoping document and PMT revised to delete requirement for pump start.
3-TI-338	0	II HU to 55%			
	0	III 55 to 100%			
3-SI-4.3.A.1	0	II HU to 55%			
0-TI-137	1	III 55 to 100%	Three pairs of TIP channels were reversed	Closed	Software change BFN-SSR-95-075 made to compensate for data input in computer