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SUBJECT: Forwards response to 860106 request for addl info re description of initial test program in facility FSAR. Recommended editorial changes to test prerequisite will be incorporated in future FSAR amend.

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AUTH.NAME AUTHOR AFFILIATION
ZIMMERMAN,S Carolina Power & Light Co.
RECIP.NAME RECIPIENT AFFILIATION
DENTON,H.R. Office of Nuclear Reactor Regulation, Director (post 851125

SUBJECT: Forwards response to 860106 request for addl info re description of initial test program in facility FSAR. Recommended editorial changes to test prerequisites will be incorporated in future FSAR amend.

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	BUCKLEY,B 01	2	2	PWR-A PSB	1	1
	PWR-A RSB	1	1			
INTERNAL:	ACRS 41	6	6	ADM/LFMB	1	0
	ELD/HDS1	1	0	IE FILE	1	1
	IE/DEPER/EPB 36	1	1	IE/DQAVT/QAB 21	1	1
	NRR BWR ADTS	1	0	NRR PWR-B ADTS	1	0
	NRR ROE,M.L	1	1	NRR/DHFT/TSCB	1	1
	NRR/DSRO/RRAB	1	1	REG FILE 04	1	1
	RGN2	3	3	RM/DDAMI/MIB	1	0
EXTERNAL:	24X	1	1	BNL(AMDTS ONLY)	1	1
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CP&L

Carolina Power & Light Company

SERIAL: NLS-86-068

MAY 2 1986

Mr. Harold R. Denton, Director
Office of Nuclear Reactor Regulation
United States Nuclear Regulatory Commission
Washington, DC 20555

SHEARON HARRIS NUCLEAR POWER PLANT
UNIT NO. 1 - DOCKET NO. 50-400
INITIAL TEST PROGRAM
REQUEST FOR ADDITIONAL INFORMATION

Dear Mr. Denton:

This letter provides Carolina Power & Light Company's (CP&L) response to your January 6, 1986 request for additional information regarding the description of the Initial Test Program in CP&L's Shearon Harris Nuclear Power Plant (SHNPP) Final Safety Analysis Report (FSAR).

Each request for information and the corresponding CP&L response is provided in the enclosure to this letter. Marked-up FSAR pages are included at the end of the enclosure for those responses which require changes to the SHNPP FSAR. These changes will be incorporated into a future amendment of the FSAR.

If you have any further questions regarding this matter, please contact Mr. J. D. Kloosterman at (919) 836-8055.

Yours very truly,

S. R. Zimmerman
Manager
Nuclear Licensing Section

CGL/ljs (3455CGL)

Enclosure

cc: Mr. B. C. Buckley (NRC)
Mr. B. Clayton (NRC)
Mr. G. F. Maxwell (NRC-SHNPP)
Dr. J. Nelson Grace (NRC-RII)
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RESPONSE TO JANUARY 6, 1986 REQUEST FOR ADDITIONAL INFORMATION

NRC Request No. 1

640.5 4.t
(open Item 202)

The following FSAR sections should be modified to conform with the Westinghouse Revised Special Low Power Testing Program as described in the letter from E. P. Raha (Westinghouse) to H. R. Denton (NRC) dated July 8, 1981:

(1) Subsection 14.2.12.2.22 (Pressurizer Heaters and Spray Valves Capability Test Summary).

(a) Prerequisites 3 and 4 (regarding charging flow variations and RCS cooldown) should be rewritten as part of the test method.

(b) The test method and acceptance criteria should be modified to address the effects of auxiliary pressurizer spray on pressurizer pressure.

(c) The test method and acceptance criteria should be modified to address the effects of charging flow and steam from variations on subcooling.

(d) Acceptance Criteria 3 should be clarified.

(2) Subsection 14.2.12.2.26 (Natural Circulation Test Summary).

(a) The test objective should be modified to reinstate the demonstration of the effects of loss of pressurizer heaters on margin to saturation temperature.

(b) The test method should be modified to reinstate the observation of the core power distribution as it remains part of the acceptance criteria.

CP&L Response No. 1

CP&L will incorporate the recommended changes as well as an editorial change to the Test Prerequisite (shown on the attached mark-ups) into a future FSAR amendment.

NRC Request No. 2

640.9 FSAR Subsection 14.2.12.1.16 (Emergency Diesel Generator Test Summary) should be modified to reinstate the following acceptance criteria in accordance with FSAR Subsection 8.3.1.2.4:

(1) The recovery of within 10 percent of nominal voltage and two percent of nominal frequency within 40 percent of each load sequence time interval.

(2) The diesel generator speed shall not exceed 107.5 percent of nominal speed (450 rpm) upon disconnection of the largest single load.

CP&L Response No. 2

The criteria stated in FSAR Section 14.2.12.1.16 are consistent with the current revision of Regulatory Guide 1.9 (Revision 2) which represents the current practice in the operation and testing of emergency diesel generators; FSAR Sections 1.8 (Regulatory Guide 1.9) and 8.3.1.2.4 will be revised in a future FSAR amendment to update the SHNPP commitment to Revision 2 of Regulatory Guide 1.9 and change data to conform to Revision 2.

NRC Request No. 3

640.21 FSAR Subsection 14.2.1.25 (Safety Injection System Performance Test Summary) should be modified to reinstate the recording of CSIP system pressure, temperature, chemistry and duration of testing, or appropriate justification should be provided in response to this item.

CP&L Response No. 3

Preoperational Test 1-2080-P-01, HHSI Pumps Performance and Flow Balance Test was completed and approved by the Joint Test Group on July 3, 1985. CP&L recorded the CSIP system pressure, temperature, chemistry and duration of testing where appropriate and these records are located in site files.

The following summarizes this effort:

(1) The charging and safety injection pumps (CSIP) used water from the Reactor Water Storage Tank (RWST) throughout the test. Test prerequisites verified that the RWST had demineralized quality water as defined in the SHNPP Start-Up Manual.

(2) CP&L recorded CSIP fluid pressure and temperature on applicable data sheets for system performance tests, pump curve verifications and flow adjustments.

(3) The actual differential pressure across critical valves which were tested under flow conditions can be obtained from plant configuration as determined from procedure steps.

(4) The duration of testing can be obtained from the Test Comment Sheet, which contains documentation of the dates and times of significant events.

In conclusion, CP&L considers revision of FSAR Subsection 14.2.1.25 unnecessary due to the completion of the test and adequate recording of the parameters in question.

NRC Request No. 4

14A FSAR Figure 14.2.11-1 and Figure 14.2.11-2 should be modified to include all test summaries contained in FSAR Subsection 14.2.12.

CP&L Response No. 4

Figures 14.2.11-1 and 14.2.11-2 are intended to provide an overview of the startup and test program and a general guide to testing sequence. The inclusion of each test would place unnecessary restrictions upon the test program by rigidly specifying the sequence of testing. A footnote to this effect will be added to these figures in a future FSAR amendment.

NRC Request No. 5

14D FSAR Subsection 14.2.12.1.36 (Fuel Pool Cooling and Clean-up System Test Summary) should be modified to reinstate the test methods and acceptance criteria regarding operability and leak tests on sectionalizing devices and drains and leak tests on gaskets and bellows, or FSAR Subsection 14.2.7 should be modified to provide technical justification for exception to Regulatory Guide 1.68, Appendix A.1.m(3).

CP&L Response No. 5

CP&L will incorporate the recommended changes (as shown on the attached mark-ups) into a future FSAR amendment.

NRC Request No. 6

14E FSAR Subsection 14.2.12.2.12 (Control Rod Reactivity Worth Test Summary) should be modified to provide clarification regarding the location and position of the greatest worth control rod.

CP&L Response No. 6

CP&L will incorporate the recommended change (as shown on the attached mark-ups) into a future FSAR amendment.

Regulatory Guide 1.9 SELECTION OF DIESEL GENERATOR SET CAPACITY FOR STANDBY POWER SUPPLIES (REV. ~~0~~ 2)

The SHNPP project complies with Regulatory Guide 1.9, as presented in FSAR Sections 8.3.1.2.4 and 14.2.12.1.16. 11

g) Each standby power source consists of a single generator driven by a single prime mover.

8.3.1.2.4 Regulatory Guide 1.9 (Revision ~~0, March 1971~~ 2, December 1979)

The intent of Regulatory Guide 1.9 is met as follows:

a) The diesel generators are each rated as shown in Table 8.3.1-1. The maximum automatically started load on each diesel generator is within the continuous rating of 6500 kW. The total maximum load, including manually started loads, is also within the continuous rating of the diesel generators.

b) Preoperational tests are discussed in Chapter 14.

c) Preoperational tests will verify the capability of each diesel generator set to start and accelerate to rated speed all of the needed safety related loads in the required sequence.

d) The diesel generator sets will be capable of reaching full speed and voltage within 10 seconds after receiving a signal to start. The engine will be capable of starting, accelerating and supplying the above loads in the
26 | sequence shown in Table 8.3.1-2 without exceeding five percent speed drop, maximum, at any time.

A load sequencing test has been performed reflecting the Shearon Harris diesel generator loading condition as per FSAR Table 8.3.1-2 with margin. The test results indicate that at no time during the load sequencing does the frequency and voltage decrease to less than 95 percent of the nominal and 75 percent of the nominal respectively.

The generator will be capable of starting, accelerating, and supplying the above loads in their proper sequence without exceeding 25 percent voltage drop at the generator terminals.

The speed of the diesel generator set will not exceed ~~107.5~~ 111.25 percent of nominal speed (450 rpm) during recovery from transients caused by disconnection of the largest single load. The engine trip setpoint is ~~495~~ 517.5 rpm (~~110~~ 115 percent nominal) to ensure that the unit will not trip on rejection of the largest single loads.

The recovery of the diesel generator from transients, to within 10 percent of nominal voltage and two percent of nominal frequency, will be within ~~40~~ 60 percent of each load sequence time interval. The recovery from transients will be verified during preoperational testing.

Qualification data (as described in Section 3.11) will be submitted and preoperational tests will be performed to confirm the suitability of the diesel generator set.

8.3.1.2.5 Regulatory Guide 1.29 (Revision 3, September 1978)

For a listing of the seismic classification of electrical equipment important to safety, refer to Section 3.2.

b) Prerequisites

1) The fuel pools and transfer canals, and Plant Reactor Cavity are filled with demineralized water as required. |23

2) The general prerequisites of Section 14.2.12.1 are met. |23

c) Test Method

1) Operate the Fuel Pool Cooling Pumps at various flow rates to verify the pump performance curves. |23

2) Operate the Fuel Pool and Refueling Water Purification Pumps at various flow rates to verify the pump performance curves. |23

3) Operate the Fuel Pool Skimmer Pumps at various flow rates to verify the pump performance curves. |23

4) Simulate high fuel pool temperatures and low fuel pool cooling flows and verify proper alarm annunciation. |23

5) Vary levels in fuel pools and demonstrate proper operation of fuel pools level instrumentation and alarms. |23

6) FILL FUEL POOLS AS NECESSARY TO HAVE WATER ON ONE SIDE OF POOL GATES AND AIR ON THE OTHER, TO DEMONSTRATE THE INTEGRITY OF THE SEAL INSTALLATION AND THAT ONLY MINOR LEAKAGE OCCURS.

d) Acceptance Criteria

1) The Fuel Pool Cooling, Fuel Pool and Refueling Water Purification, and Fuel Pool Skimmer Pumps operate in accordance with the specific pump performance curves. |23

2) System controls and alarms function properly in Fuel Pool Cooling Cleanup and Skimmer Systems. |23

3) THE FUEL POOL GATES SHALL ISOLATE THE VARIOUS SECTIONS OF THE FUEL POOL WITH ONLY MINOR LEAKAGE. |23

14.2.12.1.37 Component Cooling Water System Test Summary

a) Test Objectives

1) To verify the characteristic performance of the component cooling water pumps.

2) To verify that each train of the Component Cooling Water System is capable of providing adequate cooling water to supplied components.

3) To verify alarms and control setpoints.

4) To verify system activation with safety injection signal.

14.2.12.2.12 Control Rod Reactivity Worth Test Summary

a) Test Objective

26 1) To determine the Integral Rod Reactivity Worths of the control rods and shutdown rod banks, and to verify by analysis that the Rod Insertion limits will be adequate to ensure a shutdown margin consistent with accident analysis assumptions with the greatest worth control rod stuck out of the core. (B-8, Reference Figure 4.3.2-36 FSAR)

b) Prerequisites

1) The reactor is critical at zero power.

2) The general prerequisites are met.

c) Test Method

1) The integral control rod worths will be determined and compared to design predictions by utilizing the boron dilution or the Rod Swap technique.

26

2) Verify by calculation that a shutdown margin consistent with the accident analyses exists assuming the greatest worth rod remains in the full out position with the control rods previously inserted to their maximum Rod Insertion Limits.

3) With the greatest worth control rod in the full out position, determine the minimum boron concentration required to maintain the reactor shutdown.

d) Acceptance Criteria

1) The rod worths are determined to be within the limits of FSAR Table 4.3.2-3.

26

2) The calculated shutdown margin is greater than 1.77% Δk/k.

14.2.12.2.13 Boron Reactivity Worth Test Summary

a) Test Objective

1) To determine the boron reactivity worth over the boron concentration ranges in which the reactor may be taken critical.

b) Prerequisites

1) The reactor is critical at zero power.

2) The general prerequisites are met.

c) Test Method

1) Determine the reactivity worth of the boron in solution by diluting the boron concentration and compensating for the reactivity effect by movement of control rods.

3) The RHR System is operated from outside the Control Room and will reduce the RCS temperature 50F without exceeding the cooldown rate.

14.2.12.2.21 Loss of Offsite Power Test Summary

a) Test Objective

To demonstrate that the necessary equipment, controls, and indication are available following the isolation of the offsite power distribution system to remove decay heat from the core using only emergency power supplies.

b) Prerequisites

1) The plant is at a steady state power level between 10 and 20 percent.

2) The general prerequisites are met.

c) Test Method

1) Simulate a loss of offsite power coincident with a loss of turbine-generator.

2) Using approved operating procedures, bring the plant to a hot standby condition and maintain the plant in a hot standby condition for at least thirty (30) minutes using only emergency on-site power sources.

d) Acceptance Criteria

1) The hot standby condition is achieved and maintained for at least thirty (30) minutes using only emergency on-site power sources.

2) The emergency diesel generators start and sequence loads when off-site power is not available.

14.2.12.2.22 Pressurizer Heaters and Spray Valves Capability Test Summary

a) Test Objective

1) To determine the capability of the pressurizer heaters and spray valves.

2) To measure the effect of auxiliary pressurizer spray on pressurizer pressure.

3) To measure the effects of charging flow and steam flow on subcooling.

23

b) Prerequisties

1) The plant is in hot standby condition with three reactor coolant pumps running and system pressure and temperature at approximately 2235 psig and 547 F.

5

2) The general prerequisites are met.

c) Test Method

1) Vary charging flow to allow a 5 percent increase in pressurizer level and obtain subcooling data.

2) Initiate an RCS cooldown of 10F/hour to 552F and obtain subcooling data.

~~e) Test Method~~

1) With the pressurizer spray valves closed, all heaters are energized, and the time to reach a 2300 psig system pressure is measured and recorded.

2) With all pressurizer heaters de-energized, both spray valves are opened, and the time to reach a 2000 psig system pressure is measured and recorded.

3) With all pressurizer heaters de-energized, place ~~with~~ Auxiliary Spray in service to approximately 2000 psig RCS pressure. Record/trend system parameters

d) Acceptance Criteria

1) The pressurizer pressure response, as the heaters are energized, is within the allowable range graphed in the Westinghouse NSSS Start-up Manual.

2) The pressurizer pressure response, as the spray valves open, is within the allowable range graphed in the Westinghouse NSSS Start-up Manual.

3) The pressurizer pressure response, as auxiliary spray is placed in service, is within the allowable range graphed in the Westinghouse NSSS Start-up Manual.

~~3) The rate of change of pressurizer pressure with respect to the increase of pressurizer pressure and RCS temperature change is determined for natural circulation date.~~

4) See attached

5) See attached

14.2.12.2.23 ~~Gross~~ Failed Fuel Detection System Test Summary

a) Test Objective

1) To verify proper operation of the Gross Failed Fuel Detection System during power ascension.

b) Prerequisites

1) Power level is established to meet the test requirements.

2) The general prerequisites are met.

c) Test Method

1) At steady state power levels of 25 and 100 percent, verify that detector H.V. is at the setting determined during the initial preoperational setup.

2) At a power level of 100 percent, set the high alarm to 2 X 10^4 CPM above the level established by the plant chemistry section, to be within technical specifications.

d) Acceptance Criteria

4) The effects of RCS temperature decrease (steam flow) on RCS subcooling is recorded/determined and the results are compatable to prototype designs (North Anna, V.C. Summer Farley etc)

5) The effects of Charging flow variations (increase) on RCS subcooling is recorded/determined and the results are compatable to prototype designs (North Anna V.C Summer, Farley, etc).

14.2.12.2.26 Natural Circulation Test Summary

a) Test Objective

1) To confirm that design heat removal capability exists under natural circulation conditions.

2) To verify that flow (without pumps) and temperature data are comparable to prototype designs for which equivalent tests have been successfully completed.

3) To obtain a data base for simulator training in natural circulation operation.

23 4) To demonstrate the effects of loss of pressurizer heaters on margin to saturation temperature.

b) Prerequisites

1) Plant is stable at approximately 3 percent and parameters are at no-load values.

2) Three reactor coolant pumps are running.

3) The general prerequisites are met.

c) Test Method

1) Trip the reactor coolant pumps.

2) Verify adequate natural circulation flow to maintain cooling.

23

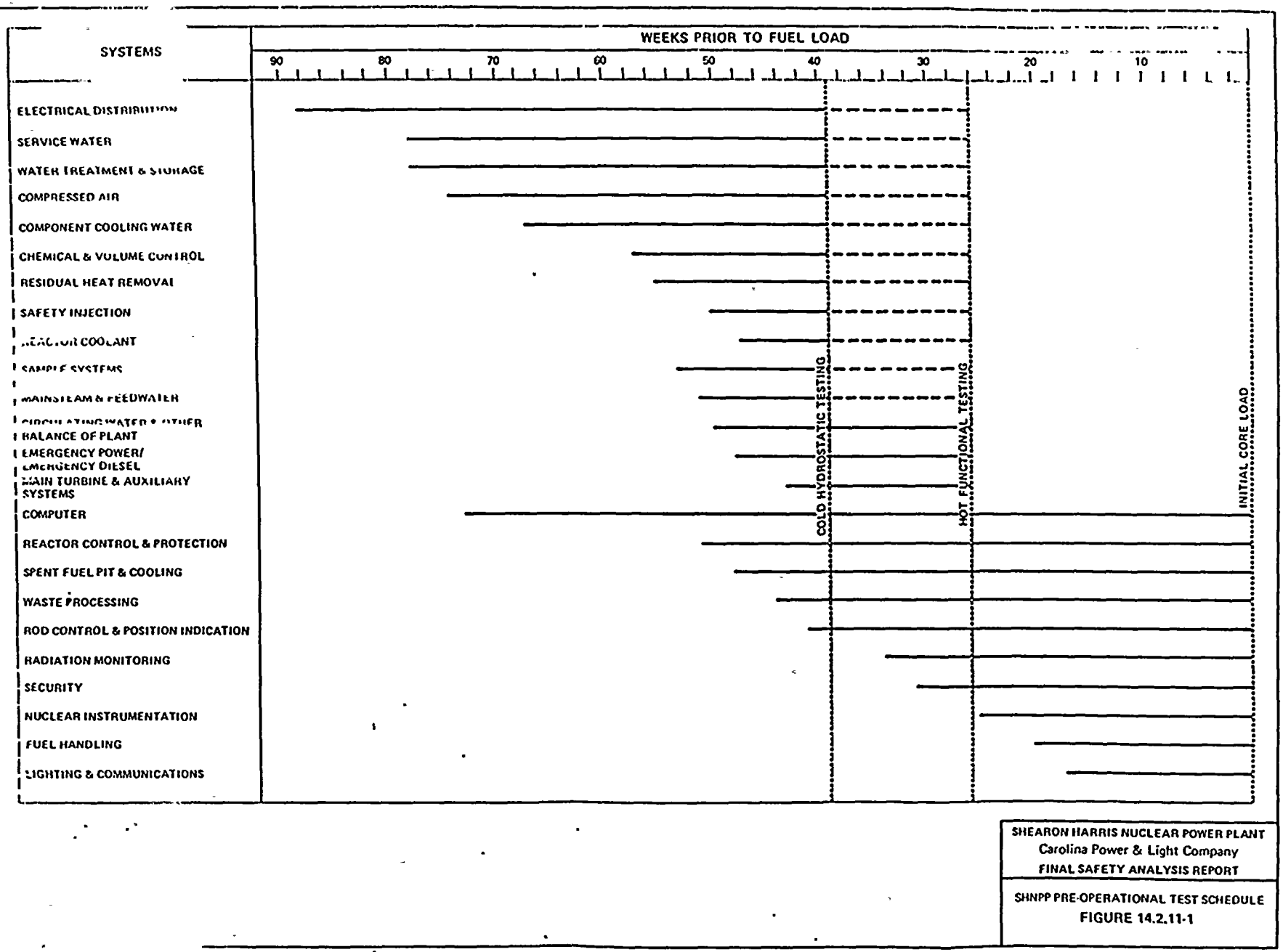
3) Demonstrate the effects of loss of pressurizer heaters by de-energizing all heater banks. Maintain natural circulation and constant T_{avg} while observing the pressure drop.

23 4) Obtain Core flux maps at specified intervals to compare power distributions.

d) Acceptance Criteria

1) The heat removal capability, power distribution, flow data, and temperature data are comparable to those of the prototypes (North Anna) for which equivalent tests have been completed.

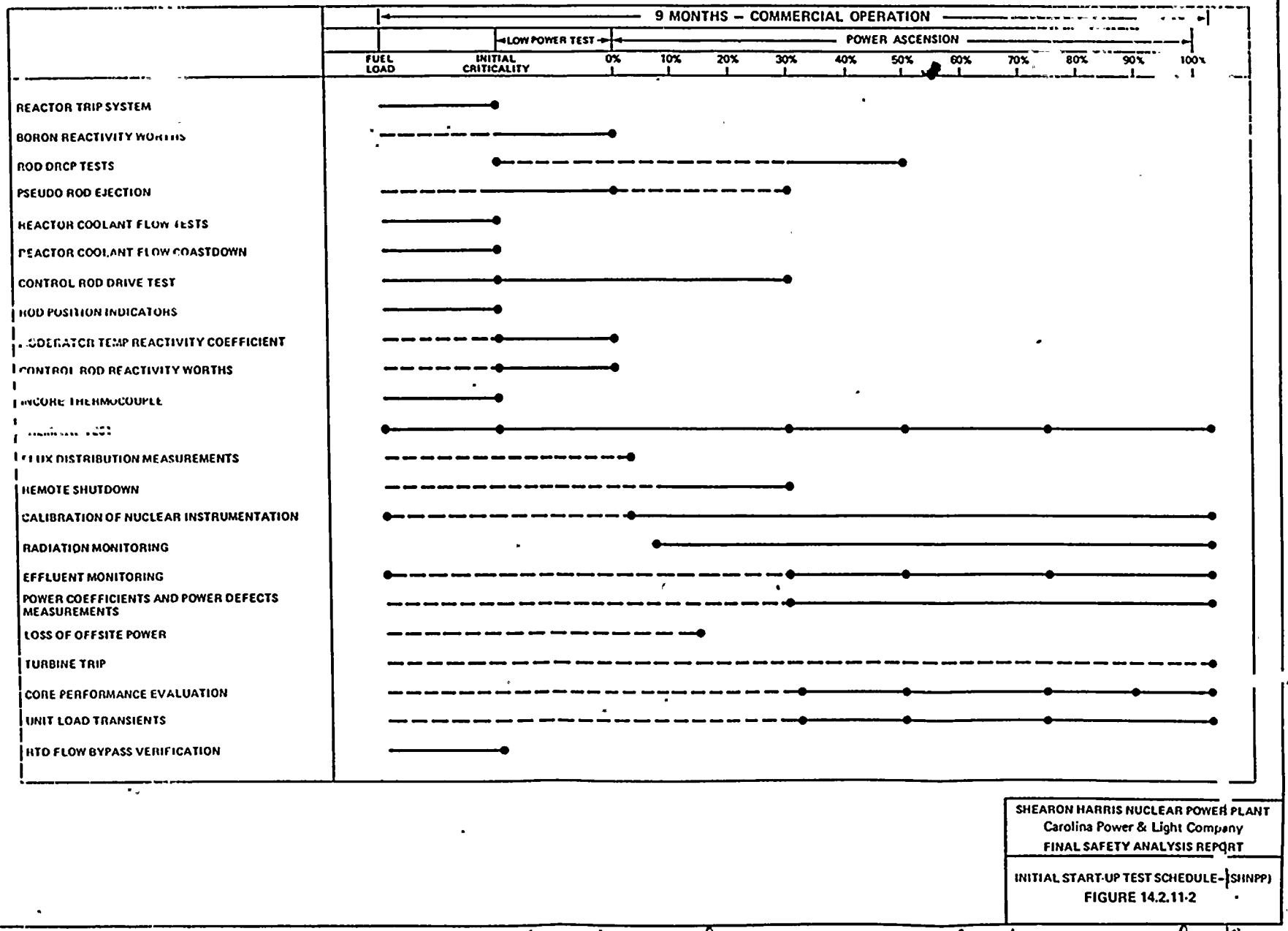
2) Pressurizer pressure remains above 1800 psig.



SHEARON HARRIS NUCLEAR POWER PLANT
Carolina Power & Light Company
FINAL SAFETY ANALYSIS REPORT

SHNPP PRE-OPERATIONAL TEST SCHEDULE
FIGURE 14.2.11-1

NOTE: This figure intended to show the overall Start-Up and Test Program and to provide a logical guide to testing sequence. (ALL TEST SUBPROGRAMS ARE NOT NECESSARILY SHOWN.)



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INITIAL START-UP TEST SCHEDULE-(SHNPP)
FIGURE 14.2.11-2

NOTE: This figure intended to show the overall start-up and test Program and to provide a general guide to testing sequence. All test summaries are not necessarily shown.