	UNITED STATES NUCLEAR REGULATORY COMMISSION REGION II 101 MARIETTA STREET, N.W. ATLANTA, GEORGIA 30323
	Report No.: 50-400/86-70
	Licensee: Carolina Power and Light Company P. O. Box 1551 Raleigh, NC 27602
	Docket No.: 50-400 License Nos.: CPPR-158
	Facility Name: Harris 1
	Inspection Conducted: September 15-19, 1986
	Inspector: <u>A. R. Long</u> A. R. Long Date Signed
	Approved by: <u>A, L, Whitener / for</u> <u>10/8/86</u> F. Jape, Section Chief Engineering Branch Division of Reactor Safety
ł	summary.
	Scope: This routine, announced inspection involved the review of test procedures for cold shutdown, hot standby, initial criticality, and low power physics testing.

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Results: No violations or deviations were identified. Ъ

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REPORT DETAILS

1. Persons Contacted

Licensee Employees

- *J. L. Willis, Plant General Manager
- *R. B. Van Metre, Manager, Technical Support
- *W. R. Wilson, Director, Start-Up Power Test Program, Technical Support
- W. M. Peavyhouse, Scheduling Coordinator, Technical Support
- *R. J. Duncan, Test Program Development Engineer, Technical Support
- R. R. Wojonarowski, Reactor Engineering Leader, Technical Support
- J. M. Neely, Administrative Coordinator, Technical Support
- D. A. Nummy, Procedure Coordinator, Technical Support
- *D. L. Tibbitts, Director, Regulatory Compliance
- *M. G. Wallace, Specialist, Regulatory Compliance
- #*O. N. Hudson, Senior Engineer, Regulatory Compliance
- *G. L. Forehand, Director, QA/QC
- *N. J. Chiangi, Manager, QA/QC
- *M. J. Thompson, Jr., Manager, Engineering Management Section
- *H. W. Bowles, On Site Nuclear Safety
- *C. E. Rose, Jr., Project QA Specialist

Other Organizations

Westinghouse Employees F. Baskerville, Westinghouse Senior Advisor

NRC Resident Inspectors

*G. F. Maxwell, Senior Resident Inspector S. Burris, Resident Inspector

*Attended exit interview on September 19, 1986 #Participated in telephone call on September 22, 1986

2. Exit Interview

The inspection scope and findings were summarized at the exit interview on September 19, 1986, and in a telephone call on September 22, 1986, with those persons indicated in paragraph 1 above. The inspector described the areas inspected and discussed in detail the inspection findings. No open items resulted from the inspection.

The licensee did not identify as proprietary any of the information reviewed during the inspection.

3. Licensee Action on Previous Enforcement Matters

This subject was not addressed in the inspection.

4. Unresolved Items

No unresolved items were identified during this inspection.

5. Startup Test Procedure Review (72300)

The startup test summaries described in section 14.2.12.2 of the FSAR (Revision 34) were compared against the licensee's list of startup test procedures. A procedure was identified for each required test. The detailed test instructions and the acceptance criteria in each procedure were then compared with the Chapter 14 requirements of the FSAR, Chapter 22 of the Startup Manual, appropriate Regulatory Guides, and current industry practice.

All of the procedures which were reviewed accomplish the specified objectives, and meet or exceed technical and administrative requirements. The test instructions are straightforward and thorough, and the acceptance criteria are clear and sufficient for showing whether or not the test results are acceptable.

During this inspection, review was completed of approved or draft versions of all cold shutdown, hot standby, initial criticality, and low power testing procedures. The individual procedures reviewed are listed below with pertinent observations and closeout actions on inspector followup items.

a. Overall Startup Test Program (72400)

The inspector reviewed the current revision of Chapter 22 of the Startup Manual, which describes the Power Ascension Test program.

The program meets the regulatory requirements for overall startup test program.

The Power Ascension Group is responsible for testing from core loading through low power physics testing, power ascension, and final plant acceptance. The Manager of Technical Support is responsible for the development and administration of the Power Ascension test program. The plant's Operations Manager is responsible for final approval or cancellation of all power ascension test procedures. This reorganization gives increased priority and resources to the power ascension program.

The inspector was shown the ARTEMIS system for scheduling and tracking power ascension activities. It is detailed and flexible, and will be supplemented with frequent planning meetings attended by members of interacting groups. The ARTEMIS schedule will be integrated with the Surveillance Test Scheduling System (STSS) which is controlled by Regulatory Compliance.

The following administrative procedures were reviewed:

- (1) 9100-S-01 (Revision 2) Power Ascension Test Program Power Escalation
- (2) 9100-S-02 (Revision 1) Power Ascension Test Log

The following item identified by the inspector was addressed in an advance change to the procedure while the inspector was on site:

The purpose of Procedure 9100-S-01 is to document administrative holds on increasing power to the next plateau until prerequisite testing and data analysis have been completed. An advance change to Revision 2 itemizes the preoperational tests scheduled for completion prior to exceeding 5% power, and includes a signoff by Regulatory Compliance that Surveillance tests scheduled by STSS for each plateau have been completed.

The administrative procedures which were reviewed, and the Power Ascension Test Program as described in Chapter 22 of the Startup Manual, meet or exceed regulatory requirements.

b. Cold Shutdown Testing Procedures (72500, 72564)

The following Cold Shutdown Procedures were reviewed:

- (1) 9101-S-01 (Revision 0) Initial Fuel Loading
- (2) 9101-S-O3 (Revision O) Reactor Coolant System Boron Concentration Sampling
- (3) 9101-S-04 (Revision 1) Core Loading Instrument Check
- (4) 9101-S-06 (Revision 1) Rod Drive Mechanism Timing Test RCS Cold
- (5) 9101-S-07 (Revision 1) Rod Drop Time Measurement RCS Cold No Flow
- (6) 9101-S-08 (Revision 1) Rod Drop Time Measurement RCS Cold Full Flow

These procedures meet regulatory requirements and FSAR commitments.

The following Inspector Followup Item in the area of Cold Shutdown Test Procedures was closed during this inspection: •

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(Closed) IFI 400/86-20-01: Revise the Initial Fuel Loading Procedure -Procedure 9101-S-01 Revision O incorporates all of the NRC comments. The procedure specifies that the SRO in charge of refueling has no other concurrent duties, the test instructions specify restrictions on the suspension of operation of the Residual Heat Removal System, plots of Inverse Count Rate Ratio will be renormalized at 0.5, and surveillance test procedures are specifically identified.

c. Hot Standby Testing (72564, 72566)

The following Hot Standby test procedures were reviewed:

- (1) 9101-S-09 (Draft of Revision 1) Incore Movable Detector System Checkout
- (2) 9102-S-01 (Revision 0) Incore T/C and RTD Cross Calibration
- (3) 9102-S-02 (Revision 1) Reactor Coolant System Leak Rate Test
- (4) 9102-S-03 (Revision 1) Reactor Coolant System Flow Measurement by D/P
- (5) 9102-S-04 (Revision 1) Reactor Coolant System Flow Coastdown
- (6) 9102-S-05 (Revision 2) RTD Bypass Loop Flow Verification
- (7) 9102-S-06 (Draft of Revision 0) Pressurizer Spray, Heater Capability And Continuous Spray Flow Setting
- (8) 9102-S-08 (Revision 2) Rod Drive Mechanism Timing Test RCS Hot
- (9) 9102-S-09 (Revision 1) Rod Drop Time Measurement RCS Hot No Flow
- (10) 9102-S-10 (Revision 1) Rod Drop Time Measurement RCS Hot Full Flow
- (11) 9102-S-11 (Revision 1) Rod Control Test
- (12) 9102-S-12 (Revision 1) Rod Position Indication
- (13) 9102-S-14 (Draft of Revision O) NSSS Setpoint Verification
- (14) 9102-S-15 (Revision O) Operational Alignment of Process Temperature Instrumentation at Hot Zero Power
- (15) 9102-S-17 (Draft of Revision O) Statepoint Data Acquisition at Hot Zero Power

The following item identified by the inspector was addressed in an advance change to the procedure while the inspector was on site:

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Procedure 9102-S-O4, RCS Flow Coastdown Measurement, was revised in response to NRC comments to classify the acceptance criterion on flow coastdown time constant as Level I (FSAR Safety Analysis Limit, which must be met for a test to be acceptable).

The following Inspector Followup Item in the area of Hot Standby testing was closed during this inspection:

(Closed) IFI 400/86-20-02: Revise RCS leakrate procedures - All NRC comments were incorporated into Procedure 9102-S-03 Revision 1. The duration of the test was increased to three hours, instructions were added to restrict changes in RCS average temperature and to correct for any minor changes which occur during the test, and RCS sampling and makeup to the Volume Control Tank were restricted. The test acceptance criteria were modified and reclassified as Level I (FSAR Safety Analysis Limit which must be met for test results to be acceptable).

The Hot Standby Procedures listed above meet regulatory requirements and FSAR commitments.

d. Initial Criticality (72570)

The following procedure was reviewed:

24) 9103-S-01 (Revision 1) Initial Criticality

The procedure meets regulatory requirements and FSAR commitments.

The following inspector followup item in the area of Initial Criticality was closed during this inspection:

(Closed) IFI 400/86-20-03: Revise the procedure for initial criticality - All NRC comments have been incorporated into an advance change to Revision 1 of Procedure 9103-S-01. The procedure includes isolation of Volume Control Tank spray to prevent possible overdilution, dynamic check of the reactivity computer using negative periods, and inclusion of Estimated Critical Position calcutions at the expected and actual critical boron concentrations.

e. Low Power Test Procedure Review (72572, 72576, 72578, 72584)

The following Low Power Test Procedures were reviewed:

- 25) 9103-S-O4 (Revision O) Technical Specification and Data Acquisition During Low Power Physics Testing
- 26) 9103-S-05 (Revision 1) Boron Endpoint Measurement All Rods Out
- 27) 9103-S-10 (Revision 1) Isothermal Temperature Coefficient All Rods Out)

- 28) 9103-S-13 (Draft of Revision 1) Flux Distribution Measurement Test (ARO - HZP)
- 29) 9103-S-23 (Revision 1) Natural Circulation.
- 30) 9103-S-25 (Revision 1) NIS Overlap Verification, Data Acquisition, Power Range Calibration and Setpoint Adjustment - Hot Zero Power
- 31) 9103-S-26 (Revision O) Reactivity Worth of the Control and Shutdown Banks Utilizing the Rod Swap Technique
- 32) 9103-S-31 (Revision O) Rod Worth Measurement at Zero Power
- 33) 9103-S-32 (Revision O) Boron Endpoint Measurement at Zero Power
- 34) 9103-S-33 (Revision O) Shield Test Survey at Zero (<5%) Power Test Plateau

The following items identified by the inspector were addressed in advance changes to the procedures while the inspector was on site:

The test instructions and an acceptance criterion of procedure 9103-S-23 were modified in an advance change to Revision 1 to more clearly demonstrate the FSAR Chapter 14 criterion that pressurizer pressure shall remain above 1800 psi with pressurizer heaters off.

The acceptance criterion on shutdown margin in procedure 9103-S-26 was changed from Level II to Level I.

An acceptance criterion on control rod worth by rod swap was revised in procedure 9103-S-26 to be consistent with Westinghouse recommendations and with acceptance criteria in other rod worth measurement procedures.

The Low Power Testing procedures listed above meet regulatory requirements and FSAR commitments.

The following Inspector Followup Item' in the area of Hot Shutdown procedure review was closed:

(Closed) IFI 400/86-20-04: Revise Boron Endpoint procedures - All NRC comments on procedure 9103-S-05 were adequately addressed. The procedure has been revised to define steady state boron concentrations and ensure boron stability during the test.

f. Computer Programs

The licensee is making effective use of computer programs in the power ascension test program. In addition to the automated scheduling previously discussed, the inspector was given demonstrations of two PC

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programs which will be used during startup testing and then during normal operation.

The program EXSPACK is an estimated critical rod position package which includes xenon and samarium calculations for an input power history. EXSPACK will calculate either estimated critical boron concentration for a known rod configuration, or estimated critical rod position if the boron concentration is known. The other program demonstrated to the inspector automates data reduction for the Incore/Excore detector normalization.

These computer programs are controlled by the corporate office, and the input can be readily checked. The output is in procedural format with appropriate provisions for sign-offs. The runs can be attached to or referenced by other procedures. The programs also have the additional benefit of providing a data base for determining trends in the agreement of measurements and predictions.