UNITED STATES
NUCLEAR REGULATORY COMMISSION
REGION II
101 MARIETTA STREET, N.W.
ATLANTA, GEORGIA 30323

Report No.: 50-261/86-07

Licensee: Carolina Power and Light Company
P. O. Box 1551
Raleigh, NC 27602

Docket No.: 50-261 License No.: DPR-23

Facility Name: H. B. Robinson

Inspection Conducted: March 11 - April 10, 1986

Inspectors: P.S. Mellen 5/6/86
H. E. P. Krug, Senior Resident Inspector Date Signed

FOR P.S. Mellen 5/5/86
R. M. Latta, Resident Inspector Date Signed

Approved by: W. M. Dennis 5/5/86
P. E. Fredrickson, Section Chief Date Signed
Division of Reactor Projects

SUMMARY

Scope: This routine, announced inspection involved 254 resident inspector-hours on site in the areas of Technical Specification (TS) compliance, plant tour, operations performance, reportable occurrences, housekeeping, site security, surveillance activities, maintenance activities, quality assurance practices, radiation control activities, outstanding items review, IE Bulletin and IE Notice followup, organization and administration, independent inspection and enforcement action followup.

Results: Violation 50-261/86-07-01, "Adequacy and Execution of Procedures", paragraph 3.

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REPORT DETAILS

1. Licensee Employees Contacted

R. Barnett, Maintenance Supervisor, Electrical
G. Beatty, Manager, Robinson Nuclear Project Department
A. Beckman, Principal Specialist, Planning and Scheduling
J. Benjamin, Supervisor, Operations
R. Chambers, Engineering Supervisor, Performance

D. Crocker, Principal Health Physics Specialist
J. Curley, Director, Regulatory Compliance
W. Ritchie, Supervisor (Acting), Radiation Control
J. Eaddy, E&C Supervisor
W. Flanagan, Manager, Design Engineering
W. Gainey, Maintenance Supervisor, Mechanical
G. Honma, Senior Specialist, Regulatory Compliance
F. Lowery, Manager, Operations
A. McCauley, Director (Acting), Onsite Nuclear Safety
P. Harding, Project Specialist (Acting), Radiation Control
M. Marquick, Senior Specialist, Planning and Scheduling
R. Morgan, Plant General Manager
M. Morrow, Specialist, Emergency Preparedness
D. Nelson, Operating Supervisor
B. Murphy, Senior Instrumentation and Control Engineer
M. Page, Engineering Supervisor, Plant Systems
R. Powell, Principal Specialist, Maintenance
D. Quick, Manager, Maintenance
B. Rieck, Manager, Control and Administration
R. Smith, Manager, Environmental and Radiation Control
J. Sturdavant, Technician, Regulatory Compliance
R. Wallace, Manager, Technical Support
L. Williams, Supervisor, Security
C. Wright, Senior Specialist, Quality Assurance/Quality Control
H. Young, Director, Quality Assurance/Quality Control

Other licensee employees contacted included technicians, operators, mechanics, security force members, and office personnel.

2. Exit Interview (30702, 30703)

The inspection scope and findings were summarized on April 10, 1986, with the Plant General Manager. A violation described in paragraph 3 was discussed in detail. The licensee acknowledged the findings without exception. The licensee did not identify as proprietary any of the materials provided to or reviewed by the inspectors during this inspection. No written material was provided to the licensee by the resident inspectors.

3. Licensee Action on Previously Identified Inspection Items (92701, 62703, 37700, 37701)

a. (Closed) IFI 50-261/86-01-02, "Loss of Offsite Power"

Following a thorough investigation, the licensee concluded that the loss of emergency bus E-2 and the subsequent loss of offsite power which occurred on January 28, 1986 were independent events. The licensee determined that the loss of offsite power was caused by false operation of the startup transformer "C" phase differential relay causing a west bus lockout; and that the false operation of the relay was caused by DC saturation of the current transformers (CTs) on the 115 KV side of the transformer.

The licensee also concluded that the loss of E-2 was caused either by a blown AC fuse in the E-2 bus undervoltage (UV) protection circuitry, or a loose DC control power fuse which protects both the E-2 bus normal supply breaker and the E-2 bus degraded grid voltage protection circuitry.

The design problems associated with these two events identified by the licensee have been corrected by modifications as follows:

- The startup transformer 115 KV-side current transformers have been modified to eliminate their susceptibility to saturation.

- The startup and auxiliary transformer differential relays have been replaced with relays less susceptible to false operation, caused by the harmonic component of sudden in-rush currents.

- Both emergency bus UV and degraded grid relay circuits have been made less susceptible to false operation caused by random fuse failure.

In addition, the faulty DC control power fuse holders on the E-1 and E-2 busses were replaced prior to reactor startup. Normal plant refueling testing has demonstrated that plant safety systems were operating properly.

The licensee modification to the undervoltage protection circuit of the emergency busses to decrease the probability that it will actuate when not needed was performed under the licensee's formal plant modification program. The licensee performed this work under Plant Modification M-890 titled "Upgrading PT Fuses on 480 V Emergency Buses"; which was inspected. Emphasis was placed on inspecting the Safety Evaluation (which comprised Attachment 890-2), the Design Verification Record and the Modification and Setpoint Revision Form.

During the review, the inspectors verified (1) that the design changes were reviewed and approved in accordance with TS and established quality controls, (2) that design changes were controlled by established procedures, (3) that the licensee conducted a review and evaluation of test results and that these test results were within previously established acceptance criteria, (4) that operating procedure modifications were made and approved in accordance with TS, and (5) that as-built drawings were changed to reflect the modifications. The inspectors also observed (1) that change activities were conducted in accordance with the appropriate specifications, drawings, and other requirements, (2) that acceptance and startup testing of modifications were conducted in accordance with technically adequate and approved procedures, and (3) the implementation of appropriate controls (e.g., firewatch, portable fire fighting equipment, welding and cutting authorizations, etc.). Additionally, the inspectors reviewed the outstanding facility change requests and determined that an excessive backlog was not developing.

No violations or deviations were identified within the areas inspected.

b. (Closed) URI 50-261/86-01-01; "Challenges to Safety Systems"

The licensee, using the task group approach described in inspection report 50-261/86-01, completed its evaluation of the reactor trips which occurred in January 1986. The licensee's preliminary description of proposed corrective actions included the incorporation of certain observations presented on the topic by an INPO team on January 5, 1986. Details associated with the specific trips were reported in inspection report 50-261/86-01.

Specifically, the licensee is promulgating measures to increase communication between the Operators at the controls and the I&C Technicians performing the surveillance activities. In particular, the licensee is modifying procedures to require definitive feedback between the operators and the technicians, concerning equipment status, at those steps in procedures where a plant trip could be generated. Extra independent verification of equipment status by both operators and technicians is being used under certain circumstances.

The role of the operators during surveillances is also being strengthened by using the second control operator as the communicator and as an additional verifier of plant status, between the surveillance technicians and the control operator responsible for the manipulation of the controls.

Increased involvement by I&C Foreman is also being established by the licensee, along with a number of significant but less important measures.

Concerning the trip which occurred on January 15, 1986, the licensee stated that the controlling procedure MST-013 (Revision 3) titled "Steam Generator Water Level Protection Channel Testing (Monthly)" was inadequate in that, at step 7.3.3, MST-013 did not require that the feedwater regulating valve be in manual; so that a reactor trip resulted upon execution of subsequent steps. The licensee stated that, to correct this problem, visual verification that the feedwater regulating valve is in manual will be required of the technician responsible for performing the surveillance.

Also, to maximize technician alertness, the licensee stated that MST-013 will be revised so that steps in MST-013 which can cause a plant trip will be performed at the beginning of the procedure. Consideration is also being given to dividing MST-013 up into four separate procedures.

The licensee also repaired a failed test switch and a loose input jack on Level Controller LC-476. The test technician was determined to be one step ahead in the procedure at the time of the trip; but that this departure could not have caused the trip. The test technician was counseled by the licensee that procedures must be rigorously followed.

With respect to the trip which occurred on January 21, 1986, the licensee established that the instrument bus voltage spikes on busses 2 and 7 were caused by a short resulting from the attempted reinsertion, by a surveillance technician, of a misaligned multi-pronged jack, back into its socket in the level transmitter module cabinet. The licensee performed a detailed evaluation of this trip and concluded that the root cause was a poorly designed jack. These jacks are being modified and the licensee expects that this source of plant trips will be eliminated.

With respect to the trip which occurred on January 22, 1986, the licensee stated that, when the test technicians completed the calibration of N-42, they did not return it to the "normal" position as required by step 7.3.12 of LP-705 (Revision 1) titled "NIS Power Range Channel N41, N42, N43 and N44." This oversight resulted in a reactor trip when subsequent steps were performed.

In summary, the licensee stated that the root cause of the trip on January 15, 1986 was an inadequate procedure. The licensee also stated that the root cause of the trip on January 22, 1986, was a failure to follow a procedure. This is a violation, with two examples, of the licensee's failure to follow and provide adequate procedures.

This is identified as Violation 50-261/86-07-01, "Adequacy and Execution of Procedures".

4. Plant Tour (71707, 62703, 71710)

The inspectors conducted plant tours periodically during the inspection interval to verify that monitoring equipment was recording as required, equipment was properly tagged, operations personnel were aware of plant conditions and maintenance activities, and plant housekeeping efforts were adequate. The inspectors determined that appropriate radiation controls were properly established, excess equipment or material was stored properly, and combustible material was disposed of expeditiously. During tours, the inspector looked for the existence of unusual fluid leaks, piping vibrations, pipe hanger and seismic restraint abnormal settings, various valve and breaker positions, equipment clearance tags and component status, adequacy of fire fighting equipment, and instrument calibration dates. Some tours were conducted on backshifts. With the exception of the Residual Heat Removal Pump Pit, where housekeeping was observed to be poor, plant housekeeping was observed to be excellent.

The inspectors performed system status checks on the following systems:

a. Safety Injection System
b. Residual Heat Removal System
c. Containment Spray System
d. Electrical Switchgear
e. Vital Station Batteries

No violations or deviations were identified within the areas inspected.

5. Technical Specification Compliance (71707, 62703, 61726)

During this reporting interval, the inspectors verified compliance with selected limiting conditions for operation and reviewed results of certain surveillance and maintenance activities. These verifications were accomplished by direct observation of monitoring instrumentation, valve positions, switch positions, and review of completed logs and records.

No violations or deviations were identified within the areas inspected.

6. Plant Operations Review (71707, 62703, 61726, 61707, 61711)

Periodically during the inspection interval, the inspectors reviewed shift logs and operations records, including data sheets, instrument traces, and records of equipment malfunctions. This review included control room logs, maintenance work requests, auxiliary logs, operating orders, standing orders, jumper logs, and equipment tagout records. The inspectors routinely observed operator alertness and demeanor during plant tours. The inspectors conducted random off-hours inspections during the reporting interval to assure that operations and security were maintained in accordance with plant procedures.

The inspectors periodically verified the reactor shutdown margin. The inspectors also periodically observed the reactor axial flux difference and compared the observed values with those required by the TS.

No violations or deviations were identified within the areas inspected.

7. Physical Protection (71707)

The inspectors verified by general observation, perimeter walkdowns and interviews that measures taken to assure the physical protection of the facility met current requirements. The inspectors routinely observed the alertness and demeanor of security force personnel during plant tours. Areas inspected included the organization of the security force; the physical condition of gates, doors and isolation zones; the performance of access controls and searches; communications procedures; and the enforcement of escorting rules.

No violations or deviations were identified within the areas inspected.

8. Monthly Surveillance Observation (61700, 61726)

The inspectors witnessed portions of the execution of the weekly operability test of the emergency diesel, as it was performed on the "A" emergency diesel generator. This test was conducted using Operations Surveillance Test Procedure OST-401 (Revision 7) titled "Emergency Diesels - Weekly." The test technician used the correct and current procedure and was qualified to perform the test.

OST-401 is designed to verify the mechanical performance and operational readiness of the emergency diesels; and that the requirements of TS 4.6.1.1 and 4.6.1.4 are satisfied. With respect to tests and surveillances which are to be performed as stated, TS 4.6.1.1 requires a

> "Manually-initiated start of the diesel generator, followed by manual synchronization with other power sources and assumption of load by the diesel generator up to the nameplate rating. Normal plant operation will not be affected."

TS 4.6.1.4 requires that:

> "Diesel generator electric loads shall not be increased beyond the long term rating of 2500 kw."

The inspectors observed that the proper administrative approvals were obtained and that the required precautions were observed. The inspectors noted that although the TS require that this test be performed on a monthly basis, the licensee performs the test weekly in accordance with vendor recommendations. As part of the test, the operator verified the operation of the redundant solenoid valves on the "A" diesel prior to the engine start. The "A" diesel generator successfully completed the test requirements.

No violations or deviations were identified within the areas inspected.

9. Operational Safety Verification (71707)

The inspectors observed licensee activities to ascertain that the facility was being operated safely and in conformance with regulatory requirements, and that the licensee management control system was effectively discharging its responsibilities for continued safe operation by direct observation of activities, tours of the facility, interviews and discussions with licensee management and personnel, independent verification of safety system status and limiting conditions for operation, and reviewing facility records.

No violations or deviations were identified within the areas inspected.

10. ESF System Walkdown and Monthly Surveillance Observation (71710, 61726, 56700)

The inspectors verified the operability of the engineered safety features system by performing a walkdown of the accessible portions of the safety injection, residual heat removal and containment spray systems as prescribed by Operations Surveillance Test Procedure OST-158 (Revision 2) titled "Safety Injection and Containment Spray Systems Flowpath Verification Monthly Interval (At Power)." The inspectors confirmed that the licensee's system lineup procedures matched plant drawings and the as-built configuration. The inspectors looked for equipment conditions, maintenance status and items that might degrade performance (that hangers and supports were operable, acceptable housekeeping, etc.). The inspectors verified that valves were in proper position, power was available, and valves were locked as appropriate. The inspectors compared both local and remote position indications. The inspectors notified the licensee that housekeeping in the Residual Heat Removal Pump Pit was poor.

No violations or deviations were identified within the areas inspected.

11. Plant Startup from Refueling (71711)

The inspectors reviewed plant startup activities following the recent refueling outage which ended on March 22, 1986. The inspectors ascertained that systems disturbed or tested during the refueling outage were returned to an operable status before plant startup and that plant startup, heatup, approach to criticality, and core physics tests following the outage were conducted in accordance with approved procedures. Before plant startup, the inspectors performed a walk-through of appropriate portions of the residual heat removal and safety injection systems, which were disturbed during the refueling outage, and independently ascertained that these systems were returned to service in accordance with approved procedures. The inspectors also observed portions of the control rod drive and control rod position indication checks.

While witnessing the startup, the inspectors verified that the control rod withdrawal sequence and rod withdrawal authorization were available and that all surveillance tests required to be performed before the startup were satisfactorily completed. Additionally, the inspectors verified that the startup was performed in accordance with technically adequate and approved procedures which had been revised to reflect changes made to the facility and to the startup testing program, and verified that startup activities were conducted in accordance with TS requirements.

The post-refueling initial criticality and zero power physics tests were conducted by the licensee in accordance with Engineering Surveillance Test Procedure EST-050 (Revision 3) titled "Refueling Startup Procedure". Revision 3 to EST-050 was inspected and found to be technically adequate, properly approved, and in accordance with TS requirements. The inspectors witnessed the approach to, and the achievement of, reactor criticality; which was sustained, with all rods out, at a boron concentration well within the acceptance criteria.

The inspectors also observed portions of the measurements of the moderator temperature coefficient (at two rod positions); and control rod banks "C" and "D" differential and integral reactivity worth. In every case, the measured values agreed with those predicted within the prescribed acceptance criteria. Licensee personnel were observed to properly follow and annotate the procedure.

The inspectors observed portions of a number of surveillance activities of safety-related systems and components to ascertain that these activities were conducted in accordance with license requirements. On March 28, 1986, the inspectors observed all aspects of operations surveillance test OST-010 (Revision 5), "Power Range Calorimetric During Power Operation."

The inspectors determined that the surveillance test procedure OST-010 conformed to TS requirements, that all precautions and LCO were met and that the surveillance test was completed at the required frequency. The inspectors also verified that the required administrative approvals were obtained prior to initiating the test, that the testing was accomplished by qualified personnel in accordance with the current version of an approved test procedure and that the required test instrumentation was properly calibrated. Upon completion of the testing, the inspectors observed that the recorded test data were accurate, complete and met TS requirements. There were no test discrepancies.

On March 26, 1986, the inspectors witnessed the core flux mapping performed in accordance with performance of EST-054, Revision 2. This engineering surveillance test was conducted to obtain information pertinent to core power distribution and to obtain data necessary for proper calibration of the excore detectors. During the conduct of this surveillance, control room personnel were observed aligning the movable detector system and operating

the computer in order to perform a full core flux map. The licensee personnel involved were qualified and they used the latest revision of EST-054. Upon the completion of EST-054, the inspectors witnessed the return of the movable detectors to their respective storage areas as indicated by the control room instrumentation.

No violations or deviations were identified within the areas inspected.

12. Onsite Followup of Events and Subsequent Written Reports of Nonroutine Events at Power Reactor Facilities (92700, 90714, 93702)

For onsite followup of nonroutine events, the inspectors determined that the licensee had taken corrective actions as stated in written reports of the events and that these responses to the events were appropriate and met regulatory requirements, license conditions, and commitments. During this reporting period, the inspectors reviewed the following LERs to verify that the report details met license requirements, identified the cause of the event, described appropriate corrective actions, adequately assessed the event, and addressed any generic implications. When licensee identified violations were noted, they were reviewed in accordance with enforcement policy. The inspectors had no further comments.

LER	EVENT
84-11	Loss of Containment Integrity
85-02	Main Steam Isolation Valves
85-10	Reactor Trip Low S/G Level
85-21	Reactor Trip Due to a False Low Reactor Coolant Flow
86-01	Design Deficiency SI Minimum Flow Recirculation Path
86-05	Loss of Offsite AC Event

No violations or deviations were identified within the areas inspected.

13. Organization and Administration (36700)

The inspectors reviewed the on-site licensee organization to ascertain whether changes made to the licensee's onsite organization are in conformance with the requirements of the TS by verifying that (1) the established organization is functioning as described in the TS is functioning effectively, (2) personnel qualification levels are in conformance with applicable codes and standards, and (3) the lines of authority and responsibility are in conformance with TS and applicable codes and standards.

Comprehensive discussions of current safety-related activities were conducted with plant management and technical personnel during this reporting period including, and in particular, Technical Support, Environmental and Radiation Controls, Quality Assurance, Regulatory Compliance and Onsite Nuclear Safety organizations. Topics discussed included licensee activities associated with plant startup and other operations activities; plant modifications, the fire protection system, and communications interfaces.

No violations or deviations were identified within the areas inspected.

14. Plant Nuclear Safety Committee (PNSC) (40700)

The inspectors reviewed specific activities of the PNSC to determine whether the onsite review functions were conducted in accordance with TS and regulatory requirements. The inspectors attended the regularly scheduled PNSC meeting held on March 19, 1986 and observed the conduct of the meeting to ascertain that provisions of the TS concerning membership, review process, frequency and committee member qualifications were satisfied.

Topics of concern which were reviewed included procedures, tests and experiments, modifications, reportable events to NRC, non-conformance reports, PNSC subcommittee activities, and reactor trips. The inspectors noted that all topics addressed by the committee were thoroughly discussed. In particular, the subject of reactor trip reviews for the events which occurred on January 15, 1986, January 21, 1986, and January 22, 1986, were comprehensively reviewed for both safety considerations and technical analysis.

No violations or deviations were identified within the areas inspected.

15. Plant Procedures (42700)

The inspectors reviewed portions of the established procedure program to ascertain whether overall plant procedures were in accordance with regulatory requirements, temporary procedures and procedure changes were made in accordance with TS requirements, and the technical adequacy of the reviewed procedures was consistent with desired actions and modes of operation. Procedures examined included low power physics testing, and startup procedures, maintenance procedures and administrative procedures.

No violations or deviations were identified within the areas inspected.