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

Report No.: 50-261/93-07

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 Unit 2

Inspection Conducted: March 20 - April 16, 1993

Lead Inspector: _____ 5/5/93
L. W. Garner, Senior Resident Inspector Date Signed

Other Inspectors: G. A. Harris, Project Inspector
C. R. Ogle, Resident Inspector

Approved by: _____ 5/5/93
H. O. Christensen, Chief Date Signed
Reactor Projects Section 1A
Division of Reactor Projects

SUMMARY

Scope:

This routine, unannounced inspection was conducted in the areas of operational safety verification, surveillance observation, maintenance observation, and followup.

Results:

A violation was identified for failure to adequately establish surveillance procedures to test the emergency diesel generators at nameplate rating as required by Technical Specification 4.6.1.1 (paragraph 6).

Plant management did not ensure that the A channel of AMSAC was expeditiously returned to service after it was repaired (paragraph 3).

Confusion between a shift supervisor and maintenance personnel over the scope of work to be performed on a control room door resulted in a loss of configuration control of the control room habitability boundary (paragraph 3).

Sensitivity to minimizing risks was demonstrated by the ample precautions, quality of workmanship, and supervisor oversight involved with implementation of the initial phase of the switchyard breaker replacement modification (paragraph 3).

During performances of inservice test surveillance tests, operators verified that the C safety injection pump discharge valve successfully passed reverse flow tests even though the check valve was within a clearance boundary and isolated from the system. This lack of attention to detail and the subsequent failure of review personnel to detect the errors was considered as a weakness (paragraph 4).

REPORT DETAILS

1. Persons Contacted

R. Barnett, Manager, Outages and Modifications
*C. Baucom, Senior Specialist, Regulatory Compliance
*C. Coffman, System Engineer, Technical Support
*B. Clark, Manager, Maintenance
*T. Cleary, Manager, Technical Support
C. Dietz, Vice President, Robinson Nuclear Project
R. Downey, Shift Supervisor, Operations
R. Femal, Shift Supervisor, Operations
*W. Flanagan Jr., Acting Plant General Manager, Robinson Nuclear Project
*J. Harrison, Manager, Regulatory Compliance
D. Knight, Shift Supervisor, Operations
*A. McCauley, Manager - Electrical Systems, Technical Support
R. Moore, Shift Supervisor, Operations
D. Morrison, Shift Supervisor, Operations
A. Padgett, Manager, Environmental and Radiation Control
D. Seagle, Shift Supervisor, Operations
E. Shoemaker, Manager, Mechanical Systems, Technical Support
W. Stover, Shift Supervisor, Operations
*A. Wallace, Manager - Acting Manager, Operations
D. Winters, Shift Supervisor, Operations

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

*Attended exit interview on April 21, 1993.

Acronyms and initialisms used throughout this report are listed in the last paragraph.

2. Plant Status

Except for a power reduction to performed required testing, the unit operated at full power during the report period. On March 24, 1993, the unit exceeded its previously established continuous run record of 182 days.

3. Operational Safety Verification (71707)

The inspectors evaluated licensee activities to confirm that the facility was being operated safely and in conformance with regulatory requirements. These activities were confirmed by direct observation, facility tours, interviews and discussions with licensee personnel and management, verification of safety system status, and review of facility records.

To verify equipment operability and compliance with TS, the inspectors reviewed shift logs, Operation's records, data sheets, instrument traces, and records of equipment malfunctions. Through work observations and discussions with Operations staff members, the

inspectors verified the staff was knowledgeable of plant conditions, responded properly to alarms, adhered to procedures and applicable administrative controls, cognizant of in-progress surveillance and maintenance activities, and aware of inoperable equipment status. The inspectors performed channel verifications and reviewed component status and safety-related parameters to verify conformance with TS. Shift changes were routinely observed, verifying that system status continuity was maintained and that proper control room staffing existed. Access to the control room was controlled and operations personnel carried out their assigned duties in an effective manner. Control room demeanor and communications were appropriate.

Plant tours and perimeter walkdowns were conducted to verify equipment operability, assess the general condition of plant equipment, and to verify that radiological controls, fire protection controls, physical protection controls, and equipment tagging procedures were properly implemented.

AMSAC Failure

On March 31, 1993, AMSAC was declared inoperable due to the failure of both microprocessor units. The operators were alerted to the AMSAC failure when the AMSAC Trouble/Bypass annunciator APP-005-F5 was received. Investigation at the AMSAC panel revealed that all indicating lights were extinguished and no voltage indication could be obtained on the AMSAC inputs for either channel. The AMSAC power supply breaker located on MCC 17 was found closed; however, the "inverter on" breaker at the AMSAC UPS panel was found tripped. The "inverter on" breaker was reset and the "AMSAC ARMED" status light momentarily energized and then extinguished. Although the "inverter on" breaker remained closed, the AMSAC panel remained de-energized. On April 5, the spare microprocessor unit in stock was installed in the A channel. At the end of the report period, repair of the B channel was pending delivery of another microprocessor unit from the vendor, Modicon Sealed Support Center. Anticipated delivery date was April 23.

Although the unit installed in the A channel appeared to function properly, the AMSAC channel was kept in bypass due to the lack of a functional test procedure to verify the units' operability with the turbine generator at power. The established AMSAC functional test procedure PM-429, AMSAC System Test, was written for performance at cold shutdown. Using PM-429 as a template, the system engineer began, on April 7, the development of SP-1198, AMSAC System Test (At Power). On April 10, SP-1198 was issued and successfully performed on the A channel. This channel was declared operable and AMSAC was placed in service, i.e., the bypass switch was placed in the unbypassed position. With the B channel inoperable, the AMSAC Trouble/Bypass annunciator remained lit. The continued operability of the A channel is being verified at least once per shift during normal AO rounds.

The inspector conducted a review of the work history for the AMSAC system to determine if there were instances where previously performed

corrective maintenance during power operation would have required a channel functional test. No instances were identified.

The inspectors determined that management did not ensure that the A channel of AMSAC was expeditiously returned to service after it was repaired on April 5. As of April 8, issuance of SP-1198 was not anticipated until April 14, at the earliest. The projected schedule was dominated by the unavailability of the designated technical and electrical/I & C reviewer, i.e., he was out of town. This maintenance person was considered by maintenance management to possess the greatest understanding of and familiarity with the AMSAC system and thus was the best qualified maintenance personnel to perform the review. On April 8, the inspectors expressed concern about the length of time AMSAC A channel was out of service due to the lack of a test procedure. On April 9, the inspectors asked management whether or not there were other individuals qualified to perform the necessary review. Another individual was selected and the SP was approved and performed as described above. Although operability of the AMSAC system was not required by TS, AMSAC was required to be installed by 10 CFR 50.62 and as such was a system important to safety. Because AMSAC installation was required by regulation, it was anticipated that the system be maintained capable of performing its function and when out of service be returned to service in an expeditious manner. Scheduling AMSAC to be out of service for greater than a week solely because of a lack of a test procedure was determined not to meet this expectation. Station management indicated that technical and maintenance management has been counseled on the need to ensure that the AMSAC remains operable, although operability is not required by TS.

Spurious OT Delta T Channel Actuations

IR 93-05 described electrical noise induced spurious OT delta T alarms/trips on RPS channels 2 and 3 which occurred in March 1993. On April 3, 1993, a spurious trip signal occurred on channel 2 when the reactor makeup water system was placed in service. The source of the induced electrical noise was attributed to a malfunctioning relay in the makeup system, i.e., the relay was rapidly energizing and de-energizing. The relay was replaced. On April 4, the inspectors witnessed a noise expert evaluate portions of the circuit associated with channel 2. Based upon the expert's preliminary recommendations, ferrite beads have been placed around several cables and conductors in protection rack 11 (channel 2). The ferrite beads were designed to help suppress high frequency noise induced currents but not affect the process signals. The inspectors reviewed EE 93-035, Use of Ferrite Beads For Electromagnetic Interference Suppression In The Reactor Protection Cabinets, and have no questions at this time. The inspectors verified that the ferrite beads were installed as described in the EE. At the end of the report period, preparation of the expert's final report was in progress. Upon receiving this report, an evaluation was planned to determined if ferrite beads or other noise suppression devices should be installed in other circuits. The inspectors will monitor the licensee's efforts in this area as part of the routine inspection program.

Control Room Boundary

On April 14, 1993, the inspectors observed that I & C personnel had blocked open door 49 and removed the door latching mechanism from the frame. This had been accomplished to aid in troubleshooting intermittent security alarms on the door. The door was the south entrance to the control room and as such, was included in the control room habitability system. From discussions with the shift supervisor and a review of the shift supervisor logs, the inspectors determined that the door had been declared inoperable with security and fire protection compensatory measures implemented. However, no consideration had been given to any degradation in the control room habitability complex. Subsequent interviews with plant management personnel indicated that confusion existed between maintenance and operations personnel as to the extent of the troubleshooting efforts. As a result of this confusion, the shift supervisor was unaware that the door latch had been removed and that the capability to immediately shut the door had been lost. The net result was a loss of configuration control for a TS system. Following the restoration of the door to service, the inspectors reviewed the operation of the control room habitability system and, based on observations of control room pressures with the door open, concluded that the system probably remained capable of maintaining a positive pressure, the technical specification requirement, throughout the troubleshooting effort.

Switchyard Breaker Modification

During the report period, the inspectors witnessed various work activities associated with the 230 KV breaker upgrade modification. In particular the inspectors witnessed the installation and testing of the new 115 KV to 480 V transformers and the placement of the first replacement 230 KV breaker (breaker 52-3). During the west bus transformer testing, it was determined that the phase rotation was in the wrong direction, i.e., the transformers were connected to the improper phase due to a misinterpretation of a drawing. The inspectors noted that supervision elected to rewire the transformers instead of rolling the transformer output leads at the load breaker. The latter would have been simpler since rewiring the transformers required pulling a new cable. However, this would have resulted in the wiring being in a non-conventional arrangement and thus a potential personnel safety hazard during future maintenance activities. The inspectors observed that an ample number of spotters and adequate precautions were taken to prevent damage to nearby equipment when a crane removed the old breaker and placed the new breaker. The inspectors determined that the precautions and quality workmanship observed, as well as, the degree of supervisory oversight provided to the work activities by Operations, engineering, and craft supervision demonstrated a high degree of sensitivity to minimizing risks.

No violations or deviations were identified. Except as noted above, the area/program was adequately implemented.

4. Surveillance Observation (61726)

The inspectors observed certain safety-related surveillance activities on systems and components to ascertain that these activities were conducted in accordance with license requirements. For the surveillance test procedures listed below, the inspectors determined that precautions and LCOs were adhered to, the required administrative approvals were obtained prior to test initiation, testing was accomplished by qualified personnel in accordance with an approved test procedure, test instrumentation was properly calibrated, the tests were completed at the required frequency, and that the tests conformed to TS requirements. Upon test completion, the inspectors verified the recorded test data was complete, accurate, and met TS requirements, test discrepancies were properly documented and rectified, and that the systems were properly returned to service. Specifically, the inspectors witnessed/reviewed portions of the following test activities:

OST-151	Safety Injection System Component Test (Quarterly)
OST-401	Emergency Diesels (Slow Speed Start)(Biweekly Except When OST-409 Is Scheduled)

Safety Injection System Component Test

During a review of OST-151, completed on April 16, 1993, the inspectors noted that in steps 7.3.17.2 and 7.4.18.2 the operators had recorded a reading of "0" psig for PI-956C, C SI Pump discharge pressure gauge. The piping monitored by PI-956C was isolated by a clearance associated with the removal of the C SI Pump. Hence, no change in the reading on this instrument would be expected during the course of the OST. The inspectors questioned Operations management as to the validity of this practice. Based on this concern, the licensee determined that the operators who had perform the OST had recorded readings from a pump pressure gauge sensing an isolated section of piping. Furthermore, the licensee determined that from this data the operators had incorrectly concluded proper reverse flow operation of SI-879C, C SI pump discharge check valve. The C SI pump discharge check valve was also isolated by clearance and its operation could not be determined during performance of the OST.

The inspectors reviewed seven previous accomplishments of OST-151 since October 1991, and determined that this same error had been made on two previous occasions by two other shifts. The inattention to detail demonstrated by these errors and the failure of personnel to note these errors during reviews of the completed OSTs were considered a weakness.

Emergency Diesels Slow Speed Start

On April 12, 1993, the inspectors witnessed accomplishment of OST-401 for the A EDG. The A EDG startup, operation under full load, and shutdown were accomplished satisfactorily. However, during the post-

shutdown barring of the A EDG, the engine speed continued to increase after the start pushbutton was released. The licensed operator performing the OST, pushed the stop button at the local engine control panel and the engine shutdown.

From a review of a stripchart printout, the licensee determined that the engine achieved a maximum speed of approximately 300 RPM during the barring. The inspectors independently reviewed the stripchart and agreed with this observation. The inspectors also reviewed the electrical schematic for the diesel generator and concurred with the licensee's assessment that the increase in engine speed during barring was not an expected response. An increase in A EDG speed during barring and after releasing the start pushbutton had been observed on one other occasion.

The inspectors concluded, based on the satisfactory operation of the A EDG during the OST and a review of the EDG electrical schematic, that this phenomenon will not impact the capability of the EDG to perform its intended safety function nor prevent the EDG from being shut down by normal means. Thus, the safety significance of this phenomenon is minimal. As part of the routine inspection program, the inspectors will continue to monitor the licensee's efforts in determining the cause of this phenomenon.

No violations or deviations were identified. Based on the information obtained during the inspection, the area/program was adequately implemented.

5. Maintenance Observation (62703)

The inspectors observed safety-related maintenance activities on systems and components to ascertain that these activities were conducted in accordance with TS and approved procedures. The inspectors determined that these activities did not violate LCOs. The inspectors verified that required administrative, material, testing, and radiological controls were adhered to. In particular, the inspectors observed/reviewed the following maintenance activities:

WR/JO 92-ATHZ1	Install Sample Line Jumper In Primary Sample System In Accordance With TM 92-731
WR/JO 93-ADFG1	Troubleshoot And Repair Control Rod Insertion Limit Malfunction
WR/JO 93-AEFN1	Troubleshoot And Repair Heat Circuit Trace 25S

Secondary Heat Trace Circuit 25

At 5:58 a.m. on April 5, 1993, secondary heat trace circuit 25 was declared out of service following detection of an open circuit during performance of MST-101, Boric Acid Heat Trace Operability. The circuit

provided heating for the boric acid piping from the boric acid filter discharge isolation valve, V-348, to the boric acid to charging pumps suction header isolation valve, MOV-350. (Repairs to this circuit conducted on January 15, 1993, are discussed in IR 93-03.) As this circuit maintains temperature for the flow path from the boric acid tanks, the licensee entered a LCO in accordance with TS 3.2.3.c. The LCO allowed operation to continue for 24 hours with one channel of heat tracing out of service before placing the reactor in hot shutdown. During the repair efforts, the licensee monitored the temperature of the CVCS piping heated by circuit 25. At 3:10 p.m. the licensee entered a LCO in accordance with TS 3.0. This LCO was entered when it was determined that the remaining heat tracing circuit for the piping, primary circuit 25, was unable to maintain the CVCS piping temperature above 145° F. Thus, the requirement to maintain at least one channel of heat tracing on the flow path from the BAST as required by TS 3.2.3.c could not be met. At 7:01 p.m., the CVCS piping temperature was restored to greater than 145°F following partial reinstallation of insulation on the CVCS piping and TS 3.0 was exited. At 12:30 a.m. on April 6, 1993, repairs were completed to secondary heat trace circuit 25 and the LCO for TS 3.2.3.c was exited.

The inspectors witnessed a portion of the repair efforts and concluded that the work was well executed.

No violations or deviations were identified. Based on the information obtained during the inspection, the area/program was adequately implemented.

6. Followup (92700, 92701, 92702)

(Closed) URI 91-21-09, EDGs Not Tested At Nameplate Rating As Required By TS 4.6.1.1. Through a review of industry events and IN 91-13, Inadequate Testing Of Emergency Diesel Generators, the licensee identified that KVA loading capability was not being verified during surveillance testing. However, the licensee interpreted nameplate rating, the term used in TS 4.6.1.1, to mean testing only at the nameplate KW rating and thus considered the established surveillance tests as meeting TS requirements. OST-401, Emergency Diesel (Slow Speed Start), and OST-409, Emergency Diesel (Rapid Speed Start), were the procedures established to implement TS 4.6.1.1 testing requirements. Subsequent review by the NRC determined that TS nameplate rating test requirement included KW at the power factor or the KVA specified on the nameplate. Thus, since the existing surveillance procedures utilized to verify compliance with TS 4.6.1.1 did not test to these conditions, the surveillance tests were determined to be inadequately established. Failure to adequately establish surveillance procedures is a failure to comply with the requirements of TS 6.5.1.1.1.c and is identified as a VIO: Failure To Establish Adequate EDG Surveillance Test Procedures As Required By TS 4.6.1.1, 93-07-01.

IR 91-28 and 92-32 described a December 9, 1991, performance of OST-401. At that time, OST-401 had been revised to test at nameplate conditions,

i.e., 3125 KVA. However, due to high voltage experienced on E-1, the emergency bus feed by the A EDG, the revised test was not performed on the B EDG nor again on the A EDG.

It was not the NRC's intention that EDG testing would degrade or otherwise damage plant equipment. However, adequate EDG testing should periodically verify that the EDGs are capable of assumption of the calculated worst case accident loads and verify that the EDG and associated controls are not degrading. At the end of the report period, the licensee was in the process of developing additional testing requirements for the EDGs. It was anticipated that these new tests would be in place by the Fall 1993 refueling outage.

(Open) URI 91-03-01, Evaluate Local Submergence Test Results For Qualification Of Patel Conduit Seals. The NRC has completed its review of Wyle Laboratories Test Report No. 41175-1 volumes I and II and EGS Corporation International Reports No. EGS-TR-903200-02 and EGS-TR-903200-04. The review focused on two areas of concern. One area of concern involved whether or not the tests used the proper activation energy for the seal's grommet material when applying the Arrhenius equation. The NRC concluded that the activation energy used in the tests, 1.34 eV, was acceptable when calculating the aging and the qualified life of the grommet material.

The other issue involved the adequacy of the tests to demonstrate that the Patel conduit seals were environmentally qualified when submerged. The NRC determined that the results of these reports are inconclusive and thus environmental qualifications has not been demonstrated for submerged patel conduit seals. In particular, the tests were inconclusive because there was no retesting under LOCA conditions following resolution of identified anomalies (leakage occurred in specimens designated CS-1A and CS-2). This matter is presently under discussion with the licensee.

One violation was identified. Except as noted above, the area/program was adequately implemented.

7. Exit Interview (71701)

The inspection scope and findings were summarized on April 21, 1993, with those persons indicated in paragraph 1. The inspectors described the areas inspected and discussed in detail the inspection findings listed below and in the summary. Dissenting comments were not received from the licensee. The licensee did not identify as proprietary any of the materials provided to or reviewed by the inspectors during this inspection.

Item Number	Description/Reference Paragraph
93-07-01	VIO - Failure To Establish Adequate EDG Surveillance Test Procedures As Required By TS 4.6.1.1 (paragraph 6).

8. List of Acronyms and Initialisms

a.m.	Ante Meridiem
AMSAC	ATWS Mitigation System Actuation Circuitry
AO	Auxiliary Operator
APP	Annunciator Panel Procedure
ATWS	Anticipated Transient Without Scram
BAST	Boric Acid Storage Tank
CFR	Code of Federal Regulations
CVCS	Chemical And Volume Control System
EDG	Emergency Diesel Generator
EE	Engineering Evaluation
eV	Electron Volt
F	Fahrenheit
I & C	Instrumentation & Control
i.e.	That is
IN	Information Notice
IR	Inspection Report
KV	Kilovolt
KVA	Kilovolt-Ampere
KW	Kilowatt
LCO	Limiting Condition for Operation
LOCA	Loss of Coolant Accident
MCC	Motor Control Center
MOV	Motor Operated Valve
MST	Maintenance Surveillance Test
NRC	Nuclear Regulatory Commission
OST	Operations Surveillance Test
OT Delta T	Overtemperature Delta Temperature
p.m.	Post Meridiem
PI	Pressure Indicator
PM	Preventive Maintenance
psig	Pounds Per Square Inch - gauge
RPM	Revolutions Per Minute
RPS	Reactor Protection System
SI	Safety Injection
SP	Special Procedure
TM	Temporary Modification
TS	Technical Specification
UPS	Uninterruptible Power Supply
URI	Unresolved Item
V	Volt
VIO	Violation
WR/JO	Work Request/Job Order

Unresolved items are matters about which more information is required to determine whether they are acceptable or may involve violations or deviations.