



UNITED STATES
 NUCLEAR REGULATORY COMMISSION
 REGION II
 101 MARIETTA STREET, N.W., SUITE 2900
 ATLANTA, GEORGIA 30323-0199

Report No.: 50-261/93-33

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

Facility Name: H. B. Robinson Unit 2

Inspection Conducted: November 21 - December 25, 1993

Lead Inspector: *Paulle Stanford for* 1-20-94
 W. T. Orders, Senior Resident Inspector Date Signed

Other Inspector: *Paulle Stanford for* 1-20-94
 C. R. Ogle, Resident Inspector Date Signed

Approved by: *H. O. Christensen* 1/20/94
 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, engineered safety feature system walkdown, plant safety review committee activities, and followup.

Results:

One Violation was identified which involved a failure to take adequate corrective action for pressurizer pressure transmitters found out of tolerance, paragraph 4; a non-cited violation was identified which involved a failure to have a procedure to control a transfer canal pumpdown, paragraph 3.b; a Deviation was identified which involved the failure to install RHR pump suction pressure instrumentation as committed to in response to Generic Letter 88-17, paragraph 3.c; and an Inspector Followup Item was identified involving the need for verification of CV spray and turbine auto stop circuitry continuity following routine testing, paragraph 3.d.

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REPORT DETAILS

1. Persons Contacted

- *R. Barnett, Manager, Projects Management
- C. Baucom, Senior Specialist, Regulatory Compliance
- D. Bauer, Regulatory Compliance Coordinator, Regulatory Compliance
- J. Benjamin, Shift Outage Manager, Outages and Modifications
- S. Billings, Technical Aide, Regulatory Compliance
- B. Clark, Manager, Maintenance
- *T. Cleary, Manager, Technical Support
- D. Crook, Senior Specialist, Regulatory Compliance
- *C. Dietz, Vice President, Robinson Nuclear Project
- R. Downey, Shift Supervisor, Operations
- J. Eaddy, Manager, Environmental and Radiation Support
- S. Farmer, Manager, Engineering Programs, Technical Support
- B. Harward, Manager, Engineering Site Support, Nuclear Engineering Department
- *S. Hinnant, Director, Site Operations
- P. Jenny, Manager, Emergency Preparedness
- D. Knight, Shift Supervisor, Operations
- E. Lee, Shift Outage Manager, Outages and Modifications
- A. McCauley, Manager, Electrical Systems, Technical Support
- R. Moore, Manager, Operations
- D. Morrison, Shift Supervisor, Operations
- D. Nelson, Manager, Outage Management
- A. Padgett, Manager, Environmental and Radiation Control
- *M. Pearson, Plant General Manager
- D. Seagle, Shift Supervisor, Operations
- M. Scott, Manager, Reactor Systems, Technical Support
- E. Shoemaker, Manager, Mechanical Systems, Technical Support
- W. Stover, Shift Supervisor, 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 January 12, 1993.

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

2. Plant Status

The Unit began the report period in a forced outage which began on November 17, when a drain valve on the discharge of one of the main feedwater pumps was determined to be leaking. On November 20, 1994, a RII based Augmented Inspection Team reported to the site to investigate problems which had been identified with the Unit's restart from RF015. During that startup, a number of problems were identified involving operator performance, and fuel manufacturing errors. Details of that inspection are delineated in Inspection Report 50-261, 93-34. The Unit remained shutdown through the end of the report period performing

required maintenance on the diesel generators and implementing corrective actions to equipment and personnel deficiencies identified during the forced outage.

3. Operational Safety Verification (71707)

a. General

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.

b. SFP Draindown

At 5:15 a.m. on December 3, 1993, a SFP low level alarm was received in the control room. An AO dispatched to investigate reported that the SFP level was between 36 feet and 36 feet 2 inches, just below the nominal SFP low level alarm setpoint of 36 feet 2.5 inches. The AO observed that the SFP level was decreasing as a result of the transfer canal pump discharge hose siphoning SFP water back into the canal when the pump was secured. The hose was approximately 1 to 2 inches below the surface of the water. The siphon was broken by lifting the hose clear of the surface of the SFP and the transfer canal was subsequently pumped down to restore SFP level.

In response to the event, the Operations manager directed the cessation of SFP transfer canal pumping operations. An ACR was written and a team formed to review the event. As a result of the licensee investigation, the need for a procedure to govern the pumpdown of the SFP transfer was identified. The licensee committed to developing this procedure prior to February 1994.

The inspectors reviewed log entries associated with the event; interviewed the cognizant shift supervisor, system engineer, and the plant manager; and inspected the general arrangement of the pump discharge hose used to reduce the transfer canal water level. The inspectors also reviewed the evaluation completed in response to the ACR for the event.

Based on this effort, the inspectors determined that the siphoning occurred as a result of not removing the hose from the higher elevation SFP following the pumpdown of the transfer canal. This pumping was necessitated by weir gate leakage to the canal. No procedure existed to govern this evolution. Furthermore, licensee management was aware of this lack of procedural guidance prior to the SFP draindown.

While no TS violation occurred as a result of this level excursion, the inspectors did note that the placement of the hose had bypassed an anti-siphon hole in the SFP cooling water return line located at approximately 36 feet 5 inches. This feature is credited in a safety evaluation in the FSAR as providing protection against inadvertently siphoning the SFP.

The failure to perform the transfer canal pumpdown in accordance with a procedure is a violation of 10 CFR 50, Appendix B, Criterion V, Instructions, Procedures, and Drawings. This violation will not be subject to enforcement action because the licensee's efforts in identifying and correcting the violation meet the criteria specified in Section VII. B of the Enforcement Policy. This is identified as a non-cited violation, NCV 93-33-01: Failure to Proceduralize Transfer Canal Pumpdown.

c. Preparations For RCS Draindown

The inspectors reviewed preparations for reducing RCS water level to approximately 16 inches below the vessel flange to support vessel head reinstallation. This review was documented on a mid-loop/reduced inventory checklist and forwarded to Region II under separate cover on December 13, 1993. For this draindown, the vessel water level remained well above the reduced inventory setpoint of -36 inches. However, the checklist verifies items from Generic Letter 88-17 which minimize the potential for and consequences of a loss of decay heat removal with less than full vessel.

Overall, the inspectors noted that the licensee's preparations were good and in general, fulfilled the recommendations of GL 88-17. The inspectors did note that the draindown procedure used for this evolution, did not contain a precaution to minimize perturbations in RCS level when the vessel inventory was reduced. (This precaution was contained in the appropriate procedure for reduced inventory.) Following questions on this point by the inspectors, GP-009, Filling, Purification, and Draining of the Refueling Cavity was revised to include a precaution to this effect.

The inspectors also observed that the licensee's sensitivity to the plant's performance while in this condition was adequate. For example, a camera monitor was installed in the control room to provide a remote indication of the RCS water level as measured on the tygon tube standpipes. Though the camera monitor has been used in the auxiliary building in the past, its placement in the control room was a significant enhancement in the control room monitoring capability. Furthermore, a watchstander was dedicated to this monitor when the RCS was lower than 5 feet above the flange. The inspectors also observed that the responsible control room watchstanders were cognizant of the RCS water level and sensitive to variation between the indicators. These observations are considered strengths.

However, on December 16, 1993, the inspectors observed that all incore thermocouples displayed "bad" instead of the incore temperature. The inspectors were advised that this was the result of RCS temperature being reduced below the 80° F low end setpoint of the incore thermocouple system. This had been deliberately accomplished to ensure that the mismatch between the head and vessel temperatures was within procedural limitations.

The inspectors questioned the shift supervisor and the Engineering Technical Support staff on the prudence of intentionally disabling all incore temperature monitoring equipment. The inspectors were advised that RCS temperature was being raised to restore the temperature indication. On a subsequent tour of the control room on December 17, 1993, the inspectors observed that RCS temperature had been raised and that incore thermocouple indication had been restored. The inspectors were also advised that since RHR flow existed through the core, alternate indications of core temperature conditions existed. Furthermore, the inspectors were informed that in the event core cooling was lost, core temperatures would rise and upon exceeding 80° F, the thermocouple indication would be restored. The inspectors determined from interviews of Engineering Technical Support personnel that alternatives to reducing RCS temperature below 80° F and subsequently disabling the incore thermocouples may have existed. For example, the head could have been permitted to warm up after placement on the vessel. Alternatively, the incore thermocouple temperature could have been determined using measuring and test equipment. The inspectors concluded that the licensee's

temporarily disabling incore thermocouple temperature indication with a reduced RCS water level was a Weakness.

In reviewing the licensee's written response to Generic Letter 88-17, Serial NLS 89-024 dated February 1, 1989, the inspectors noted that the licensee committed to the installation of a "suction pressure indicator and associated low pressure alarm [on] the RTGB for each RHR pump." No such features exist. RHR indication on the RTGB consists of: RHR total flow, pump discharge pressures, and temperatures of pump and heat exchanger discharges. Alarms are provided for low RHR pump cooling water flows, high and low RHR pump discharge pressures, RHR heat exchanger low flows, and RHR pump motor overload/trip. In response to the inspectors' questions on why this commitment was not satisfied, the inspectors were provided extracts Modification 1011, Instrumentation for Mid-loop Operation. This information documented the licensee's evaluation and subsequent installation of RHR pump discharge pressure instruments and alarms in lieu of the suction pressure instrumentation. This is identified as a deviation, DEV 93-33-02, Failure to Install RHR Pump Suction Pressure Instrumentation as Committed To In Response To Generic Letter 88-17.

d. ESFAS/RPS Logic Testing

On December 20, 1993, in response to NRC Information Notice 93-38, Inadequate Testing of Engineered Safety Features Actuation Systems, the licensee determined that routine testing performed on the CV spray system was deficient. Specifically, Maintenance Surveillance Test Procedures, MST-016: Containment Pressure Protection Channel (SET I, II, and III) Testing (Bi-Weekly); MST-022: Safeguard Relay Rack Train "A" (Monthly); and MST-023: Safeguard Relay Rack Train "B" (Monthly) were all found deficient, in that, following testing the actuation circuit continuity was not completely verified. The CV spray system is designed such that the actuation relays are normally de-energized. On a high-high containment pressure condition, the containment spray logic matrix operates to energize the CV spray actuation relays. The licensee determined that no continuity checks were performed on test switches in series with the input relay coil or the bistable outputs upon their restoration to the normal position at the end of the surveillances. The failure to establish this continuity could interrupt a valid actuation signal and hence, render the circuit inoperable.

Subsequently, the licensee also determined that similar deficiencies existed in routine testing performed to verify proper operation of the turbine auto stop circuitry (reactor trip coincident with turbine trip if greater than P-7 interlock).

In response to these discoveries, the licensee stated that they satisfactorily conducted testing to verify the continuity of these circuits. Furthermore, the licensee was evaluating the need to

modify existing testing for these circuits. Pending the resolution of these reviews this item will be tracked as an inspector follow-up item, IFI 93-33-03: Need For Verification Of CV Spray And Turbine Auto Stop Circuitry Continuity Following Routine Testing.

The inspectors reviewed the operation of the CV spray and auto stop circuits with the system engineer. Additionally, the inspectors reviewed portions of the WR/JO used to document the testing performed after the discovery of the MST deficiencies. Other than the IFI identified above, the inspectors have no further questions.

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

4. Maintenance Observation (62703)

a. General

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

SP-1280	Cycle 16 Fuel Assembly Inspection (Video Review)
WR/JO 93-APAH1	Install New Air Start Distributor On B EDG
WR/JO 93-AKXD1	Replace Pressurizer Transmitter PT-457
WR/JO 93-APAH1	Install New Air Start Distributor On B EDG

b. Fuel Assembly Inspection

On December 10, 1993, the inspectors reviewed a videotape taken during the performance of Special Procedure, SP-1280, Cycle 16 Fuel Assembly Inspection. This special procedure was accomplished to verify the position of gadolinium bearing fuel elements in assemblies X-43 and X-39. As a result of this special procedure, the licensee concluded that the gadolinium bearing fuel elements were properly positioned in these assemblies. Based upon the inspectors comparisons of fuel element serial numbers recorded on the videotape and on fuel assembly bundle maps, the inspectors concurred with this conclusion. The inspectors have no further questions on this special procedure.

c. EDG Air Start Distributor Maintenance

On December 20, 1993, in response to concerns raised by the licensee during the root cause analysis of B EDG start failures, the air start distributor for that engine was replaced. During the installation of the new distributor, while torquing the drive shaft nut to the 185 ft - lbs of torque specified in the assembly procedure, the camshaft threads failed. Following procurement of a new camshaft, the air distributor was successfully installed on December 22, 1993.

The engine was successfully operated in accordance with OST-401, Emergency Diesels (Slow Speed Start), on December 21, 1993. (A subsequent failure to start, however, was observed for the engine on December 26, 1993.)

The inspectors witnessed portions of the air start distributor maintenance performed on December 20 and 21, 1993. Overall, the inspectors noted that the maintenance was well performed and the work was accomplished in accordance with appropriate procedures. Maintenance supervisory participation was also evident.

Though not in attendance for the camshaft thread stripping, the inspectors concluded from their review of maintenance documentation and interviews of cognizant personnel that the threads were overtorqued as a result of erroneous torque valves provided by the vendor. The torque valves for this nut provided by the manufacturer have ranged as high as 480 ft-lbs. In fact, while attempting to achieve 480 ft-lbs of torque on November 24, 1993, a failure of the air start cam was incurred. The licensee has revised Corrective Maintenance Procedure, CM-627, Emergency Diesel Generator Air Start System Maintenance, to reflect a required torque of 55 ft-lbs. This revision was based on a written recommendation received from the vendor. The inspectors reviewed the vendor's letter specifying the revised torque and the licensee's review performed to change CM-627. The inspectors have no further questions on this maintenance.

c. Pressurizer Pressure Transmitter Calibration/Replacement

On November 30, 1993, the licensee determined through a special calibration, that pressurizer pressure transmitters PT-455 and PT-457 were out of tolerance. These instruments provide pressure inputs for the low pressure reactor trip, high pressure reactor trip, and safety injection initiation. Both instruments experienced a maximum drift of 0.017 mV resulting in both instruments reading at worst approximately 3.4 psig too high. In response to this out of tolerance condition the licensee replaced the two transmitters. Additionally, the licensee performed an analysis of the out of tolerance condition and concluded that no violation of TS resulted.

The inspectors reviewed the instrument calibration data sheets and work packages associated with this event as well as the licensee's evaluation of the as found calibration data. Additionally, on December 14, 1993, the inspectors witnessed the replacement of PT-457 in accordance with WR/JO 93-AKXD1. The inspectors have no further questions on this documentation. The inspectors concurred that no violation of TS occurred.

Inspection Report 93-28 discussed a series of calibrations performed on PT-455, PT-456, and PT-457 during RFO-15. That report outlines instrument adjustments of PT-455, PT-456, and PT-457 on October 15, 1993, following drift outside allowed tolerance just 2 days after the instruments had been calibrated on October 13, 1993. Transmitter PT-456 was also found out of tolerance on October 15, 1993, however, on November 30, 1993, it was within calibration tolerances.

10 CFR 50, Appendix B, Criterion XVI, Corrective Action, requires that measures be established to assure that the cause of conditions adverse to quality be determined and corrective action taken to preclude repetition. Contrary to the above, on November 30, 1993, the licensee determined that pressurizer pressure transmitters PT-455 and PT-457 had drifted out of calibration tolerance. The licensee's corrective action to a similar occurrence of these instruments drifting out of tolerance between October 13 and October 15, 1993, failed to prevent this event. This is identified as a violation, VIO 93-33-04: Failure To Take Adequate Corrective Action For Pressurizer Pressure Transmitters Found Out Of Tolerance.

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

5. 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 and tagouts were obtained prior to test initiation, testing was accomplished by qualified personnel in accordance with an approved test procedure, 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-401

Emergency Diesels (Slow Speed Start) (EDG B Only)

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

6. Fire Protection/Prevention Program (64704)

The inspectors toured the plant routinely throughout the report period. During those tours, the fire protection features of the following areas were inspected:

- Diesel Generator "A" Room
- Diesel Generator "B" Room
- Safety Injection Pump Room
- Auxiliary Building First and Second Level Hallways
- Emergency Switchgear Room
- Component Cooling Pump Room
- Turbine Building

The manual fire fighting equipment, automatic fire detection systems, and fire area/fire zone boundary walls, floors, and ceilings associated with the above plant areas were inspected and verified to be in service or functional. Based on these observations, it was concluded that the fire protection features associated with these areas were being adequately maintained.

During this inspection period, the inspectors did not witness any instances of inadequate implementation of fire prevention administrative procedures, such as the posting of fire watches, there have been a number of cases during the last 6 months in which a fire watch left his watch station before being relieved. This is considered a weakness in the licensee's implementation of the fire protection/prevention program and the instances were identified in Inspection Reports 50-261/93-19 and 50-261/93-21 as Non-cited Violations.

The licensee's implementation of housekeeping procedures were reviewed during the inspectors' tours. Other than minor discrepancies which were identified to the licensee and immediately resolved, the licensee's control of combustibles and flammable materials, liquids and gases, as well as general housekeeping were found to be adequate.

The inspectors visually verified the proper alignment of the sectional control valves in the main fire protection water supply system.

Except as noted above, the licensee's fire protection/prevention program appeared to be adequately implemented.

7. Followup (92700, 92701, 90702)

(Closed) Unresolved Item 93-19-06, Adequacy of Control Room Ventilation System Surveillance Testing

Unresolved item, URI 93-19-06, documented that testing accomplished by OST-163 and OST-924 failed to fully comply with the requirements of TS 4.15.f.3. This TS requires verification that on a SI test signal or high radiation test signal the control room ventilation system switches into the emergency pressurization mode with flow through the ACU. Instead, both OSTs merely check for proper alignment of dampers and starting of fans in the system. In response to the URI, the licensee stated that OST-750, Control Room Emergency Ventilation System, Biweekly, verified flow through the ACU while in the emergency pressurization mode on a biweekly basis. The licensee stated that the flow data obtained from OST-750 on a biweekly basis in combination with the observations of OST-163 and OST-924 provided sufficient evidence to satisfy the requirements of TS 4.15.f.3. However, the licensee also committed to modifying OST-163 and OST-924 to require the verification of air flow through the ACU so that each OST can satisfy TS independently. URI 93-19-06 is considered closed.

8. Exit Interview (71701)

The inspection scope and findings were summarized on January 12, 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. The following items were identified and reviewed during this inspection period:

<u>Item Number</u>	<u>Description/Reference Paragraph</u>
NCV 93-33-01	Failure to Proceduralize Transfer Canal Pumpdown.
DEV 93-33-02	Failure to Install RHR Pump Suction Pressure Instrumentation as Committed To In Response To Generic Letter 88-17.
IFI 93-33-03	Need For Verification Of CV Spray And Turbine Auto Stop Circuitry Continuity Following Routine Testing.
VIO 93-33-04	Failure To Take Adequate Corrective Action For Pressurizer Pressure Transmitters Found Out Of Tolerance.

9. List of Acronyms and Initialisms

ACR	Adverse Condition Report
ACU	Air Cleaning Unit
AO	Auxiliary Operator

CFR	Code of Federal Regulation
CM	Corrective Maintenance
CV	Containment Vessel
DEV	Deviation
EDG	Emergency Diesel Generator
FSAR	Final Safety Analysis Report
GL	Generic Letter
GP	General Procedure
IFI	Inspection Followup Item
LCO	Limiting Condition for Operation
MST	Maintenance Surveillance Test
Mv	Milli-volt
NCV	Non-cited Violation
NRC	Nuclear Regulatory Commission
OST	Operations Surveillance Test
psig	Pounds Per Square Inch Gauge
RCS	Reactor Coolant System
RHR	Residual Heat Removal
RTGB	Reactor Turbine Gauge Board
SFP	Spent Fuel Pit
SI	Safety Injection
SP	Special Procedure
TS	Technical Specification
URI	Unresolved Item
VIO	Violation
WR/JO	Work Request/Job Order