



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

Report No.: 50-261/90-12

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: May 11 - June 10, 1990

Lead Inspector:

H. C. Dance / L. W. Garner
L. W. Garner, Senior Resident Inspector

7/2/90
Date Signed

Other Inspectors:

K. R. Jury
R. E. Carroll, Jr.

Approved by:

H. C. Dance
H. C. Dance, Section Chief
Reactor Projects Branch 1
Division of Reactor Projects

7/2/90
Date Signed

SUMMARY

Scope:

This routine, announced inspection was conducted in the areas of operational safety verification, monthly surveillance observation, maintenance observation, Engineered Safety Feature system walkdown, onsite followup of events, onsite review committee, and onsite followup of written reports of nonroutine events.

Results:

The Plant Nuclear Safety Committee review of a proposed volume control tank drain line temporary repair thoroughly addressed the safety implications of potential problems which could occur during, and as a result of, the temporary repair (paragraph 8).

Management oversight of control room activities was evident during unit restarts on May 14 and 20, 1990 (paragraph 2).

All safety-related systems performed as expected during a reactor trip on May 17, 1990. Subsequent investigation and corrective actions were appropriate (paragraphs 4 and 6).

Material condition and housekeeping concerns were identified in areas not frequented by management (paragraphs 2 and 5).

A fire barrier penetration inspection identified an instance of where a previously documented inspection was not appropriately conducted (paragraph 6).

REPORT DETAILS

1. Persons Contacted

- R. Barnett, Manager, Outage Management
- C. Baucom, Senior Specialist, Regulatory Compliance
- C. Bethea, Manager, Training
- R. Cady, Engineer, Technical Support
- R. Chambers, Engineering Supervisor, Plant Performance
- D. Crook, Senior Specialist, Regulatory Compliance
- J. Curley, Manager, Environmental and Radiation Control
- *C. Dietz, Manager, Robinson Nuclear Project
- D. Dixon, Manager, Control and Administration
- R. Femal, Shift Foreman, Operations
- S. Griggs, Technical Aide, Regulatory Compliance
- *E. Harris, Manager, Onsite Nuclear Safety
- C. Jones, Engineer, Onsite Nuclear Engineering Department
- *J. Kloosterman, Director, Regulatory Compliance
- D. Knight, Shift Foreman, Operations
- E. Lee, Shift Outage Manager, Outage Management
- R. Moore, Shift Foreman, Operations
- *R. Morgan, Plant General Manager
- M. Page, Manager, Technical Support
- *R. Powell, Supervisor, Technical Support
- D. Quick, Manager, Plant Support
- *E. Roper, Fire Protection Specialist
- D. Seagle, Shift Foreman, Operations
- J. Sheppard, Manager, Operations
- E. Shoemaker, Project Engineer, Operations Programs
- *R. Smith, Manager, Maintenance
- R. Steele, Shift Foreman, Operations
- *H. Young, Director, Quality Assurance/Quality Control

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

*Attended exit interview on June 25, 1990.

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

2. 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-process 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 continued to be effective.

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.

During an "at power" partial tour of the CV on June 6, 1990, the inspectors noted small pieces of miscellaneous trash and debris within the CV. As this concern regarding debris and material condition (see paragraph 5 for additional details) has been on-going, the licensee has initiated a review by the Plant Support Section to examine possible enhancements in housekeeping/material condition reporting. This review is scheduled for completion by July 31, 1990. Additionally, the licensee performed a housekeeping tour on June 16 to improve the CV's condition.

On May 14 and May 20, 1990, the inspectors observed restart activities up to and including generator synchronization onto the grid. During these evolutions, shift communications and control were formal and well executed. Response to emergent problems was good; monitoring of intermediate range channel NI-36 (which was experiencing a loss of detector sensitivity at low flux levels) was appropriate. Both restarts were observed by the Operations Manager.

No violations or deviations were identified.

3. Monthly 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, 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-101 (revision 14)	Chemical and Volume Control System Component Test
OST-401 (revision 25)	Emergency Diesels (Bi-weekly Slow Speed Start)

No violations or deviations were identified.

4. Monthly 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, 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:

WR/J0 89-ALJP1	Repair Flange Leak on Boric Acid Transfer Pump Suction Valve (CVC-345)
WR/J0 90-AAPF1	Repair Bonnet Leak on Boric Acid Pump Minimum Flow Valve (CVC-344)
MST-007 (revision 8)	Reactor Coolant Low-Temperature Protection System Test Over Pressure
MST-552 (revision 7)	Turbine Redundant Overspeed Trip System Test
MST-451 (revision 6)	Level Channels 182, 183, 603, 604, 605, and 948

The above MSTs were witnessed by an inspector from the MTI the week of June 4, 1990. MSTs-007 and 552 were conducted satisfactorily with no discrepancies identified. During conduct of MST-451, a procedural discrepancy and equipment identification concerns were identified. (See IR 90-10 for details.)

During repair of CVC-344 on June 8, 1990, it appeared that the valve did not have a faulty diaphragm as originally suspected. The inspector was informed that the cause of the leak was due to the valve evidently being loose at the body to bonnet connection (i.e., stud nuts were loose). This item is important, in that, this loose connection was not captured on the WR; thus inhibiting root cause analysis should this valve exhibit a similar failure in the future. The AMMS data base which is utilized as the foundation of the repetitive failure program should contain all pertinent problem identification and cause information to be most effectively implemented.

Feedwater Regulating Valve (FCV-488) Failure

Subsequent to the reactor trip discussed in paragraph 6, the licensee conducted an investigation into the cause of the trip, as well as implementing corrective actions. The following is a description of the investigation, actions taken, and conclusions (per EONCR TS-90-024).

Disassembly of the valve revealed that the split pin locking the stem to the plug had sheared, letting the stem back out of the plug. Inspection of the stem showed the first four threads to be badly galled and uneven seating on the tapered seat. As a result, the remaining two FRVs, FCV-478 and FCV-498, were disassembled to determine if the same conditions existed as were found on FCV-488.

It was determined in a telephone conversation with the Copes-Vulcan Representative that they recommend a stem to plug torque of 100 ft-lbs; however, this value was never incorporated into Plant Maintenance Procedure CM-107, Main Feedwater Regulating Valve Maintenance, revision 1. As a result, while checking the torque on FCV-478 and 498, FCV-478 was found to have at least 100 ft-lbs torque and FCV-498 had slightly less than the required torque. Exact existing torque values are unknown.

Close inspection of the split pin for FCV-488 indicated that one end had been sheared; however, the other end did not show any such signs. This indicated that the pin was not fully engaged through the stem and both sides of the plug shoulder. The pins removed from FCV-478 and 498 showed slight signs of erosion/corrosion between the stem and plug. This was not as pronounced on the pin removed from FCV-488; however, there was some pitting observed on the shaft of the pin.

The following actions were taken:

- o Copes-Vulcan split pin, Part No. 96342, was drawn from the stockroom and found to be 3/16" in diameter and 1-1/4" long. This pin was 1/4" too short for full engagement of both the stem and plug shoulder. A rolled pin from stock 3/16" in diameter and 1-1/2" long was selected as an acceptable substitute and utilized in lieu of the Copes-Vulcan pin.

- Copes-Vulcan was contacted in regard to the over torque on FCV-478 and replied that excessive stem to plug assembly torque is not detrimental if it has not created a failure during assembly. The valve was reassembled in accordance with CM-107, utilizing a rolled pin with full stem and plug engagement.
- FCV-488 was fitted with a new stem from the stock room, stem to plug torqued to 100 ft-lbs, a rolled pin with full stem and plug engagement installed, and the valve reassembled in accordance with CM-107.
- As FCV-498 was under torqued, a new stem was ordered from Copes-Vulcan, installed, torqued to 100 ft-lbs, a rolled pin with full stem and plug engagement installed, and the valve reassembled in accordance with CM-107.

The inspectors concluded that the licensee's investigation and corrective actions taken were comprehensive. CM-107, revision 2 (June 15, 1990) was reviewed, and it appeared that all measures necessary to preclude recurrence of inadequate stem torquing were incorporated into the procedure.

Service Water Pump Motor Oil Foaming

During February 1990, it was identified that the B SW pump motor oil level was evidently below normal. Upon investigation, it was discovered that the oil was foaming; once the foam was "broken-up", oil level returned to normal. In May 1990, a WR (90-AFZR1) was initiated to replace the oil, as phosphorous contamination was the suspected cause of the foaming. After-oil sample analysis by three separate laboratories (two Texaco labs and the Harris E&E center), the cause of the foaming could not be conclusively determined.

The licensee continued to monitor oil level, looking for possible adverse effects from the foaming and its cause. On June 5, 1990, the licensee again discussed the foaming situation with Texaco, and concluded that the source of contamination was contained in the oil reservoir. Cause of the contamination still could not be determined. On June 6, 1990, the motor oil was flushed several times (per WR 90-AHDY1), with samples from the flushed oil being analyzed. At the end of the report period, the foaming condition had not recurred, and it is suspected that the contamination was an isolated case (e.g., dirty oil can). The licensee is continuing to monitor the situation for recurrence, as well as, for occurrence in any of the three other SW pumps. Additionally, the licensee initiated EONCR TS-90-030 to document the concern and to further evaluate the possible root cause.

No violations or deviations were identified.

5. ESF System Walkdown (71710)

The inspectors performed a walkdown of selected RHR components and piping inside the CV, in conjunction with a complete walkdown performed by the Maintenance Team Inspection. Problems were noted with material condition of valves RHR-751 (corrosion on packing nuts) and the RHR pumps (excessive boric acid build-up). Valve RHR-744A was identified as having an actuator oil leak. Various other housekeeping/material condition concerns were identified in the RHR pit and RHR HX room, as well, as the CV (see paragraph 2). These areas are not routinely toured by management. IR 90-10 will detail the results of the RHR walkdown and the housekeeping/material condition concerns identified.

No violations or deviations were identified.

6. Onsite Followup of Events (93702)

On May 17, 1990, at 6:06 a.m., the reactor experienced a B S/G low water level coincident with steam/feedwater flow deviation trip from 100% full power. All safety-related systems performed as expected. During routine rounds (shortly before the trip), the shift foreman noticed that FRV B, FCV-488, was indicating further open than the other two FRVs (approximately 90 percent versus 75 percent). While investigating this condition, the unit tripped; FCV-488 did not indicate full closure. Subsequent investigation revealed that the FCV-488 disk had unscrewed (to some degree) from its stem. The root cause determination, inspection of the A and C FRVs, and repair activities are discussed in paragraph 4. The inspectors reviewed the draft OMM-010 post trip report. Due to the previous issues involving AFW (see IR 89-18 and 89-20), special emphasis was placed on verifying that there were no observable AFW system performance anomalies. Both the licensee and the inspectors determined that based on ERFIS data, the AFW system had performed as designed. The unit was returned to service on May 20, 1990.

Fire Barrier Penetration Inspection

During a TS required 100 percent inspection of fire barrier penetrations, an internal conduit seal for penetration EP-2247.22-FL-07 was found to be degraded. The specific conduit's (2247.38) seal was not in the penetration data base; however, it was identified on the penetration drawing. Upon review of this discrepancy, it was determined that this penetration had been previously inspected and was signed off as being acceptable for both sides of the penetration. Through interviews the licensee confirmed that the individual had not actually inspected both sides of the penetration. As a result, a selected portion of the work was reinspected on a sample basis per OQA-402, Rev.3, Receipt Inspection. This sample encompassed approximately 98 items (approximately 12.5 percent) of the inspector's previous work. No items were found inoperable nor were major items of concern identified. The licensee concluded that based on

interviews, the sample inspection conducted, and the circumstances surrounding the penetration in question, this was an isolated occurrence. The licensee's corrective actions were expeditious and the penetration inspection program is designed to identify any further potential discrepancies during the verification process.

7. Onsite Followup of Written Reports on Nonroutine Events (92700)

(Closed) LER 88-05, Inadvertent Safety Injection On High Steam Line Differential Pressure During Maintenance Testing. On February 12, 1988, with the unit in cold shutdown, an SI occurred when the high steam line differential pressure signal was automatically unblocked while simulating normal pressurizer pressure for the performance of MST-011 (revision 12), Reactor Protection Logic Train "A" and "B" at "0" Power Safeguard Relay Rack Train "A" and "B". All safeguards trains and equipment responded as designed; however, the A EDG tripped on apparent overspeed. The inspector verified that the MST has been appropriately revised to direct the use of SPP-013, Hagan Rack Simulations to Perform MSTs at "0" Power, to ensure potential SI initiating signals are blocked or disabled prior to simulating pressurizer pressure above 2000 psig. Since the trip of the A EDG is encompassed by the NRC's review of the licensee's EDG reliability improvement program (addressed in CP&L's May 28, 1988, response to related concerns in Inspection Report 88-04), this LER is considered closed.

(Closed) LER 88-06, Diesel Generator Fuel Oil Storage Capacity Load Profile Discrepancy. Both the TS and FSAR reflected the availability of 25,000 gallons of diesel fuel oil; the TS basis indicated a sufficient supply for one diesel carrying "minimum safety features" load for seven days, and the FSAR indicated a sufficient supply for one diesel carrying "full load" for seven days. Results from detailed calculations to resolve this discrepancy revealed that 35,000 gallons was only marginally sufficient to support one diesel carrying "minimum safety features" load for seven days, as fuel consumption is highly dependent on selective load shedding. In addition, the calculations showed that the seven day supply for one diesel carrying "full load" is approximately 30,430 gallons. The licensee's review of records indicated that this capacity had been maintained onsite for the operating history of the plant. The inspector verified that TS 3.7.1.d, its associated basis, and FSAR section 8.3.1.5.1, have been changed (i.e., TS Amendment No.124 and FSAR Amendment No.8) to reflect a minimum of 34,000 gallons of fuel oil is maintained onsite to ensure the operation of one diesel at "full load" for seven days.

(Closed) LER 88-09, Reactor Power Exceeding TS Limit Due To Plant Transient. On April 22, 1988, while attempting to adjust turbine load, an E-H control system transient occurred which resulted in an increase in reactor power from 60 percent to 64.5 percent. At the time, H.B. Robinson was limited by TS to 60 percent power as only one SI pump could be assumed available due to single failure considerations. Since analysis conducted subsequent to this event revealed that one SI pump is sufficient for operation at 100

percent power, the inspector determined that this event had minimal safety significance. An E-H relay card in the governor valve position limiter circuitry was found to be faulty and was replaced. The inspector reviewed the corrective actions for this event in conjunction with those for a similar event reported in LER 88-10, and had no further concerns.

(Closed) LER 88-10, Automatic Reactor Trip Due To Turbine Trip on Governor Valves Closure. On May 2, 1988, during attempts to adjust turbine load swings, an E-H control system malfunction resulted in a turbine trip/reactor trip from 60 percent power. The trip was attributed to a failed clock circuit and loose connection in the governor valve position limiter circuitry. Repairs were implemented and the full system test conducted by the manufacturer's technical representative to ensure repair effectiveness, was considered appropriate.

(Closed) LER 88-14, Failure To Meet TS Minimum Degree of Redundancy. On June 24, 1988, monthly maintenance surveillance testing revealed that a lo-lo S/G water level channel associated with S/G A had failed non-conservatively. Upon discovery, the channel was placed in the tripped mode, restoring the TS required minimum degree of redundancy. The channel failure was due to a faulted capacitor (#C-2; 50 MFD, 50 VDC) in the comparator power supply. Due to the nature of the failure, performance of the MST is the only detection method. Although the capacitor appeared to have failed through normal wear, this failure was captured for trending purposes. Failure trends of #C-2 and #C-3 comparator capacitors in the 7100 series Haygon process equipment (i.e., Reactor Protection and Safeguards related level, flow, temperature, and pressure power supply comparators) prompted the licensee to replace the respective capacitors during the August 1989 AFW outage. The inspector confirmed that the licensee: (1) utilized the improved capacitor (47 MFD, 75 VDC) specified in Westinghouse Technical Bulletin 75-14, Undesirable Failure Rates of Capacitors in 7100 Series Equipment, during this replacement effort, and (2) presently meets the other recommendations of the Technical Bulletin.

(Closed) LER 88-21, Plant Shutdown Due To Loss Of Containment Vessel Integrity. On September 22, 1988, both inner (V12-9) and outer (V12-8) CV purge exhaust valves were determined to be leaking due to debris on the valves' seating surfaces. The unit was subsequently shutdown, as the debris had caused significant damage to the valves' seats and seal rings. The licensee determined that earlier high pressure cleaning on the fan side of the four CV HVH units blew small pieces of debris into the downstream CV ventilation duct work, and ultimately to the low point of the purge system (i.e., the two purge exhaust valves). Aside from the duct work and associated component system inspections that were conducted prior to unit restart, the inspector verified that the ventilation ring header (i.e., purge suction) was inspected as committed to during the November 1988 refueling outage. In addition, the inspector also confirmed that: (1) the Tefzel seal rings were replaced again during the August 1989 AFW

outage with more resilient EPR seal rings and (2) Section 8.2.2 of OP-921, Placing Containment Purge Fans HVE-1A & 1B In Service For Refueling, was revised to require cleaning of the CV purge valves' sealing surfaces. These latter actions should assure improved system reliability.

(Closed) LER 88-27, Technical Specification Violation During Refueling. During a suspension of control rod unlatching on November 25, 1988, it was discovered that the requirement of TS 3.8.1.g (direct communication between the control room and the refueling cavity manipulator crane whenever changes in core geometry are taking place) had not been met. The shift foreman responsible for the refueling operation did not consider control rod unlatching a change in core geometry. As a result, he did not ensure that all the refueling preparations checklists required by GP-010, Refueling, were completed prior to the unlatching evolution. As the reactor cavity was flooded with water borated to refueling shutdown concentration, the effects of this event are considered insignificant. The inspector verified that GP-010 was revised to preclude recurrence.

No violations or deviations were identified.

8. Onsite Review Committee (40500)

The inspectors evaluated certain activities of the PNSC to determine whether the onsite review functions were conducted in accordance with TS and other regulatory requirements. In particular, the inspectors attended the PNSC restart readiness review Meetings on May 14 and 20, 1990. The inspectors verified that the PNSC reviewed and concurred in the actions taken or planned to be taken to address safety-related issues or potentially important to safety issues prior to restart.

The review of the proposed VCT drain line temporary repair was especially noteworthy. The review thoroughly addressed the safety significance of, and plant response to, potential problems which could conceivably occur during and as a result of the temporary repair. It was ascertained that provisions of the TS dealing with membership, review process, frequency, and qualifications were satisfied. Previous meeting minutes were reviewed to confirm that decisions and recommendations were accurately reflected in the minutes. The inspectors also followed up on selected previously identified PNSC activities to independently confirm that corrective actions were progressing satisfactorily.

No violations or deviations were identified.

9. Exit Interview (30703)

The inspection scope and findings were summarized on June 25, 1990, with those persons indicated in paragraph 1. The inspectors described the areas inspected and discussed in detail the inspection findings. Dissenting comments were not received from the licensee. Proprietary information is not contained in this report.

10. List of Acronyms and Initialisms

AFW	Auxiliary Feedwater
AMMS	Automated Maintenance Management System
CM	Corrective Maintenance
CV	Containment Vessel
CVC	Chemical and Volume Control
DCN	Design Change Notice
EDG	Emergency Diesel Generator
EONCR	Engineering Off-Normal Condition Report
ERFIS	Emergency Response Facility Information System
ESF	Engineered Safety Feature
FCV	Flow Control Valve
FRV	Feedwater Regulating Valve
GP	General Procedure
HBR	H. B. Robinson
HVH	Heating Ventilation Handling
HX	Heat Exchanger
IR	Inspection Report
LCO	Limiting Condition for Operation
LER	Licensee Event Report
MST	Maintenance Surveillance Test
MTI	Maintenance Team Inspection
NRC	Nuclear Regulatory Commission
OMM	Operations Management Manual
OST	Operations Surveillance Test
PNSC	Plant Nuclear Safety Committee
REV	Revision
RHR	Residual Heat Removal
SCR	Significant Condition Report
S/G	Steam Generator
SI	Safety Injection
SW	Service Water
TS	Technical Specification
VCT	Volume Control Tank
VDC	Volts Direct Current
W/R	Work Request
WR/JO	Work Request Job Order