



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

Report No.: 50-261/90-14

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: June 11 - July 10, 1990

Lead Inspector:

Robert E. Carroll for
L. W. Garner, Senior Resident Inspector

8/2/90
Date Signed

Other Inspector(s): K. R. Jury

Approved by:

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

Date Signed

SUMMARY

Scope:

This routine, announced inspection was conducted in the areas of operational safety verification, monthly surveillance observation, self-assessment capability, pressurized water reactor moderator dilution (TI 2515/94), outage preparations, onsite followup of written reports of nonroutine events, onsite followup of events at operating reactors, licensee quality assurance (QA) program implementation, and action on previous inspection findings.

Results:

Management tours and observations of routine work activities in the control room and the auxiliary building have been infrequent (paragraph 2).

The licensee determined that the service water booster pump cables do not meet plant design separation criteria; however, this deficiency has minor safety significance and will be corrected during refueling outage 13 (paragraph 2).

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An apparently inordinate delay in masonry wall issues followup and corrective actions parallels the root cause of the auxiliary feedwater (AFW) net positive suction head (NPSH) issue. Corrective actions resulting from the AFW NPSH issue should be sufficient to preclude recurrence (paragraph 8).

A potential move of the quality control (QC) function into the line organization resulted in a significant decline in the number of field reports and nonconformance reports issued by QA/QC during May (paragraph 4).

Modification package approvals and procurement of required outage parts are a significant challenge prior to refueling outage 13 (paragraph 7).

REPORT DETAILS

1. Persons Contacted

R. Barnett, Manager, Outage Management
*C. Baucom, Senior Specialist, Regulatory Compliance
C. Bethea, Manager, Training
*W. Biggs, Manager/NED Site Unit
*S. Billings, Technical Aide, Regulatory Compliance
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
*J. Eaddy, Supervisor, E & RC Support
R. Femal, Shift Foreman, Operations
*E. Harris, Manager, Onsite Nuclear Safety
*C. Jones, NED Onsite/Senior Civil Engineer
*J. Kloosterman, Director, Regulatory Compliance
D. Knight, Shift Foreman, Operations
E. Lee, Shift Outage Manager, Outage Management
A. McCauley, Principal Engineer, Onsite Nuclear Safety
R. Moore, Shift Foreman, Operations
*R. Morgan, Plant General Manager
*M. Page, Manager, Technical Support
D. Quick, Manager, Plant Support
D. Seagle, Shift Foreman, Operations
*J. Sheppard, Manager, Operations
R. Smith, Manager, Maintenance
R. Steele, Shift Foreman, Operations
D. Winters, 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 July 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 informal, yet 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.

Management Tours

The inspectors reviewed the amount of time selected managers were present in the control room and auxiliary building for a period spanning forty days beginning June 5, 1990. During this interval, the Site, General, Operations, Maintenance, and Technical Support Managers were present in the control room 2.0 hrs., 1.9 hrs., 2.7 hrs., 0.3 hrs., and 0.6 hrs., respectively. These five managers were present in the auxiliary building for a total of 1.6 hours. The inspectors discussed with management the apparent lack of routine management tours and routine work activity observations. The lack of management involvement in maintenance activities was previously identified by the MTI.

SW Booster Pump Separation Problem

On June 12, 1990, the licensee reported (per 10 CFR 50.72) a condition that was outside the design basis of the plant. During design validation, the low power control cables for the by-passing of the low pressure starting interlocks of the SW booster pumps during an SI, were determined to be routed with other low power control cables of the redundant SW booster pump. This condition was addressed by EE 90-053, SW Booster Pump Control Cable Separation. The inspectors reviewed the EE and expressed concern with the lack of detail regarding the potential impact of other raceway cable faults on the SW booster pump control cables. The licensee indicated that the other raceway cables are most

likely all low voltage control cables (based on applicable drawings and successful field validation results of other drawings previously field validated) and as such, the EE addressed the concern. The inspectors agree that if all the raceway cables are low voltage control cables, there is minor safety significance associated with this separation issue. This separation problem will be corrected during refueling outage 13.

The inspectors are concerned about the licensee's practice of using an EE which determines that a condition has minor safety significance and low probability, to determine operability. In this instance, the licensee potentially should have requested a temporary waiver of compliance from the TS. This concern should be resolved, however, when the licensee implements their formalized operability determination procedure which is scheduled for completion prior to the end of refueling outage 13. Implementation of this procedure is in response to AFW NPSH issues. The adequacy of this procedure is an IFI: Assure Operability Determination Procedure Adequacy, 90-14-01.

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:

MST-004 (revision 9)	Pressurizer Pressure Protection Channel Testing
MST-005 (revision 8)	Pressurizer Water Level Protection Channel Testing

No violations or deviations were identified.

4. Self-Assessment Capability (40500)

During a review of the May 1990 QA/QC PNSC Report, the inspectors noted a significant decrease in the number of NCRs and FRs issued during the month. There was an average of 23 FRs and 2 NCRs generated per month by QA/QC during February, March, and April 1990, as compared to 8 FRs and 0 NCRs during May.

After discussions with QA and site management it was determined that this decrease in NCRs and FRs could be primarily attributed to the potential reorganization of QA/QC and potential movement of QC personnel into the "line" organization. This matter was addressed by licensee management during the June 20, 1990 PNSC meeting. Once management became aware of the decline, a slight increase was noted in June (3 NCRs and 11 FRs were issued).

5. PWR Moderator Dilution (TI 2515/94)

On September 14, 1977, the Division of Operating Reactors notified the licensee of a limited boron dilution incident at an operating PWR facility. This event highlighted the fact that there could exist postulated single failures which could result in a moderator dilution incident which had not been previously considered. The licensee was requested to perform and submit the results of an analysis of the potential for and consequences of boron dilution accidents. The licensee submitted the results of their analysis via CP&L letter, NG-77-1442, dated December 19, 1977. The letter identified two potential sources of unborated water which had not been previously considered, the CCW system and the NaOH tank. In regard to the CCW system, the licensee concluded that the system does not have a sufficient quantity of water to dilute reactor coolant to criticality. Dilution from the NaOH tank was considered to not be credible as the tank is isolated from any connecting system by three closed valves. The inspectors verified that the NaOH tank is isolated from the RHR system during the decay heat removal mode by the normally closed valves SI-845A and B (valves in parallel), and SI-862A and B (valves in series) which are closed during performance of GP-007, Plant Cooldown From Hot Shutdown To Cold Shutdown. Thus, boron dilution via the NaOH tank requires more than a single failure. This item, TI 2515/94, is closed.

6. Outage Preparations

Refueling outage number 13 is scheduled to begin September 8, 1990. As of July 10, 1990, only 9 of the 28 modifications scheduled for the outage had been approved. Included among the modifications not yet approved were:

M-988	V2-14, V2-16, and V1-8 Valve Operator Upgrade (SDAFW and MDAFW Injection Valves and SDAFW Pump Steam Admission Valves, Respectively).
M-994	Control Room Habitability
M-1004	Resolve Load Interrupt Capacity Problems With DB-50 Breakers
M-1011	Instrumentation for Midloop Operations

M-1017	Eliminate RHR Pump Single Failure
M-1023	Installation of EDG KW Output Indication On RTGB
M-1037	Emergency Diesel Generator Supply and Exhaust Fan Interlock
M-1043	Modification of Degraded Grid Voltage Relay Logic
M-1047	Reduction of Boric Acid Concentration In Boric Acid Storage Tank From 12 Percent to 4 Percent
M-1056	MCC 9 and MCC 10 Transformer Replacement and MCC 5 and MCC 6 Load Shedding

Several of the above modifications (e.g. M-988, M-994, and M-1004), resolve issues which were initially identified three or more years ago. Other modifications listed above were generated in response to emergent issues (i.e., recent regulatory commitments or DBDR deficiencies). The present status indicates that the licensee under-estimated the length of time required to research, design, and approve modifications and/or failed to provide sufficient resources to preclude emergent work from adversely impacting pre-planned work activities.

Since May 1990, procurement activities have intensified. On May 4, 1990, of the 6000 identified outage-related parts, approximately 1750 items were in stock while more than 2,000 items were awaiting procurement action. By July 10, 1990, 9500 outage parts were identified; approximately 3500 were in stock, approximately 4900 parts were in the procurement process, and approximately 1,100 parts were awaiting procurement action. As indicated, there remains a substantial number of items to be ordered and received. The prevention of an adverse outage impact due to lack of parts continues to be a major challenge for the site. It should be noted that the ability to determine part status to this degree is positive, and is the result of a recent planning and schedule organization initiative.

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

Potential Common Mode Switch Failure In Safety Trains

The Westinghouse Electric Corporation notified the licensee via letter CPL-90-539 dated May 8, 1990, of a potential common mode failure due to the use of a single manual Westinghouse OT-2 type switch in both trains of a safety-related function. The licensee has determined that the OT-2 type switch is not used in any safety-related applications referenced in CPL-90-539. The switches used in these applications at HBR are a variety of GEMCO manufactured switches. Robinson plant letter RNP/88-5224 documented that the GEMCO switch used in the SI block/reset circuit was not susceptible to common mode failures. The site Technical Support

organization requested per RET-R-90-095 that NED evaluate all specific switch applications, functions, and switch types used in safety-related applications. This is considered an IFI: Review GEMCO Switch Evaluation, 90-14-02.

(Closed) LER 87-19, Inoperable Loop 1 Delta T. During splice additions on the environmentally qualified electrical cable connections for the RCS Loop 1 T hot and T cold RTD circuits, the connections were inadvertently reversed or "rolled". Upon discovery, the circuits were corrected by switching terminations on the Hagan racks to spare RCS Loop 1 RTDs. These splice additions were installed through a Special Procedure, SP-775, Penetration/Pigtail Splice Repair, Revision 4, versus a modification. The root cause was determined to be inadequate installation instructions within the Special Procedure utilized to do the work, as well as inadequate post-installation instruction testing requirements. WR 87-AKWX1 was initiated to correct the hardware concern and to perform necessary testing.

Subsequent to this event, the licensee developed a Nuclear Plant Modification Program. Design change activities are now performed under this program and associated procedures, which entail more thorough installation and design requirements and reviews, versus the Special Procedure process which was previously utilized for some design changes. The work performed under WR 87-AKWX1 was reviewed and apparently corrected the hardware concern. Additionally, NCR 87-246 was initiated by QA to address the fact that design changes were being implemented through the utilization of Special Procedures versus modification packages. A multi-disciplined special procedure utilization project team was established to resolve the concerns identified in the NCR. The inspector reviewed the NCR and the project team's associated corrective action. They appeared to be adequate to preclude recurrence of this situation. This item is closed.

8. Onsite Followup of Events at Operating Reactors (93702)

(Open) URI 88-30-04, Review Issues With Unreinforced Masonry Block Walls. During modification work in November 1988 (see IR 88-30 for details), and April 1990, original blockouts in concrete walls were found to contain masonry of unevaluated design and quality. These blockouts were assumed to be grout filled and the grout facia hid the existence of the discovered masonry. Per IEB 80-11, the failure of masonry walls which are in proximity to or have attachments from safety-related piping, was to be evaluated. These walls were to be identified and the design adequacy to perform their intended function under all postulated loads and load combinations, was to be verified.

The licensee responded to the above IEB as required in 1980, and supplemented their response in 1982 as a result of NRC Inspection 82-18 which requested that a review be made of certain areas in the plant not

addressed in the original response. The original responses (1980 and 1982) were apparently based on a review of available design documents and on drawings. These reviews revealed an apparent total of seven walls (one or more blockouts per wall) which fell under the scope of IEB 80-11.

The 1988 discovery was documented in IR 88-30, and an URI (88-30-04) was generated as a result. In early 1989 (IR 89-05), while attempting to close URI 80-30-04, the inspectors inquired as to the existence of additional masonry block walls which were not detected and evaluated during the IEB 80-11 program. The licensee conducted an EDBS search of penetrations 2 ft. by 2 ft. or larger. The documentation associated with these penetrations did not indicate that they were closed with block and/or brick. However, a memorandum from the Mechanical and Civil Nuclear Section Manager, to the Manager, Modification Projects, stated, "a confirmatory check by plant personnel is deemed prudent to ensure compliance." Apparently, action was not taken on this memorandum. This subject was again raised in early 1990 during NRC inspection 90-01; the licensee verbally agreed to review the potential for additional block walls. In April 1990, while core drills were taking place through existing (previously closed) penetrations within the RAB, additional penetrations containing block and brick were identified.

Subsequent to the identification of these additional blockouts, the licensee initiated SCR 90-030 to document the concern and to determine root cause for the penetrations being block-filled. Per the SCR, "blockouts that have been clearly identified to date that service as support anchors and containing block have been repaired with solid grout fill or concrete". In response to these additional blockouts being identified, Project PCN 90-1871-00, Evaluation of Blockouts per NCR IEB 80-11, was developed. The following is a description of the projected action plan (per the Project) and associated timetable:

- (a) A design basis document will be created to define the criteria for inspection of all penetrations.
- (b) A special procedure will be written with specific guidance for evaluations. The procedure will specify how the penetrations are to be inspected.
- (c) NED will resolve any problems/conflicts/operability studies that arise if an attachment (i.e., anchor) is found to be located in a penetration. This also applies to the attachments identified prior to the formal walkdown.
- (d) With all penetrations inspected, a specific list of all penetrations that may be filled with block will be generated.

- (e) Included in the special procedure will be sampling (per Military Standard 105) and testing guidelines for the masonry block. Approximately 50 penetrations will be cored. If the material results are consistent from penetration to penetration, the assumption will be made that all other penetrations are identical to the ones core drilled. The core drilled penetrations will be placed under a mandatory seven-day LCO for closure if the penetration is deemed a fire barrier. Once core drilled, all inner material shall be removed and the penetration closed per CM-621, Structural Mechanical and Electrical Penetration Fire Barriers, Revision 10.

Penetrations selected at random will have a block removed intact. They will be cut loose using a diamond wire saw or comparable methods while under observation of QA. The penetrations will then be sealed per CM-621 if they are considered fire barriers. The samples will be transported to the Harris E&E Center for compression testing. The test data will be compiled in the special procedure.

- (f) NED will perform a reanalyzes in accordance with IE Bulletin 80-11, utilizing the testing data obtained in e. These analyses will be checked and verified to document the final results. If corrective action is required, NED will proceed to the design phase in order to resolve discrepancies.
- (g) NED will complete a final report and submit to Licensing for disposition.
- (h) NED will update the applicable civil drawing to mark penetrations stating, "Do not install supports within this penetration."

This project is scheduled for completion prior to the end of refueling outage 13.

During the course of this review, the inspectors were concerned with the fact that from the April 1989 memorandum expressing the need for a confirmatory check of 2 ft. by 2 ft. and larger penetrations until the April 1990 SCR, there is not evidence that any corrective actions were taken to resolve the concerns. While this issue (lack of timely corrective action) closely parallels that identified during the AFW inadequate NPSH issue (IR 89-18), the inspector discussed the concerns with management, and the corrective actions taken in response to the AFW issues (VIO 89-18-01) should be sufficient to preclude recurrence. The inspectors also expressed the need for the licensee to supplement their response to IEB 80-11, the licensee has committed to submit this supplemental response by September 1, 1990. Review of the project's implementation, SCR root cause determination, and the response supplement will be tracked by URI 88-30-04, Review Issues With Unreinforced Masonry Block Walls.

No violations or deviations were identified.

9. Licensee Quality Assurance Program Implementation (35502)

An internal office evaluation was conducted on July 12, 1990, of the licensee's quality assurance program implementation by reviewing recent inspection reports, SALP report, open items, licensee corrective actions for NRC inspection findings, and licensee event reports. Particular emphasis was placed on all new items or findings since the last SALP report period (November 1, 1989 through December 31, 1989). Recommendations were made to maintain inspection efforts at the current level.

10. Action on Previous Inspection Findings (92701)

(Closed) Violation 88-03-04, Failure To Meet General Design Criterion 35 10 CFR 50 Appendix A; Violation 88-03-05, Failure to Take Corrective Action as Required by Criterion XVI of 10 CFR 50, Appendix B; and LER 88-03. The two proposed violations were combined, and a NOV and Proposed Imposition of Civil penalty (EA 88-88) were issued on June 15, 1988. The licensee's letter of July 15, 1988, denied the alleged violation, an order was issued to impose the civil penalty, and the licensee subsequently paid the civil penalty on December 15, 1988.

As described in IR 88-04, plant modification M-951 was installed to delete the auto-starting circuit on the B SI pump. This allowed only manual operation of the B SI pump. Emergency TS Amendment 115 was issued on March 7, 1988, to allow plant operation up to 60 percent power with this configuration. By additional analysis, it was demonstrated that only two SI pumps are required to meet the single failure criteria associated with 10 CFR 50.46. TS Amendment 119 was issued on June 20, 1988, to allow 100 percent power operation with only two SI pumps capable of auto-starting during postulated FSAR Chapter 15 accidents. Plant modification M-959 was installed such that the B SI pump can be used as a spare when one of the auto-starting SI pumps is out of service. In other words, the B SI pump can be manually placed into service such that it will auto-start on whichever emergency bus the inoperable auto-start SI pump is on. The inspectors reviewed this modification package and witnessed the successful completion of the acceptance test. The inspectors have verified that the licensee has established procedures to perform all required surveillance testing on the B SI pump prior to placing it in service. These actions resolve the single failure problems associated with the SI pump auto-start circuitry. The above subject violations and LER are considered closed.

The plant vulnerability to single electrical failures in other safety systems is still under evaluation. The licensee has committed by letters dated April 19 and May 19, 1989, to re-evaluate the ECCS for such vulnerabilities. On June 1, 1990, the NRC requested the licensee to submit the results of the evaluation within 60 days following the end of

refueling outage 13. Additionally, the licensee was requested to demonstrate that the plant can meet an equivalent degree of safety as afforded by meeting the GDC. These outstanding single failure issues are being tracked by NRR.

(Closed) URI 88-04-02, ISI Inspection For Reinstalled Supports Adjacent to Code Boundary. Inspection after reinstallation of supports adjacent to the code boundaries has been determined not to be a requirement of the ASME Section XI code. This item is closed.

(Closed) Violation 88-10-02, Failure to Implement Adequate Surveillance Procedure to Test TROTS in Accordance with TS 4.1.1.; and LER 88-11. The inspectors verified that OST-551 and MST-554 were revised as stated in LER 88-11. The specific problems associated with TROTS testing were satisfactorily addressed. However, as documented in IR 90-11, an additional example of incomplete logic testing was identified; an NOV was issued for failure to take adequate corrective actions to preclude repetition. Thus, corrective actions to preclude future occurrences such as was cited in violation 88-10-02 will be inspected as part of the followup on violation 90-11-01.

No violations or deviations were identified.

10. Exit Interview (30703)

The inspection scope and findings were summarized on July 25, 1990, 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. Proprietary information is not contained in this report.

<u>Item Number</u>	<u>Description/Reference Paragraph</u>
90-14-01	IFI - Assure Operability Determination Procedure Adequacy (paragraph 2)
90-14-02	IFI - Review GEMCO Switch Evaluation (paragraph 7)

11. List of Acronyms and Initialisms

AFW	Auxiliary Feedwater
CCW	Component Cooling Water
CFR	Code of Federal Regulations
CP&L	Carolina Power & Light
DBDR	Design Basis Documentation Reconstitution
EDBS	Equipment Data Base System
EE	Engineering Evaluation
FR	Field Report

GDC	General Design Criteria
GEMCO	
GP	General Procedure
HBR	H. B. Robinson
IE	Inspection and Enforcement
IEB	Inspection and Enforcement Bulletin
IFI	Inspector Followup Item
ISI	Inservice Inspection
JCO	Justification For Continued Operation
LCO	Limiting Condition for Operation
LER	Licensee Event Report
MST	Maintenance Surveillance Test
MTI	Maintenance Team Inspection
NaOH	Sodium Hydroxide
NCR	Nonconformance Report
NED	Nuclear Engineering Department
NOV	Notice of Violation
NRC	Nuclear Regulatory Commission
NRR	Nuclear Reactor Regulation
OST	Operations Surveillance Test
PCN	Project Control Number
QA	Quality Assurance
QC	Quality Control
RAB	Reactor Auxiliary Building
RCS	Reactor Coolant System
RHR	Residual Heat Removal
RO	Reactor Operator
SCR	Significant Condition Report
SI	Safety Injection
SP	Special Procedure
SW	Service Water
TROTS	Turbine Redundant Overspeed Trip System
TS	Technical Specification
UNR	Unresolved Item
URI	Unresolved Item
WR/JO	Work Request/Job Order