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

Report No.: 50-261/89-12

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: June 11 - July 10, 1989

Inspector: H C Dance /for 7/31/89
L. W. Garner, Senior Resident Inspector Date Signed

H C Dance /for 7/31/89
K. R. Jury, Resident Inspector Date Signed

Approved by: H C Dance 7/31/89
H. C. Dance, Section Chief Date Signed
Division of Reactor Projects

SUMMARY

Scope:

This routine, announced inspection was conducted in the areas of operational safety verification, surveillance observation, maintenance observation, onsite followup of events, operator requalification exam failure control, and follow-up on previous inspection items.

Results:

One violation with two examples was issued involving inadequate design controls for OT delta T and OP delta T setpoints. This is indicative of a lack of attention to details for control of reactor protection system setpoints, paragraphs 5.a and 7.

The licensee is in the process of verifying that manual isolation of SW to non-safety related components can be accomplished in a timely manner if required, paragraph 5.c.

The licensee is in the process of determining why two spent fuel assemblies have become unlatched from a fuel handling tool during spent fuel pool fuel movements, paragraph 5.

Procedure controls and licensee's sensitivity regarding removal of licensed operations from shift duties upon failure to pass requalification exams are considered adequate to preclude this situation from occurring, paragraph 6.

REPORT DETAILS

1. Persons Contacted

R. Barnett, Maintenance Supervisor, Electrical
*J. Benjamin, Engineering Supervisor, Plant Systems
C. Bethea, Manager Training
H. Bryon, Instructor
R. Chambers, Engineering Supervisor, Performance
*D. Crook, Senior Specialist, Regulatory Compliance
J. Curley, Director, Regulatory Compliance
*C. Dietz, Manager, Robinson Nuclear Project
R. Femal, Shift Foreman, Operations
W. Flanagan, Manager, Design Engineering
W. Gainey, Supervisor, Operations Support
E. Harris, Director, Onsite Nuclear Safety
D. Knight, Shift Foreman, Operations
D. McCaskill, Shift Foreman, Operations
*A. McCauley, Principle Engineer, Onsite Nuclear Safety
R. Moore, Shift Foreman, Operations
*R. Morgan, Plant General Manager
D. Myers, Shift Foreman, Operations
D. Nelson, Maintenance Supervisor, Mechanical
M. Page, Acting Manager, Technical Support
*D. Quick, Manager, Maintenance
*D. Sayre, Senior Specialist, Regulatory Compliance
D. Seagle, Shift Foreman, Operations
*J. Sheppard, Manager, Operations
R. Smith, Manager, Environmental and Radiation Control
*R. Steele, Operations Coordinator
*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 20, 1989

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

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, operations' 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 attentive and professional manner.

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

No violations or deviations were identified.

3. 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, and the tests were completed at the required frequency and 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-10 (Revision 9)	Power Range Calorimetric During Power Operation
OST-401 (Revision 22)	Emergency Diesels
OST-402 (Revision 9)	Fuel Oil System Flow Test

No violations or deviations were identified.

4. 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/JO 89-AFRK1	A Rod Drive MG Set Repair
WR/JO 89-AEZK1	Replacement of A EDG Injector Nozzles
WR/JO 89-AFDT1	Replacement of A EDG Injector Pumps 6 & 8
WR/JO 89-AFTP1	Replacement of A EDG 6 & 8 Thermocouples

The WR's concerning work performed on A EDG was performed in response to a high differential temperature (>300°F) between cylinders. As a result, on May 5, 1989, the injector nozzles were replaced on cylinders 6, 7, 10 and 12. After performance of this work, there was still a high differential temperature between cylinders 6 and 8. After consultation with the vendor, four calibrated injection pumps were replaced (WR 89-AFDT1); however, this work did not correct the temperature problem. At that time, maintenance decided to replace the cylinders' thermocouples (WR 89-AFTP1); however, again this did not correct the problem. As a result, the vendor is going to perform special diagnostic work on the EDG, as well as supplying new injector pumps to try and determine the root cause and a permanent solution to the temperature problem. This diagnostic testing and evaluation is scheduled during July 1989.

During witnessing of WR 89-AFDT1, the inspector identified a problem. The licensee considers replacement of a EDG injector pump to be a "skill of the craft" work activity and as such, does not require the work performed to be proceduralized. According to instructions contained on the WR, the work was to be performed per the vendor's technical manual. The technicians performing the work had neither the WR nor the technical manual at the job location. This in and of itself is not a problem; however, the vendor's technical manual contains specific torquing requirements in their instructions for replacing an injector. Per Plant Program procedure PLP-013, Rev. 3, Maintenance Program, Section 4.0, torquing of components which have specific torque requirements is not defined as a "skill of the craft" work activity. Section 5.0 of this procedures states that approved procedures, instructions, or check lists be utilized when the activity is beyond the skill of the craft. There were no instructions contained in the WR for specific torquing to be performed, nor were the required torque values documented. However, upon review of the completed WR, the inspector saw evidence that the torque requirements may have been met as evidenced by a completed Torque Wrench Certificate of Calibration for this work. Additionally, the nozzle replacements performed under WR 89-AEZK1 also had torque requirements that were not documented. In this instance however, there was a procedure specified to be utilized which did contain the required torque values as specified in the technical manual. This WR also had a completed Torque Wrench Certificate of Calibration attached,

thus providing some assurance the torquing was performed. As part of the licensee's Maintenance Procedure Upgrade Program scheduled for completion at the end of 1990, these type of discrepancies are expected to be addressed. The adequacy of the Procedure Upgrade Program and initiation of new procedures when required is considered an URI: Ensure Adequacy of Upgraded Maintenance Procedures, 89-12-01.

No violations or deviations were identified.

5. Onsite Followup of Events (93702)

a. Error in OT delta T and OP delta T Setpoints

On April 10, 1989, the licensee determined that the full power delta T value used in the reactor protection circuitry was different than the value assumed in certain transient analysis. This inconsistency introduced non-conservations in both the OT delta T and OP delta T protection circuit setpoints as defined in TS 2.3.1.1.2. Evaluation of the significance of this error indicated that there was sufficient conservatism in the K1 constant of the OT delta T circuit to more than compensate for this error. Hence, the OT delta T protective funcation if required would have occurred at or before the time assumed in the transient analysis. However, this was determined not to be the case for the OP delta temerpature circuit. The error was found to result in a non-conservative OP delta T setpoint which could exceed the TS value by nearly five percent. Thus, if required the OP delta T protective circuit would not have responsed as rapidly as required by TS to limit certain postulated transients. However, this error in OP delta T is deemed to have only minor safety significance in that the OP delta T function serves only as a backup function to other protection circuits and a five percent error in the OP delta T setpoint is not of a sufficient magnitude to constitute a significant degradation of the function.

The above described event is documented in LER 89-007, issued May 17, 1989. As discussed in the LER, the inconsistency existed from February 25, 1989, beginning of cycle 13, to the time of discovery in April 1989. The major contributor appears to be a breakdown in communications between various organizations responsible for design controls. During refueling 13, plant modification 959, RCS Bypass RTDs, was implemented to place the RCS hot and cold leg RTDs in the main coolant piping. During this process,, the licensee failed to maintain adequate design control to assure that a parameter utilized in an analysis and defined in TS 2.3.1.1.2.e was correctly translated into procedures and instructions. This is a violation of 10 CFR 50 Appendix B Criterion III: Inadequate Design Controls Results in Non-conservative Reactor Protection System Setpoint, 89-12-02. See paragraph 7 for a second example of a Criterion III violation.

These two examples indicate a lack of attention to detail involving a lack of thorough and effective review process for control of reactor protection system setpoints. During the exit, this item was discussed with licensee management.

b. Unlatching of a Spent Fuel Assembly

During loading of spent fuel assemblies into the DSC on June 23, 1989, one of the assemblies (K-18) became partially unlatched from the fuel handling tool in similar fashion to the occurrence described in IR 89-09. The sequence of events occurred as follows:

(1) The spent fuel handling tool was latched on assembly K-18 (which was the fifth assembly being loaded into the DSC) and proper latching was verified by Operations and Engineering personnel.

(2) Operations attempted to insert the assembly into the DSC at which time the assembly "bumped" the canister key-way causing the tool cable to slacken (approximately 6"). Simultaneously, one of four tool latching fingers became unlatched from the assembly nozzle.

(3) After discussions between Operations and Engineering, it was decided that the logical procession was to attempt to set the assembly into its respective canister position. While re-attempting to load the assembly into the canister, a similar impact resulted; however, during this impact the handling tool became completely disengaged from the top nozzle and three of the four tool fingers latched onto the hold down springs.

(4) The situation was discussed and the decision was made to place the assembly in the nearest old fuel rack location to take advantage of the large funnel-shaped lead in provided in the older fuel racks. The assembly was successfully placed in this location.

(5) The remaining canister locations were successfully loaded utilizing a newly refurbished handling tool without encountering further difficulties.

The fuel handling tool being utilized when the unlatchings occurred is the same tool that was being utilized during the spent fuel assembly drop of April 26, 1989. After that event, the licensee performed what they believed to be adequate corrective action and root cause determination. There was no failure mechanism determined for the April 1989 event based on corrective actions and attempted root cause determination; the handling tool was returned to service. Subsequent to the June events described above, the tool was removed from service, tagged out, and will be sent to Westinghouse for complete failure analysis including handling tool

dimensional checks. Follow-up for the earlier April event was identified in IR 89-09 as IFI 89-09-06. For administrative purposes, this item is considered closed. The inspectors will monitor the root cause analysis performed for both events. This item is an URI: Review Root Cause Analysis Performed on Fuel Handling Tool, 89-12-03.

c. No Justification Exists for Reliance on Manual Isolation of SW to the Turbine Building Under Certain Postulated Accident Conditions.

While conducting a review of the SW system, ONS determined that certain postulated single failures would result in the failure of the turbine building SW automatic function during accident situations. These single failures would also result in only two of the four SW pumps delivering SW to both safety and non-safety related components. Existing analysis assumes that the two SW pumps are providing flow to only the safety related components, e.g., the turbine building SW supply valves are isolated. However, the original design of the plant was for manual isolation of the turbine building SW valves by operation of the remote control switches on the RTGB. The automatic isolation was included within the last five years as an operator aid. As such, the automatic control circuitry was not designed to function under all potential single failures.

No documentation has been located which provides the time frame within which the manual isolation must occur. Failure to manually isolate the SW to the turbine building components could eventually result in degradation or loss of some safety functions. Thus the failure to have the isolation time requirement defined placed the plant in a potential unanalyzed condition. However, existing emergency procedures do require manual isolation of the turbine building SW supply isolation valves if low SW header pressure occurs. These steps are to be performed early on in the procedure. Based upon the small chance that an accident will occur with the exact component failures required to initiate the postulated scenarios, and engineering judgement that existing procedural requirements are sufficient compensatory measures if such scenarios were to occur, the licensee believes operation can safely continue until this issue is resolved. The licensee has taken steps to inform operating crews of this issue. At the close of the report period, the licensee was actively pursuing verification via analysis and/or possible testing of the acceptability of reliance on manual isolation of the SW to the turbine building. Concurrently the licensee is developing possible modifications to upgrade the automatic isolation function to preclude single failures. This issue is considered an URI: Review Resolution of Single Failure Impact on SW System Performance, 89-12-04.

No violations or deviations were identified.

6. Operator Requalification Exam Failure Controls

As part of an NRC concern regarding licensed operators who fail requalification exams performing shift duties, the inspectors reviewed and evaluated the licensee's controls in this area. Training Instruction, TI-200, Rev. 24, Robinson Plant Operator Requalification Program, provides a positive control mechanism for ensuring that an operator who fails a requalification exam is prevented from performing shift duties. This instruction contains a methodology for notifying both the individual and his/her supervision of the failure, and delineates the requalification and accelerated testing necessary before the individual may return to shift duties. Additionally, based on discussions with the licensed training supervisor, this situation has not occurred at this facility in at least the past eight years. Thus, established procedural controls, historical data, and the licensee's sensitivity in this area are considered adequate to preclude this situation from occurring at HBR.

7. Action on Previous Inspection Findings (92701)

(Closed) URI 261/88-03-01, Review OT Delta T Safety Analysis Results. This item, discussed in IR 88-03, involves discovery that an incorrect loop transport time had been used in determination of the OT Delta T trip setpoint. This item was reported to the NRC by LER 88-002, issued February 19, 1988, and by supplement number 01 issued June 6, 1988. At the time of discovery, the licensee took immediate action to compensate for the error by adjusting the K1 constant of the OT Delta T trip setpoint to 1.09, a more conservative value than the 1.1565 value specified in TS 2.3.1.1.2.d. The LER supplement reported that the TS value of 1.1565 in the OT delta T trip equation could not have maintained the MDNBR above the licensed limit of 1.17 during a control rod drop transient initiated from full power. The calculated MDNBR for the rod drop transient was determined to be 1.065. This value is approximately 10 percent below the desired 1.17 value. However, during discussions with cognizant NRC staff in both Region II and NRR, it was determined that the reduction in confidence level for prevention of fuel damage during the rod drop transient had not been significantly affected.

During the evaluation of the safety significance of the incorrect transient analysis, the contractor performing the evaluation for the licensee failed to adjust all the parameters necessary to perform the analysis for the rod drop transient. This resulted in the licensee verbally informing the NRC that the analysis had demonstrated tht the MDNBR for the rod drop transient had been greater than 1.17 for the incorrect loop transport time. Subsequent reviews revealed the error and the NRC was notifed as required. This recent breakdown in control of transient analysis as well as the problem which initiated the event in 1975 constitute a violation of NRC requirements. Specifically, these items contributed to the nonconservative OT delta T setpoints from 1975 until December 1988 and is the second

example of violation 89-12-02 associated with failure to establish adequate design controls per 10 CFR 50 Appendix B, Criterion III as discussed in paragraph 5. With the issuance of the Notice of Violation, URI 261/88-03-01, LER 88-002 and supplement LER 88-002-01 are considered closed.

8. Exit Interview (30703)

The inspection scope and findings were summarized on July 20, 1989, 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.

Item Number	Description/Reference Paragraph
89-12-01	URI - Ensure Adequacy of Upgraded Maintenance Procedures, paragraph 4,
89-12-02	VIO - Inadequate Design Controls Results in Non-Conservative Reactor Protection System Setpoints, paragraphs 5.a and 7.
89-12-03	URI - Review Root Cause Analysis Performed on Fuel Fuel Handling Tool, paragraph 5.b.
89-12-04	URI - Review Resolution of Single Failure Impact on SW System Performance, paragraph 5.c.

10. Acronyms and Initialisms

CFR	Code of Federal Regulations
DSC	Dedicated Shielded Canister
EDG	Emergency Diesel Generator
GL	Generic Letter
HBR	H. B. Robinson
IFI	Inspector Followup Item
IR	Inspection Report
LCO	Limiting Condition for Operation
LER	Licensee Event Report
MG	Motor Generator
MDNBR	Minimum Departure from Nucleate Boiling Ratio
MWt	Megawatts Thermal
NRC	Nuclear Regulatory Commission
NRR	Nuclear Reactor Regulation
ONS	Onsite Nuclear Safety
OST	Operations Surveillance Test
OP delta T	Overpower Delta Temperature
OT delta T	Overtemperature Delta Temperature

REV	Revision
RCS	Reactor Coolant System
RTD	Resistant Temperature Detector
RTGB	Reactor Turbine Gauge Board
SW	Service Water
T	Temperature
TI	Training Instruction
TS	Technical Specification
URI	Unresolved Item*
W/R	Work Request
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.