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

Report No.: 50-261/95-20

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

Docket No.: 50-261 License No.: DPR-23

Facility Name: H. B. Robinson Steam Electric Plant

Inspection Conducted: June 12-16, 1995

Inspector: _____ 7/7/95
Paul J. Kellogg, Chief Date Signed
Operational Programs Section

Accompanying Personnel: L. King, Reactor Inspector, RII
C. Rapp, Reactor Inspector, RII
M. Shlyamberg, NRC Contractor

Approved by: _____ 7/10/95
Thomas A. Peebles, Chief Date Signed
Operations Branch
Division of Reactor Safety

SUMMARY

Scope:

This was a routine, announced inspection to review the licensee's efforts relating to violations and open items identified during the Service Water Operational Performance Inspection.

Results:

The licensee had made significant efforts to address the violations and open items identified. However, there was a lack of engineering justification for many of the licensees corrective actions. Some of this could be attributed to a lack of communication between the personnel directly involved with the initial inspection and the site engineering staff. When questioned by the inspectors, the licensee was able to generate engineering calculations that supported the corrective actions taken.

Enclosure

REPORT DETAILS

1. Persons Contacted

Licensee Employees

*J. Brown, Manager, Design Engineering
*M. Clouse, Engineering
D. Crook, Senior Analyst Regulatory Programs
*T. Fay, Manager, Balance of Plant
C. Gray, Procurement
*D. Gudger, Senior Specialist, Regulatory Programs
*C. Hinnent, Vice President
*K. Jensen, Manager, Nuclear Steam Supply System
*G. Kirven, System Engineer
*R. Krich, Manager, Regulatory Affairs
*T. Lewis, Senior Engineer
*B. Meyers, Manager, Operations
*J. Moyer, Manager Nuclear Assessment
M. Ottinger, Design Engineering
*D. Phillips, Senior Engineer
S. Pruitt, Engineering
V. Smith, Operations
*W. Stover, Manager, Operations Procedures
*R. Warden, Manager, Plant Support
T. Wilkerson, Manager E & IC
W. Wagner, Supervisor Enginering System Support
D. Young, Plant General Manager

Other licensee employees contacted during this inspection included craftsmen, engineers, operators, security force members, technicians, and administrative personnel.

NRC Personnel

W. Orders, Senior Resident Inspector
*C. Ogle, Resident Inspector
*L. Garner, Project Engineer

*Attended exit interview

Acronyms and initialisms used throughout this report are listed as Enclosure, Attachment B.

2. Followup on Open Items (92903)

a. (CLOSED) VIO 50-261/93-12-01: Failure to Establish Appropriate Design Control Over SWS Throttle Valves

This violation was issued because measures were not established to maintain design basis of the safety related portion of the Service Water System (SWS) in that:

1) Operating Procedures did not specify minimum position for the component cooling water heat exchanger outlet valves. This could have allowed the non-safety related turbine building loads to remain unisolated, reducing cooling to safety related loads such that they could not fulfill their safety related functions in response a loss of coolant accident.

2) The OP-903, Attachment 9.1, SWS Valve Checklist, contained seven valves listed as open that were designated throttled on design documents and one valve listed as throttled that was designated as open on design documents.

In response to this violation licensee had undertaking the following corrective actions.

Item a.

The licensee imposed an administrative limit on the maximum CCWHX outlet pressure ensuring that valves SW-739 and SW-740 were maintained above the minimum throttled position.

The long term corrective actions were initiated by issuance of the ACR 93-139 to address the failure of the operating procedure to specify minimum throttled position of the CCWHX outlet valves. Also the licensee reviewed SWS hydraulic calculations to assure that operating procedures reflect the appropriate configurations. This review was documented in ACR 93-105.

The team reviewed the above ACRs, which were completed. ACR 93-139 was voided and its actions were addressed by ACR 93-105. The review indicated that all actions specified in ACR 93-105 were appropriately selected (review of calculations and revision of AP-022). The review of the hydraulic calculations for similar conditions was thorough. Revision 15 of the AP-022, Document Change Procedure clarified when a design engineering review is required for procedure review.

The team also reviewed the basis for the SWS header pressure administrative limits of 40 to 50 psig. This review found there was no documented analytical basis to support these limits. However, prior to completion of this inspection the licensee issued calculation RNP-M/MECH-1533, SW System Operation with Turbine Building Unisolated.

The results of this calculation indicated there was no safety concern since sufficient time existed to manually isolate the turbine building. The team concurs with the licensee's assessment of the safety significance of the results of this calculation. However, the results indicated the service water flow to the component cooling water heat exchanger may be lower than required. Also, the calculation did not include instrumentation uncertainty. The licensee issued Condition

Report 95-01562 which recommends revising the turbine building isolation setpoints to address the marginal results.

Item b.

The licensee's immediate response was to (1) identify and administratively control the subject valves using the approved plant tagging procedure and (2) revise OP-903 to specify the correct valve positions.

The long term corrective actions were initiated by issuance of the ACR 93-153. This ACR identified four following corrective actions.

(1) Shift Supervisors to stress the importance of questioning attitude to their shifts. If a procedure disagrees with a label, then investigate and correct the discrepancy.

(2) Shift Supervisors to stress to their shifts that only approved operator aids are to be used in the field.

(3) Operations to remove the information tags from the coolers and provide the information on them to the design organization.

(4) Design organization to confirm the adequacy of the information provided by operations and provide feedback to operations.

The team's review of the above items indicated they were accomplished. Furthermore, the design response included calculation RNP-M/MECH-1558, Revision 1, which established an analytical basis for minimum and maximum valve positions.

Based on the discussion provided above the team concluded that the licensee actions in response to VIO 50-261/93-12-01 to be acceptable.

b. (CLOSED) IFI 50-261/93-12-02: Configuration Control

This inspection finding was identified because minor errors were noted in the USAR and SWS drawings during the design review and detailed system walkdowns. Also, the licensee had noted a larger population of similar weaknesses in design document accuracy.

The licensee issued ACR 93-028 to address the identified design configuration issues. To determine the appropriate corrective actions, the licensee formed an evaluation team which performed a broad review of the related issues and an in-depth evaluation and root cause analysis. The evaluation team concluded the problems are not unique to the SWS and attributed the underlying cause to a lack of ownership. In order to resolve the identified problems, and minimize the future errors, the ACR identified eight corrective actions

including correction of the specific discrepancies, revision of the engineering (MOD-004 and MOD-001) and administrative (AP-022) procedures, and engineering and supervisory personnel training.

All of the corrective items were completed by the licensee. The procedure revisions clarified the types of reviews that were necessary to change the drawings including requirements for design verification and technical reviews. Training on the configuration control, modification process, and procedural requirements was performed. The team's review of the completed corrective actions found them to be acceptable.

Based on the discussion provided above the team concluded that the licensee actions in response to IFI 50-261/93-12-02 to be acceptable.

c. (CLOSED) VIO 93-12-03: Failure to Follow the Design Change Process when Using Belazona as a Safety Related Pressure Boundary

The licensee committed to a) evaluate by the end of RFO-15 the Belzona repairs to the coolers, b) not using Belzona in the repair of Section XI Class 1, 2, or 3 systems except in conformance to Generic Letter 90-05, and c) using Belzona in similar applications only after prior evaluation.

The licensee satisfied commitment a) by approving Revision 0 of Engineering Evaluation 93-181 on 11/2/93. The licensee had issued procedure CM-212 for applying Belzona.

In early 1995 an additional water leak was noted in the HVH-6A room cooler heat exchanger. An option being pursued was using Belzona for repairing HVH-6A and also to allow this repair option should leaks develop in other safety related pump room coolers; HVH-6B, HVH-7A&B, and HVH-8A&B. Room coolers HVH-6A, 7A and 7B were replaced during the recent refueling outage.

Room coolers HVH-6A&B and HVH-7A&B were not ASME Section XI components. Using Belzona as a repair material on these room coolers will not violate commitment b). Room coolers HVH-8A&B are within the ISI Class 3 boundary of the service water system and will need NRC approval before using Belzona as a repair material. These room coolers were not leaking at the time of this inspection.

In accordance with commitment c), Engineering Evaluation 93-81 is being revised to address further repairs to room coolers HVH-6A&B and HVH-7A&B.

Based on the discussion provided above the team concluded that the licensee actions in response to VIO 50-261/93-12-03 to be acceptable.

d. (CLOSED) VIO 93-12-04: Failure to Establish Adequate Instructions in the SWS Operating Procedure and AOP-022

The AOP-022 provided guidance to provide alternate Safety Injection Pump thrust bearing cooling by gravity drain from the Primary Water Storage Tank. The violation identified this method would not be possible if tank level were at the Technical Specification minimum level. As the corrective action, the licensee removed this method from AOP-022.

The inspectors walked-down the portion of AOP-022 that directed establishing alternate Safety Injection Pump thrust bearing cooling. The inspectors found the necessary equipment was contained in a gang box easily accessible by the operators. A pressure regulator preset at 50 psia to prevent overpressurization from the fire protection system was included. Tagging of the valves required to be operated by AOP-022 had been changed from the embossed stainless steel tags to large Micartia tags greatly improving the operators ability to locate valves, especially valves located overhead.

The licensee estimated that it would take 45 minutes to establish alternate Safety Injection Pump thrust bearing cooling. However, the licensee did not have any engineering analysis to demonstrate the 45 minute time-frame was adequate to ensure the pumps would be able to fulfill their safety function. The licensee contended the situation of loss of service water followed by an ESF actuation was beyond design basis; therefore no supporting engineering analysis was required. The inspectors concurred that the scenario was beyond the design basis; however the licensee was taking credit for this action reducing the core damage frequency in their IPE. This will be identified as IFI 50-261/95-20-01, Justification of Time Required to Establish Alternate SI Pump Thrust Bearing Cooling.

The IR 93-12 concluded the inadequacies with AOP-022 occurred as a result of weaknesses in the verification and validation (V&V) program. As part of the corrective actions, the licensee committed to addressing V&V programmatic weaknesses. However, as part of a general upgrade of the abnormal and emergency operating procedures, the licensee significantly revised the V&V program. Therefore, no direct comparison between the V&V program at the time of IR 93-12 and this inspection was possible. The revised V&V program was reviewed during a routine inspection of the abnormal and emergency operating procedures. The results of this review are detailed in IR 50-261/95-17.

The licensees's corrective actions for inadequate guidance in the service water operating procedures was reviewed as part of the corrective actions for VIO 50-261/93-12-01.

Based on the discussion provided above the team concluded that the licensee actions in response to VIO 50-261/93-12-04 to be acceptable.

e. (CLOSED) VIO 93-12-06: Failure to Establish Appropriate Vibration Acceptance Criteria for Pumps as Required by the IST Program

This violation concerned the pump vibration acceptance criteria for service water pumps A and B and service water booster pump B for vertical vibrations velocity measurements and for service water booster pump A for the vertical and horizontal vibration velocity measurements which were based on values which were less conservative than those granted by the licensee's relief request. This violation did not require a response due to corrective actions that were in progress at the time of the inspection. The licensee responded to the violation with additional information. This information was verified and corrective actions were inspected during this inspection.

The licensee revised the procedures to reflect the acceptance criteria of 2.5 times the reference value as an acceptable limit and 6 times the reference value as a required action limit.

Based upon the review of the revised procedures, this item Violation 93-12-06 is closed.

f. (CLOSED) VIO 93-12-07: Failure to Follow Procedures Associated with Instrument Calibration Checks

This violation concerned the lack of a documented review and disposition of out-of-tolerance parameters recorded on completed calibration sheet.

The licensee initiated ACR 93-143 to determine the root cause and corrective actions for this violation. The licensee clarified procedure MMM-006, as to which instruments required review if the calibration was found out-of-tolerance. Additionally, guidance was added to have the supervisor route copies of these data sheets to Operations, Engineering and Technical Support for appropriate evaluations. Also, the licensee had reviewed the seven calibration data sheets referenced in the violation as well as a random sampling of other calibration data sheets to ensure other systems were not affected. No other problems were found as a result of this review. Based on the inspectors review, Vio 93-12-07 is closed.

3. Additional Items

a. Waterhammer

Inspection Report 50-261/93-12, item 6b addressed the waterhammer in the SWS system and indicated that the licensee will conduct further investigations related to this matter.

The licensee conducted tests to confirm the existence (ESR 9401135) and determine the magnitude of the waterhammer (ESR 9401130). Based on these activities the licensee concluded that "the waterhammer in

the piping is not damaging, except to the pressure indicators, but nonetheless undesirable. To prevent the waterhammer, the procedure changes initiated in ESR 94-1129 should be implemented. These changes should prevent waterhammer except during actual Loss of Offsite Power or SBO."

The team's review of this issue did not identify any additional concerns.

b. EDG SW Flow Rate

Inspection Report 50-261/93-12, item 6c stated that at the analyzed SWS flow rates to EDGs the "jacket water temperature were estimated to be above the alarm point of 195°F but below the 205°F trip set point... A 24-hour EDG test run during the upcoming refueling outage will provide additional insights into acceptability of this assumption."

The discussion with licensee indicated that of this date such a test has not been conducted. However, as stated earlier, the licensee had performed a calculation (RNP-M/MECH-1189) that established the analytical basis for the minimum required flow SWS of 505 gpm to EDG. Also as documented in the Integrated SW Action Plan (ESR 9400697), the licensee is evaluating the feasibility of the alternative SW HX testing.

c. Air Operated Valves

The team's review of the design documents identified that the there is a number of the AOV's which were used for flow and/or temperature control of SW system. Since the instrument air (IA) was nor safety related, these valves were designed to move to their intended position on a loss of IA. However, if the IA is available during a DBA event then the movement of these valves will be controlled by non-safety related non-seismic components (positioners, controllers, etc). Furthermore, these valves were not equipped with position limiters, thus they can move to an undesirable position on a faulty signal. This type of failure is not a single failure, and often referred to as a "smart" failure. Discussion with the licensee revealed that these type of failures were not analyzed in their response to GL 88-14. This will be identified as IFI 50-261/95-20-02, Evaluation of Air Operated Valves "Smart Failures."

d. Thermal Relief Valves

The team's review of the design documents identified that, with the exception of the containment fan coolers, the SW side of the HXs was not equipped with the TRV's. These HXs were designed and procured as ASME Section VIII HXs and, as such, require overpressure protection. Discussion with the licensee revealed that their interpretation of ASME Section VIII allowed "positive protection" was administrative control by procedures. ASME Section VIII does not specifically

address administrative control by procedures as "positive protection." The licensee must either perform an engineering analysis that the safety related function will not be affected without TRVs or ASME interpretation or relief that administrative control by procedures are adequate. This will be identified as IFI 50-261/95-20-03, Justification for Absence of Overpressure Protection on ASME Section VIII Components.

e. Spare Parts

Inspection Report 93-12 reviewed the availability of spare parts for the service water system. At that time a purchase order was authorized for the procurement of a 30-inch, a 20-inch and two 24-inch butterfly valves. A review of the current availability of parts did not indicate that these valves had been purchased.

f. Heat Exchanger Inspection

Inspection Report 93-12 identified that a review of the work requests and procedures that implemented the inspection and cleaning of safety related heat exchangers did not define the as found conditions in sufficient detail to enable the team to determine the condition of the HXs. The licensee had corrected this by Revision 16 of CM-201, Safety Related Heat Exchanger Maintenance. The procedure now contains detailed check sheets as attachments. Attachment 8.6 of the procedure outlines detailed inspection guidelines depending on the conditions found and includes evaluation of material found.

4. Exit Interview

The inspection scope and findings were summarized on June 15, 1995, with those persons indicated in paragraph 1. The inspectors described the areas inspected and discussed in detail the the inspection results listed below. Proprietary information is not contained in this report. There were no dissenting comments at the exit meeting.

Type	Item Number	Status	Description and Paragraph
VIO	93-12-01	Closed	Failure to Establish Appropriate Design Control Over SWS Throttle Valves (paragraph 2.a)
IFI	93-12-02	Closed	Configuration Control (paragraph 2.b)
VIO	93-12-03	Closed	Failure to follow the Design Change Process when Using Belazona as a Safety Related Pressure Boundary (paragraph 2.c)

VIO	93-12-04	Closed	Faliure to establish Adequate Instracutions in SWS Operating Procedure sand AOP-022 (paragraph 2.d)
VIO	93-12-06	Closed	Failure to Establish Appropriate Vibration Acceptance Criteria for Pumps as Required by the IST Program (paragraph 2.e)
VIO	93-12-07	Closed	Failure to Follow Procedures Associated the Instument Calibrations Checks (paragraph 2.f)
IFI	95-20-01	Open	Justification of Time Required to Establish Alternate SI Pump Thrust Bearing Cooling (paragraph 2.d)
IFI	95-20-02	Open	Evaluation of Air Operated Valves "Smart Failures." (paragraph 3.c)
IFI	95-20-03	Open	Justification for Absence of Overpressure Protection on ASME Section VIII Components (paragraph 3.d)

LIST OF REVIEWED DOCUMENTS

US NRC, Region II. Inspection Report № 50-261/93-12

CP&L Letter RNP/93-2114, dated: August 27, 1993; NRC Inspection Report № 50-261/93-12 Reply to a Notice of Violation

SD-004, Revision 20, dated 6/5/92; System Operating Procedure, Service Water System

G-190199, Sheets 1 through 13, various revisions, stamped INFO ONLY, MAY 27, 1993; Service and Cooling Water System Flow Diagram

DBD/R87038/SD04, Revision 1, dated 1/11/93. Design Basis Document, Service Water System

UFSAR, Section 9.2.1, Amendment № 10

RNP Service Water Assessment Report № R-SR-93-08, dated June 4, 1993

Response to RNP Service Water Assessment Report № R-SR-93-08, dated June 4, 1993

Adverse Condition Reports: ACR 93-028, ACR 93-105, ACR 93-139, ACR 93-153

Condition Report CR № 95-01562

AP-022, Revision 15, Document Change Procedure

MOD-001, Revision 17, Engineering Evaluations

MOD-004, Revision 10, Drawings

Operating Procedure OP-903, Revision 47

Calculation RNP-M/MECH-1533, Revision 1, SW System Operation with Turbine Building Unisolated

Calculation RNP-M/MECH-1189, Revision 2, Reduced SW Flow to EDG

Engineering Services Request, ESR 9400697, Revision 0, Service Water Improvements

Engineering Services Request, ESR 9401129, Revision 0, Review SW Operating Procedures for Waterhammer concerns

Engineering Services Request, ESR 9401130, Revision 0, Install SW Test Equipment and prepare Test Procedure

Engineering Services Request, ESR 9401135, Revision 0, Investigate Potential for SW Pressure Spikes

LIST OF ABBREVIATIONS

ACR	Adverse Condition Report
ASME	American Society of Mechanical Engineers
AOP	Abnormal Operating Procedure
AOV	Air Operated Valve
CCW	Component Cooling Water
CCWHX	Cooling Water Heat Exchanger
CR	Condition Report
DBA	Design Basis Accident
EDG	Emergency Diesel Generator
ESF	Engineering Safety Features
ESR	Engineering Services Request
GL	Generic Letter
HX	Heat Exchanger
IA	Instrument Air
ISI	In Service Inspection
IST	In Service Testing
IR	Inspection Report
RFO	Refueling Outage
RNP	Robinson Nuclear Plant
SBO	Station Blackout
SWS	Service Water System
TB	Turbine Building
TRV	Thermal Relief Valve