



**UNITED STATES
NUCLEAR REGULATORY COMMISSION**
REGION II
SAM NUNN ATLANTA FEDERAL CENTER
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ATLANTA, GEORGIA 30303-8931

April 25, 2008

Carolina Power and Light Company
ATTN: Mr. Tom Walt, Vice President
H. B. Robinson Steam Electric Plant
Unit 2
3851 West Entrance Road
Hartsville, SC 29550

SUBJECT: H.B. ROBINSON STEAM ELECTRIC PLANT - NRC INTEGRATED
INSPECTION REPORT 05000261/2008002

Dear Mr. Walt:

On March 31, 2008, the US Nuclear Regulatory Commission (NRC) completed an inspection at your H.B. Robinson reactor facility. The enclosed integrated inspection report documents the inspection findings, which were discussed on April 2 with Mr. Eric McCartney and other members of your staff.

The inspection examined activities conducted under your license as they relate to safety and compliance with the Commission's rules and regulations and with the conditions of your license. The inspectors reviewed selected procedures and records, observed activities, and interviewed personnel.

Based on the results of this inspection, the inspectors identified one issue of very low safety significance (Green) that was determined to involve a violation of NRC requirements. However, because of its very low safety significance and because it has been entered into your Corrective Action Program (CAP), the NRC is treating this issue as a non-cited violation, in accordance with Section VI.A.1 of the NRC's Enforcement Policy. The inspectors identified another issue that involved a violation of NRC requirements and whose risk significance is to be determined, as explained in the body of this report. If you deny either the non-cited violation or the violation whose risk is to-be-determined, you should provide a response with the basis for your denial, within 30 days of the date of this inspection report to the Nuclear Regulatory Commission, ATTN: Document Control Desk, Washington DC 20555-0001, with copies to the Regional Administrator, Region II; the Director, Office of Enforcement, United States Nuclear Regulatory Commission, Washington, DC 20555-0001; and the NRC Resident Inspector at the H.B. Robinson facility.

In accordance with 10 CFR 2.390 of the NRC's "Rules of Practice," a copy of this letter and its enclosure will be available electronically for public inspection in the NRC Public Document Room or from the Publicly Available Records (PARS) component of NRC's document system (ADAMS). ADAMS is accessible from the NRC Web site at <http://www.nrc.gov/reading-rm/adams.html> <http://www.nrc.gov/NRC/ADAMS/index.html>. (The Public Electronic Reading Room).

Sincerely,

/RA/

Randall A. Musser, Chief
Reactor Projects Branch 4
Division of Reactor Projects

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

Enclosure: Inspection Report 05000261/2008002
w/Attachment: Supplemental Information
cc w/encls.

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Letter to T. D. Walt from Randall A. Musser dated April 25, 2008

SUBJECT: H.B. ROBINSON STEAM ELECTRIC PLANT - NRC INTEGRATED
INSPECTION REPORT 05000261/2008002

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U. S. NUCLEAR REGULATORY COMMISSION

REGION II

Docket No: 50-261

License No: DPR-23

Report No: 005000261/2008002

Facility: H. B. Robinson Steam Electric Plant, Unit 2

Location: 3581 West Entrance Road
Hartsville, SC 29550

Dates: January 1, 2008 – March 31, 2008

Inspectors: R. Hagar, Senior Resident Inspector
E. Morris, Resident Inspector

Approved by: R. Musser, Chief
Reactor Projects Branch 4
Division of Reactor Projects

Enclosure

SUMMARY OF FINDINGS

IR 05000261/2008002, Carolina Power and Light Company; on 01/01-03/31/2008; H.B. Robinson Steam Electric Plant, Unit 2; Maintenance Risk Assessment, Problem Identification & Resolution

The report covered a three month period of inspection by resident inspectors. Two violations were identified. The significance of most findings is indicated by their color (Green, White, Yellow, Red) using IMC 0609, "Significance Determination Process" (SDP). Findings for which the SDP does not apply may be Green or be assigned a severity level after NRC management review. The NRC's program for overseeing the safe operation of commercial nuclear power reactors is described in NUREG-1649, "Reactor Oversight Process," Revision 4, dated December 2006.

A. NRC-Identified and Self-Revealing Findings

Cornerstone: Mitigating Systems

Green. The inspectors identified a Green non-cited violation of 10 CFR 50.65(a)(4) for the failure of the licensee to perform a risk assessment on March 10, 2008, before establishing maintenance boundaries which removed a boric acid injection flow path from service. This finding was more than minor because it is related to a risk assessment and management issue where the licensee failed to consider risk significant systems, structures, or components and support systems that were unavailable during maintenance. The finding has a cross-cutting aspect in the area of Human Performance (H.3(a)) because the operations staff did not appropriately plan the work activity of establishing maintenance boundaries by incorporating risk insights of the site's risk model. (Section 1R13)

Identification and Resolution of Problems

TBD. The inspectors identified a violation of 10 CFR 50, Appendix B, Criterion XVI, for the licensee's failure in 2004 to determine the cause of a programmatic deficiency in foreign-material-exclusion controls, after that deficiency resulted in steam generator tube leakage. The significance of this violation is to be determined, pending completion of risk significance determination in accordance with IMC 0609, Appendix J. This finding is more-than-minor because it affects the "Protection Against External Factors" attribute of the Initiating Events Cornerstone, in that deficiencies in foreign-material-exclusion controls could allow foreign material to enter the steam generators, where the foreign material could initiate a steam generator tube rupture. The finding has a cross-cutting aspect in the area of Problem Identification and Resolution (P.1(c)), because the licensee did not thoroughly evaluate a problem such that the resolution addressed the causes. (Section 4OA2.2)

B. Licensee-Identified Violations

None

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REPORT DETAILS

Summary of Plant Status. The unit began the inspection period at full rated thermal power, and operated at full power until 10:00 p.m. on March 8 when power was reduced to 46 percent to enable maintenance on secondary-side components. The unit returned to full power at 2:32 a.m. on March 9 and remained at full power for the remainder of the inspection period.

1. REACTOR SAFETY

Cornerstones: Initiating Events, Mitigating Systems, Barrier Integrity

1R04 Equipment Alignment

a. Inspection Scope

Partial System Walkdowns:

The inspectors performed the following four partial system walkdowns, while the indicated structures, systems, and/or components (SSCs) were out-of-service for maintenance and testing:

<u>System Walked Down</u>	<u>SSC Out of Service</u>	<u>Date Inspected</u>
Motor-driven auxiliary feedwater trains	Steam-driven auxiliary feedwater train	January 22
B train of Residual Heat Removal	A train of Residual Heat Removal	January 28
B train Boric Acid Transfer	A Boric Acid Pump	February 7
Steam-driven auxiliary feedwater train	A train of Motor-driven auxiliary feedwater	March 18

To evaluate the operability of the selected trains or systems under these conditions, the inspectors compared observed positions of valves, switches, and electrical power breakers to the procedures and drawings listed in the Attachment.

b. Findings

No findings of significance were identified.

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1R05 Fire Protection

a. Inspection Scope

For the five areas identified below, the inspectors reviewed the control of transient combustible material and ignition sources, fire detection and suppression capabilities, fire barriers, and any related compensatory measures to verify that those items were consistent with Updated Final Safety Analysis Report (UFSAR) Section 9.5.1, Fire Protection System, and UFSAR Appendix 9.5.A, Fire Hazards Analysis. The inspectors walked down accessible portions of each area and reviewed results from related surveillance tests to verify that conditions in these areas were consistent with descriptions of the areas in the UFSAR. Documents reviewed are listed in the Attachment.

The following areas were inspected:

<u>Fire Zone</u>	<u>Description</u>
26	Yard Electrical Transformers
20	Emergency Switchgear Room and Electrical Equipment Area
7	Auxiliary Building Hallway (Ground Floor)
19	Unit 2 Cable Spreading Room
22	Main Control Room

Also, to evaluate the readiness of personnel to prevent and fight fires, the inspectors observed fire brigade performance during the unannounced fire drill on February 11. This drill simulated an oil fire associated with a bearing on the main turbine.

The inspectors reviewed the following action requests (ARs) associated with this area to verify that the licensee identified and implemented appropriate corrective actions:

- 233585, Fire protection compensatory actions not performed during surveillance test OST-163
- 265895, Crew failure of fire brigade drill

b. Findings

No findings of significance were identified.

1R06 Flood Protection Measures

a. Inspection Scope

External Flooding

The inspectors walked down the auxiliary feedwater pump room which contains risk-significant SSCs which are susceptible to flooding from external sources to verify that the area configuration, features, and equipment functions were consistent with the descriptions and assumptions used in UFSAR Section 3.4, Water Level (Flood) Design, and in the supporting basis documents listed in the Attachment.

b. Findings

No findings of significance were identified.

1R11 Licensed Operator Regualification

a. Inspection Scope

On February 6 the inspectors observed licensed-operator performance during regualification simulator training for shift four to verify that operator performance was consistent with expected operator performance, as described in Dynamic Simulator Scenario Examination DSS-005. This training tested the operators' ability to operate components from the control room, direct auxiliary operator actions, and determine the appropriate emergency action level classifications while responding to a pressurizer pressure channel failure, a steam generator tube leak, the loss of condenser vacuum, and a steam generator safety valve failing open. The inspectors focused on clarity and formality of communication, the use of procedures, alarm response, control board manipulations, group dynamics, and supervisory oversight. Documents reviewed are listed in the Attachment.

The inspectors observed the post-exercise critique to verify that the licensee identified deficiencies and discrepancies that occurred during the simulator training.

The inspectors reviewed the following AR associated with this area to verify that the licensee identified and implemented appropriate corrective actions:

- 249243, Auxiliary Operator exam review deleted greater than 10 percent of the exam questions

b. Findings

No findings of significance were identified.

1R12 Maintenance Effectiveness

a. Inspection Scope

The inspectors reviewed the three degraded SSC/function performance problems or conditions listed below to verify the appropriate handling of these performance problems or conditions in accordance with 10 CFR 50, Appendix B, Criterion XVI, Corrective Action, and 10 CFR 50.65, Maintenance Rule. Documents reviewed are listed in the Attachment.

The problems/conditions and their corresponding ARs were:

<u>Performance Problem/Condition</u>	<u>AR</u>
Dessicant In 'B' emergency diesel generator air compressor caused relief valve to lift	247687
Charging Pump 'B' center plunger valve cracked	260133
Functional failures in Reactor Protection System components	250359

During the reviews, the inspectors focused on the following:

- Appropriate work practices,
- Identifying and addressing common cause failures,
- Scoping in accordance with 10 CFR 50.65(b),
- Characterizing reliability issues (performance),
- Charging unavailability (performance),
- Trending key parameters (condition monitoring),
- 10 CFR 50.65(a)(1) or (a)(2) classification and reclassification, and
- Appropriateness of performance criteria for SSCs/functions classified (a)(2) and/or appropriateness and adequacy of goals and corrective actions for SSCs/functions classified (a)(1).

b. Findings

No findings of significance were identified.

1R13 Maintenance Risk Assessments and Emergent Work Evaluation

a. Inspection Scope

For the five time periods listed below, the inspectors reviewed risk assessments and related activities to verify that the licensee performed adequate risk assessments and implemented appropriate risk-management actions when required by 10 CFR 50.65(a)(4). For emergent work, the inspectors also verified that any increase in risk was promptly assessed, and that appropriate risk-management actions were promptly

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implemented. Documents reviewed are listed in the Attachment. Those periods included the following:

- January 7 – January 11, including preventative maintenance on instrument air compressor D and main feedwater flow instrument calibration
- January 21 – January 29, including maintenance on the Steam Driven Auxiliary Feedwater Pump and emergent shaft seal replacement on the “A” Residual Heat Removal Pump
- February 22 – February 25, including scheduled preventative maintenance on a boric acid transfer system flow control valve, FCV-113A, scheduled replacement of the “B” Motor Driven Auxiliary Feedwater pump control switch, and emergent work on the “B” Charging Pump discharge relief valve
- March 1 – March 7, including emergent work which involved disabling one boration flow path
- March 10 – March 14, including emergent work on boric acid transfer system flow control valve, FCV-113A, emergent work on “C” Service Water Pump, and scheduled maintenance on “A” Battery Charger

The inspectors reviewed the following AR associated with this area to verify that the licensee identified and implemented appropriate corrective actions:

- 238879, During work schedule development the plant risk profile did not include Auxiliary Feedwater Pump as being unavailable.

b. Findings

Introduction: The inspectors identified a Green non-cited violation of 10 CFR 50.65(a)(4) for the licensee’s failure on March 10 to perform a risk assessment before establishing maintenance boundaries which removed a boric acid injection flow path from service. As a result of that failure, the licensee incorrectly determined that removing a boric acid injection path from service did not increase plant risk, while according to the site’s risk-assessment model, removing a boric acid injection path from service increased plant risk from Green to Yellow.

Description: On March 10 before authorizing maintenance boundaries to be established that included removing a boric acid injection flow path from service, the licensee failed to assess the increase in plant risk that resulted from this plant configuration. This failure was contrary to site procedure OMM-048, Work Coordination and Risk Assessment, which requires, in part, the use of the licensee’s risk-assessment methodology to perform an adequate risk review prior to authorizing maintenance boundaries to be established, and that designated licensee personnel remain cognizant of the safety significance of the plant configuration.

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Analysis: This finding was more than minor because it is related to a risk assessment and management issue where the licensee failed to consider risk significant systems, structures, or components and support systems that were unavailable during maintenance, in that the licensee failed to consider a boric acid injection flow path that was unavailable during maintenance. As directed by the Phase 1 worksheet in Manual Chapter 0609, Attachment 4, Table 3b, the significance of this finding was evaluated using Manual Chapter 0609, Appendix K. In accordance with Flowchart 1 of Appendix K, because this finding was not related to Risk Management Actions only and because the Risk Deficit was calculated to be less than $1.0E-6$, this finding screened as Green. The finding has a cross-cutting aspect in the area of Human Performance because the operations staff did not appropriately plan the work activity of establishing maintenance boundaries by incorporating risk insights of the site's risk model. (H.3(a))

Enforcement: 10 CFR 50.65(a)(4) requires, in part, that before performing maintenance activities, the licensee shall assess and manage the increase in risk that may result from the proposed maintenance activities. Furthermore, licensee procedure OMM-048, Work Coordination and Risk Assessment, requires, in part, the use of the licensee's risk-assessment methodology to perform an adequate risk review prior to authorizing maintenance boundaries to be established, and that designated licensee personnel remain cognizant of the safety significance of the plant configuration. Contrary to the above, on March 10 before performing the maintenance activity of removing a boric acid injection path from service, the licensee failed to assess and manage the increase in risk that would result from that proposed maintenance activity, in that the licensee failed to assess that risk and consequently failed to recognize that this maintenance activity placed the plant in an increased-risk condition. Because this finding was of very low safety significance and has been entered into the licensee's corrective action program as AR 269817, consistent with Section VI.A of the NRC Enforcement Policy, this violation is being treated as a non-cited violation, and is designated as NCV 05000261/2008002-01, "Failure of the licensee to assess the increased risk resulting from removing a boric acid injection path from service."

1R15 Operability Evaluations

a. Inspection Scope

The inspectors reviewed the five operability determinations associated with the documents listed below. The inspectors assessed the accuracy of the evaluations, the use and control of any necessary compensatory measures, and compliance with the Technical Specification (TS). The inspectors verified that the operability determinations were made as specified by Procedure OPS-NGGC-1305, Operability Determinations. The inspectors compared the justifications provided in the determinations to the requirements from the TS, the UFSAR, associated design-basis documents to verify that operability was properly justified and the subject components or systems remained available, such that no unrecognized increase in risk occurred:

- AR 260817, Flow control valve, FCV-4702, failure to reposition
- AR 258148, Charging pump C speed control failure

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- Work Request 319506, Hinge pins missing on Reactor Protection Safeguards cabinet doors
- AR 265319, [Residual Heat Removal] pump “A” tabwasher material
- Work Order 1299827, [Service Water Pump] “C” base bolt loose

b. Findings

No findings of significance were identified.

1R18 Plant Modifications

.1 Permanent Plant Modifications

a. Inspection Scope

For the two Engineering Changes listed below, the inspectors reviewed the modifications to verify that:

- these modifications did not degrade the design bases, licensing bases, and performance capabilities of risk significant SSCs;
- implementing these modifications did not place the plant in an unsafe condition; and
- the design, implementation, and testing of these modifications satisfied the requirements of 10 CFR 50, Appendix B.

The modifications reviewed were:

- EC 67828, Redundant Solenoid for [Steam Driven Auxiliary Feedwater Pump] Governor Air
- EC 68931, [Steam Driven Auxiliary Feedwater] Pump Low Discharge Pressure Trip Time Delay Setpoint Change

Documents reviewed are listed in the Attachment.

The inspectors reviewed the following ARs associated with this area to verify that the licensee identified and implemented appropriate corrective actions:

- 243770, Self-Assessment of the Auxiliary Feedwater System
- 246099, Errors found in preventive maintenance basis documents

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- 247229, The requirements of [procedure] ADM-NGGC-0203 are not fully incorporated into [preventive maintenance] basis documents.
- 250383, [Auxiliary Feedwater] Self-Assessment 243770: Recommendations 3 -13

b. Findings

No findings of significance were identified.

.2 Temporary Plant Modifications

a. Inspection Scope

The inspectors reviewed the temporary modification described in Engineering Change 66762 to verify that the modification did not affect the safety functions of important safety systems, and that the modification satisfied the requirements of Procedure EGR-NGGC-005, Engineering Change, and 10 CFR 50, Appendix B, Criterion III, Design Control.

Documents reviewed are listed in the Attachment.

b. Findings

No findings of significance were identified.

1R19 Post Maintenance Testing

a. Inspection Scope

For the six post-maintenance tests listed below, the inspectors witnessed the test and/or reviewed the test data to verify that test results adequately demonstrated restoration of the affected safety functions described in the UFSAR and TS. Documents reviewed are listed in the Attachment.

The following tests were witnessed/reviewed:

<u>Test Procedure</u>	<u>Title</u>	<u>Related Maintenance Activity</u>	<u>Date Inspected</u>
MMM-050	Predetermined Jumper or Wire Lifts to Support Various [Preventive Maintenance] Routes	Replace instrument air compressor "D" relay and pressure switch	January 8
PM-035	Water Cooled Condensing Units WCCU-1A/1B	Rebuild internals of service water flow control valve	January 9

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OP-402	Auxiliary Feedwater System	Inspect the lubricating oil cooler on the steam driven auxiliary feedwater pump, and install a redundant solenoid on the pump's governor	January 22
OST-251-1	[Residual Heat Removal] Pump A and Components Test	Repair the pump shaft seal	January 29
LP-361	Steam Generator Level (Steam Flow) Channel 485	Replace card FM-485 to repair steam flow transmitter FT-485	February 21
OP-601	[Direct Current] Supply System	Replace capacitor for Battery Charger "A"	March 12

The inspectors reviewed the following AR associated with this area to verify that the licensee identified and implemented appropriate corrective actions:

- 218863, delay returning Service Water Pump D to service due to leakage

b. Findings

No findings of significance were identified.

1R22 Surveillance Testing

a. Inspection Scope

For the seven surveillance tests listed below, the inspectors witnessed testing and/or reviewed the test data to verify that the systems, structures, and components involved in these tests satisfied the requirements described in the TS, the UFSAR, and applicable licensee procedures, and that the tests demonstrated that the SSCs were capable of performing their intended safety functions. Documents reviewed are listed in the Attachment.

<u>Test Procedure</u>	<u>Title</u>	<u>Date Inspected</u>
OST-011	Rod Cluster Control Exercise & Rod Position Indication Monthly Interval	January 4
EST-088*	Inservice Inspection Pressure Testing of Component Cooling Water System Inside the Auxiliary Building (Each ISI Inspection Period)	January 8

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OST-101-2	Chemical Volume Control System Component Test Charging Pump B	January 16
OST-206	Comprehensive Flow Test for the Steam Driven Auxiliary Feedwater Pump	January 22
OST-202	Steam Driven Auxiliary Feedwater System Component Test	February 19
OST-551-1	Turbine Valve Test	March 9
OST-051**	Reactor Coolant System Leakage Evaluation (Every 72 Hours During Steady State Operation and Within 12 Hours After Reaching Steady State Operation)	March 19

*This procedure included inservice testing requirements.

** This procedure was a Reactor Coolant System leakage detection surveillance.

b. Findings

No findings of significance were identified.

Cornerstone: Emergency Preparedness

1EP7 Force-on-Force Drill Evaluation

a. Inspection Scope

On February 12 and in accordance with inspection procedure 71114-07, the inspectors observed the emergency preparedness component of a Force-on-Force security exercise to verify licensee self-assessment of classification, notification, and protective action recommendation development in accordance with 10 CFR 50, Appendix E during a simulated terrorist event.

b. Findings

No findings of significance were identified.

4. OTHER ACTIVITIES

4OA1 Performance Indicator (PI) Verification

a. Inspection Scope

The inspectors verified the PIs identified below. For each PI, the inspectors verified the accuracy of the PI data that had been previously reported to the NRC by comparing

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those data to the actual data, as described below. The inspectors also compared the basis in reporting each data element to the PI definitions and guidance contained in NEI 99-02, "Regulatory Assessment Indicator Guideline," Rev. 4. In addition, the inspectors interviewed licensee personnel associated with collecting, evaluating, and distributing these data.

Cornerstone: Mitigating Systems

- Mitigating Systems, Heat Removal System
- Safety System Functional Failures

For these PIs and for the period from the first quarter of 2007 through the fourth quarter of 2007, the inspectors reviewed Licensee Event Reports, records of inoperable equipment, and Maintenance Rule records to verify that the licensee had accurately accounted for unavailability hours that the subject systems had experienced during the subject period. The inspectors also reviewed the number of hours those systems were required to be available and the basis for identifying unavailability hours.

Cornerstone: Barrier Integrity

- For the Reactor Coolant System Specific Activity PI, the inspectors observed sampling and analysis of reactor coolant system samples, and compared the reported performance indicator data with records developed by the licensee while analyzing previous samples, for the period from the first quarter of 2007 through the fourth quarter of 2007.
- For the Reactor Coolant System Leak Rate PI, the inspectors reviewed records of daily measures of RCS identified leakage, for the period from the first quarter of 2007 through the fourth quarter of 2007. As described in section 1R22 of this and other inspection reports, the inspectors also periodically inspected routine licensee determinations of RCS unidentified leakage.

b. Findings

No findings of significance were identified.

4OA2 Identification and Resolution of Problems

.1 Routine Review of ARs

To aid in the identification of repetitive equipment failures or specific human performance issues for follow-up, the inspectors performed frequent screenings of items entered into the CAP. The review was accomplished by reviewing daily AR reports.

.2 Annual Sample Review

a. Inspection Scope

The inspectors selected the following two AR's for detailed review.

- 219424, [Emergency Response Organization] exercise performance not meeting management expectations, was selected because this AR relates specifically to the Emergency Preparedness Cornerstone.
- 234814, effectiveness review for Steam Generator tube leak investigation indicates ineffective corrective actions to prevent recurrence, was selected because this AR relates specifically to the Barrier Integrity Cornerstone.

The inspectors reviewed these reports to verify:

- complete and accurate identification of the problem in a timely manner;
- evaluation and disposition of performance issues;
- evaluation and disposition of operability and reportability issues;
- consideration of extent of condition, generic implications, common cause, and previous occurrences;
- appropriate classification and prioritization of the problem;
- identification of root and contributing causes of the problem;
- identification of corrective actions which were appropriately focused to correct the problem; and
- completion of corrective actions in a timely manner.

The inspectors also reviewed these ARs to verify compliance with the requirements of the CAP as delineated in Procedure CAP-NGGC-0200, Corrective Action Program, and 10 CFR 50, Appendix B. Documents reviewed are listed in the Attachment.

b. Observations and Findings

Introduction: The inspectors identified a violation of 10 CFR 50, Appendix B, Criterion XVI, for the licensee's failure in 2004 to determine the cause of a programmatic deficiency in foreign-material-exclusion (FME) controls, after that deficiency resulted in steam generator tube leakage. The significance of this violation is to be determined, pending completion of risk significance determination in accordance with IMC 0609, Appendix J.

Description: In 2004, the licensee identified a significant condition adverse to quality but did not determine the cause of that condition and did not take corrective action to preclude repetition, in that:

- In AR 115704, the licensee determined that one cause of steam generator tube leakage had been maintenance practices that resulted in substandard cleanliness.

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- That cause (maintenance practices that resulted in substandard cleanliness) is evidence of deficiencies in the licensee's foreign-material-exclusion (FME) control program.
- According to Attachment 1 of licensee procedure CAP-NGGC-0200, "Corrective Action Program," a programmatic deficiency that is likely to cause a significant adverse condition or event is itself a significant adverse condition. Therefore, because the licensee considered steam generator tube leakage to be a significant adverse condition, and because FME programmatic deficiencies caused steam generator tube leakage, FME programmatic deficiencies were also a significant adverse condition.
- The licensee did not evaluate FME programmatic deficiencies in AR 115704, or in any other NCR since 2004.

Analysis: This finding is unresolved pending completion of a significance determination. Discussions were held with NRC headquarters technical staff and no immediate plant safety consequences were identified. The risk significance of this finding will be completed at the next available maintenance opportunity (testing interval) as discussed in inspection manual chapter 0609, Appendix J. This finding is more than minor because the violation can be viewed as the possible precursor to a significant event, in that the failure to correct programmatic deficiencies in FME controls could allow maintenance activities to introduce foreign material into the secondary-side fluid stream and from there into the steam generators, where the foreign material could become a possible precursor to tube degradation.

The finding has a cross-cutting aspect in the area of Problem Identification and Resolution because the licensee did not thoroughly evaluate a problem such that the resolution addressed the causes (P.1(c)), in that:

- in NCR 115704, the licensee identified that foreign materials in the steam generators had been the cause of primary-to-secondary leakage,
- the existence of foreign materials in the steam generators indicated a programmatic deficiency in FME controls, and
- in NCR 115704, the licensee did not thoroughly evaluate the problem of steam generator tube leakage such that the resolution of that problem addressed the cause of programmatic deficiencies in FME controls.

Enforcement: 10 CFR 50, Appendix B, Criterion XVI requires, in part, that in the case of significant conditions adverse to quality, measures shall assure that the cause of the condition is determined and corrective action taken to preclude repetition. Contrary to the above, the licensee identified a significant condition adverse to quality but did not assure that the cause of the condition was determined and corrective action taken to preclude repetition, in that:

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- During their investigation of AR 115704, the licensee determined that one root cause of steam generator tube leakage during RO-22 had been “Maintenance work practices: substandard cleanliness.”
- Maintenance work practices that resulted in substandard cleanliness were evidence of a programmatic deficiency (in FME controls) that caused a significant adverse condition (steam generator tube leakage).
- According to attachment 1 of CAP-NGGC-0200, a programmatic deficiency or adverse trend that is likely to cause a significant adverse condition or event is itself a significant adverse condition.
- For the significant adverse condition represented by an identified programmatic deficiency in FME controls, the licensee did not determine the cause of that condition, and therefore did not take action to preclude repetition.

The risk significance of this finding must be completed by NRC headquarters technical staff following the next available maintenance opportunity. Because this analysis was not complete at the end of this inspection period, the risk significance of this finding is to-be-determined. Pending determination of its risk significance as described above, this finding is designated as an unresolved item, and is designated as URI 05000261/2008002-01, “Failure to determine the cause of and take corrective actions to preclude repetition of an identified programmatic deficiency in foreign-material-exclusion controls.”

This violation is in the licensee’s CAP as NCR 272388.

4OA3 Event Follow-up

.1 Unexpected Actuation of a Steam Generator Power-Operated Relief Valve

a. Inspection Scope

On January 4 the power-operated relief valve on steam generator B unexpectedly opened due to a frozen pressure-sensing line and was subsequently closed by operator action before it caused a significant plant transient. The inspectors reviewed the circumstances associated with that event to:

- determine whether the event posed an actual or potential hazard to public health and safety, property, or the environment, as defined in NRC Management Directive 8.3, NRC Incident Investigation Program;
- verify that the control-room operators’ response to the event was appropriate and in accordance with procedures and training; and
- verify that the licensee determined and adequately addressed the cause of the event.

Documents reviewed are listed in the Attachment.

Enclosure

b. Findings

The event did not pose an actual or potential hazard to public health and safety, property, or the environment. No findings of significance were identified.

4OA5 Other Activities

.1 (Closed) URI 05000261/2007006-02, Incorrect Degraded Grid Undervoltage Relays Installed.

During the component design basis inspection (CDBI) conducted July 16 to August 17, 2007, an unresolved item (URI) was identified related to the failure of the licensee purchasing group to order degraded grid undervoltage relays that referenced the correct specification for the relays. The relays installed were not the relays that were specified for the initial installation. The relays (time delay element) that were specified to be purchased and installed were relays with a $\pm 3\%$ accuracy. This specification was not translated into the purchase order and relays with a $+ 10\%$ accuracy were ordered and installed. The TS surveillance acceptance criteria for the installed relays are to demonstrate a $\pm 7\%$ accuracy. The relays have been in service for more than 16 years and have passed the surveillance requirements. The more than 16 years of successful in service surveillance results demonstrated the capability of the installed relays to satisfy all concerns with the exception of seismically induced drift. The concern was that if the relays installed were relays with $\pm 10\%$ accuracy, after a seismic event the maximum drift could occur and the relays would subsequently be outside the required TS acceptance criteria. This item was unresolved pending the licensee's analysis to assess the acceptability of the installed relays following a seismic event and an NRC review of this analysis. This issue was entered into the licensee's corrective action program as NCR 241618.

The licensee had Trentec conduct full-scale tests to address this issue, and documented results from those tests in a Trentec Certificate of Successful Test Completion for Definite Time Static Single Phase Relay – 27N UV. The inspectors reviewed the test results and associated analyses to verify that test results were accurately recorded, and that the analyses were consistent with test details. In addition, the inspectors verified that the relay tested was representative of the installed relays. The inspectors concluded that the testing performed demonstrated that electrical continuity and structural integrity were maintained and that the time delay element was found to be relatively insensitive to seismically induced drift. The inspectors concluded that a seismic event would not prevent the component from performing the intended safety function. This URI is therefore closed.

4OA6 Meetings, Including Exit

On April 2, 2008, the resident inspectors presented the inspection results to Mr. E. McCartney and other members of the plant staff. The inspectors confirmed that proprietary information was not provided or examined during the inspection.

ATTACHMENT: SUPPLEMENTAL INFORMATION

Enclosure

SUPPLEMENTAL INFORMATION

KEY POINTS OF CONTACT

Licensee personnel

C. Baucom, Manager, Support Services - Nuclear
B. Clark, Training Manager
W. Farmer, Engineering Manager
J. Huegel, Maintenance Manager
E. Kapopoulos, Plant General Manager
J. Lucas, Nuclear Assurance Manager
J. Rhodes, Radiation Protection Superintendent
T. Tovar, Operations Manager
T. Walt, Vice President
S. Wheeler, Supervisor, Regulatory Support

NRC personnel

R. Musser, Chief, Reactor Projects Branch 4

LIST OF ITEMS OPENED, CLOSED, AND DISCUSSED

Opened

05000261/2008002-01	URI	"Failure to determine the cause of and take corrective actions to preclude repetition of an identified programmatic deficiency in foreign-material-exclusion controls." (4OA2.2)
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Closed

None

Opened & Closed

05000261/2008002-01	NCV	"Failure of the licensee to assess the increased risk resulting from removing a boric acid injection path from service" (1R13)
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Closed

05000261/2007006-02	URI	Incorrect Degraded Grid Undervoltage Relay Installed. (4OA5)
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Previous Items Closed

None

Discussed

None

LIST OF DOCUMENTS REVIEWED

1R04 Equipment Alignment

Partial System Walkdown

Motor-driven auxiliary feedwater system:

System Description SD-042, "Auxiliary Feedwater System," Rev. 11

Procedure OP-402, "Auxiliary Feedwater System," Rev. 68

Drawing G-190197, "Feedwater, Condensate and Air Evacuation System Flow Diagram," Rev. 55

Residual heat removal system:

Procedure OP-201, "Residual Heat Removal System," Rev. 51

Drawing 5379-1484, "Residual Heat Removal System Flow Diagram," Rev. 40

Boric Acid Transfer Train B:

SD-021, "Chemical and Volume Control System," Rev. 10

Drawing 5379-0685, "Chemical and Volume Control System Purification and Make-Up Flow Diagram Sheet 3 of 3," Rev. 32

Clearance Order Checklist 160849, Replace diaphragm on CVC-342

Procedure OP-301, Chemical and Volume Control System (CVCS), Rev. 88

Steam-driven auxiliary feedwater system:

System Description SD-042, "Auxiliary Feedwater System," Rev. 11

Procedure OP-402, "Auxiliary Feedwater System," Rev. 68

Drawing G-190197, "Feedwater, Condensate and Air Evacuation System Flow Diagram," Rev. 55

Clearance Order Checklist 162306, "A" Motor Driven Auxiliary pump discharge pressure calibration and V2-16A diagnostic test

1R05 Fire Protection

UFSAR Sections of Appendix 9.5.1A

3.7.8, Yard Electrical Transformers

3.1.5.5, Emergency Switchgear Room and Electrical Equipment Area

3.1.5.7, Fire Zone 22 – Control Room

3.1.3.1, Auxiliary Building Hallway (Ground Floor)

3.1.5.4, Unit 2 Cable Spreading Room

Procedures

OMM-003, Fire Protection Pre-Plans/Unit No. 2, Rev. 49

results from OST-642, Main Transformer Deluge System Flow Test (Annually), Rev. 16 dated 4/21/07

results from OST-643, Startup/Auxiliary Transformer Deluge System Flow Test, Rev. 19 dated 6/5/07

results from OST-611-11, Low Voltage Fire Detection and Actuation System Zones 19 & 20 (Semi-Annual), Rev. 5, dated 12/31/07 results from OST-611-12, Low Voltage Fire Detection and Actuation System Zones 22 & 23 (Semi-Annual), Rev. 4, dated 1/8/08

results from OST-620, Carbon Dioxide Suppression System Weight test (Semi-Annual), Rev. 25, dated 12/27/07

results from OST-624, Fire Damper Inspection (18-Month), Rev. 21, dated 6/3/07

results from OST-628, Function Test of the Halon 1301 System (Annual), Rev. 21, dated 10/23/07
 results from OST-630, Halon 1301 Suppression System Weight Test (Semi-Annual), Rev. 28, dated 1/12/08
 TPP-219, Fire Protection Training Program, Rev. 14
 results from OST-611-7, Low Voltage Fire Detection and Actuation System Zone 12 (Semi-Annual), Rev. 3, dated 12/8/07
 results from OST-611-6, Low Voltage Fire Detection and Actuation System Zone 12 (Semi-Annual), Rev. 5, dated 12/29/07

Other documents

Work Order 1052259, Water gong did not sound during OST-642
 Work Order 1075883, Water gong did not sound during OST-643
 Transient Combustible and Permanent Combustible database

1R06 Flood Protection Measures

UFSAR Sections

3.4, Water Level Flood Design

Other Documents

RNP-F/PSA-0009, Assessment of Internally Initiated Flooding Events
 Procedure AOP-022, Loss of Service Water, Rev. 30

1R11 Licensed Operator Regualification

DSS-005, Dynamic Simulator Scenario Examination, Rev. 13
 TAP-409, Conduct of Simulator Training and Evaluation, Rev. 22

1R12 Maintenance Effectiveness

Action Requests

010542, "A" Charging Pump stopped due to valve failure
 192736, Yellow status for Reactor Protection System
 216145, System 1080 [Maintenance Rule] performance criteria exceeded
 247687, Dessicant In "B" [Emergency Diesel Generator] Air Compressor Caused Relief Valve To Lift
 250359, System 1080 [Maintenance Rule] performance criteria exceeded
 260133, "B" Charging Pump valve failure for center plunger

Procedures

OPS-NGGC-1305, Operability Determinations, Rev. 1

Maintenance Rule Documents

For system 1080:

- Event log for 10/2006 – Present
- Expert Panel Meeting Minutes, 8/15/2002 – 10/17/2007
- Performance Monitoring Trend

- Scoping and Performance Criteria

For system 5095:

- Event Log Report for 8/2006 - Present
- Scoping and Performance Criteria
- Performance Monitoring Status

For system 2060, Chemical and Volume Control System:

- Event Log Report for 9/2006 - Present
- Scoping and Performance Criteria
- Performance Monitoring Status
- Expert Panel Meeting Minutes 7/19/95 – Present

Other Documents

WO 1126116, Relief valve on B [Emergency Diesel Generator] air compressor lifting
Control-room operator logs, 9/24/07

1R13 Maintenance Risk Assessments and Emergent Work Evaluation

Procedure OMM-048, Work Coordination and Risk Assessment, Rev. 33

1R15 Operability Evaluations

AR 258148, Charging pump C speed control failure

AR 260817, Failure of flow control valve, FCV-4702, for water cooled condensing unit 1B

FSAR Section 9.4, Air Conditioning, Heating, Cooling, and Ventilation System

FSAR Section 9.2.1, Service Water

Work Request 319506, Hinge pin missing on Reactor Protection Safeguards cabinet

OPS-NGGC-1305, Operability Determinations, Rev. 1

Screening Evaluation Work Sheet for RACK-50

Work Order 1299827, Service Water Pump "C" base bolt loose

SD-4, Service Water, Rev. 11

GID/R87038/0003, Generic Issues Document Seismic Qualification, Rev. 2

AP-010, Housekeeping Instructions, Rev. 45

TMM-003, Q-List Control Procedure, Rev. 65

1R18 Plant Modifications

AR 243770, Self-Assessment of the Auxiliary Feedwater System

AR 246099, Errors Found in Preventive Maintenance Basis Documents

AR 247229, The requirements of ADM-NGGC-0203 are not fully incorporated into RNP PM
Basis documents.

AR 250383, [Auxiliary Feedwater] Self-Assessment 243770: Recommendations 3 -13

DBD/R87038/SD32, Auxiliary Feedwater System, Rev. 10

EC 67828, Redundant Solenoid for SDAFW Governor Air

EC 68931, [Steam-Driven Auxiliary Feedwater Pump] Low Discharge Pressure Trip Time Delay
Setpoint Change

WO 01177887, Change time delay relay for SDAFW pump per EC 68931

NO-80-746, "Auxiliary Feedwater System," Carolina Power & Light letter to Office of Nuclear
Reactor Regulation, May 15, 1980

EC 66762, NI-52A A3 preamplifier cable inner shield to outer shield shorted
 OST-023, Monthly Surveillances, Rev. 18
 OST-021, Daily Surveillances, Rev. 21
 OMM-001-11, Logkeeping, Rev. 39
 Regulatory Guide 1.97, Rev. 3

1R19 Post Maintenance Testing

Engineering Change 67828, Redundant solenoid for Steam Driven Auxiliary Feedwater pump governor air
 Procedure MMM-050, Predetermined Jumper or Wire Lifts to Support Various PM Routes, Rev. 11
 Procedure OP-402, Auxiliary Feedwater System, Rev. 68
 Procedure OP-905, Instrument and Station Air System, Rev. 97
 Procedure OST-251-1, [Residual Heat Removal] Pump A and Components Test, Rev. 19
 Procedure PM-035, Water Cooled Condensing Units WCCU-1A/1B, Rev. 19
 Purchase Order Specification 303731, Selzer Pumps Inc
 Work Order 1030422, Replace Relay's and Switches for Instrument Air Compressor "D"
 Work Order 1178442, repair water cooled condensing unit 1B flow control valve FCV-4702
 Work Order 893361, Clean and inspect Steam Driven Auxiliary Feedwater pump lube oil cooler
 Procedure LP-361, Steam Generator Level (Steam Flow) Channel 485, Rev. 13
 OP-601, DC Supply System, Rev. 41
 OMM-048, Work Coordination and Risk Assessment, Rev. 32
 OWP-035, DC Electrical System, Rev. 7
 Work Order 1024761, Replace capacitor C-1 in Battery Charger A
 Engineering Change 47091, Replacement of filter capacitor for "A" & "B" Battery Chargers

1R22 Surveillance Testing

EST-088, Inservice Inspection Pressure Testing of Component Cooling Water System Inside the Auxiliary Building (Each ISI Inspection Period), Rec. 12
 OST-011, Rod Cluster Control Exercise & Rod Position Indication Monthly Interval, Rev. 29
 TMM-020, Inservice Pressure Testing Program, Rev. 16
 OST-051, Reactor Coolant System Leakage Evaluation (Every 72 Hours During Steady State Operation and Within 12 Hours After Reaching Steady State Operation), Rev. 38
 OST-101-2, Chemical Volume Control System Component Test Charging Pump B, Rev. 35
 OMM-001-15, Operations Procedures, Rev. 30
 OST-206, Comprehensive Flow Test for the Steam Driven Auxiliary Feedwater Pump, Rev. 47
 OST-202, Steam Driven Auxiliary Feedwater System Component Test, Rev. 69
 OST-551-1, Turbine Valve Test, Rev. 0

1EP7 Force-on-Force Drill Evaluation

AR 106187, NRC [Regulatory Information Summary] 06-02 [Emergency Planning] and Force-on-Force
 AR 201463, NRC [Regulatory Information Summary] 06-12, Endorsement Of [Nuclear Energy Institute] [Emergency Planning] Enhancements To [Emergency Planning] Prog
 AR 203402, Emergency Plan Improvements
 AR 203408, Improvement Recommendations for [Robinson Nuclear Plant] [Emergency Preparedness]
 AR 206180, September 2006 Imminent Threat Walkthrough (AOP-034)

Procedure AOP-034, Security Events, Rev. 11
 Procedure Basis Document AOP-034-BD, Security Events, Rev. 11

4OA1 Performance Indicator Verification

RCP-133, Determination of [Reactor Coolant System] Radiochemical, E-Bar and I-131 Dose Equivalent, Rev. 13
 Licensee Event Report 2007-001-00, Reactor Trip Due to a Loose Wire in the Main Transformer Monitoring Circuitry
 CP-003, Systems Sampling Procedure, Rev. 68
 Chemistry Data Management Reactor Coolant Dose Equivalent Iodine Results for the period December 2006 - December 2007
 Reactor Coolant System Leakage Spreadsheet for the period January 2007 - December 2007
 Drawing 5379-353, Primary Sampling System Flow Diagram, Sheet 1 of 1, Rev. 26
 System Description SD-015, Sampling System, Rev. 6
 Reactor Coolant System Leakage Evaluation results from January 2007 - December 2007
 EBAR Analysis Report dated 11/9/07
 NEI 99-02, Regulatory Assessment Performance Indicator Guidance, Rev. 5
 RNP-F/PSA-0057, NRC Mitigating System Performance Index (MSPI) Basis Document, Rev. 6
 Consolidated Date Entry 3.0 MSPI Derivation Report, MSPI Heat Removal System Unreliability Index, generated 3/4/2008
 Consolidated Date Entry 3.0 MSPI Derivation Report, MSPI Heat Removal System Unavailability Index, generated 3/4/2008

4OA2 Identification and Resolution of Problems

AR 219424, [Emergency Response Organization] exercise performance not meeting management expectations.
 CAP-NGGC-0200, Corrective Action Program, Rev. 21
 CAP-NGGC-0205, Significant Adverse Condition Investigations, Rev. 6
 EPPRO-05, Scenario Development and Drill Control Guidelines, Rev. 10
 EPPRO-03, Training and Qualification, Rev. 23
 AR 234814, Effectiveness review of AR 115704 indicates ineffective corrective action to prevent recurrence.
 AR 115704, Potential primary to secondary leak based on R-24B indications

4OA3 Event Follow-up

Action Requests

AR 25913, At approximately 0700 on 11/22/2000 'A' [Steam Generator Power-Operated Relief Valve] lifted
 AR 260741, Unanticipated [Limiting Condition for Operation] entry, 'B' [Steam Generator Power-Operated Relief Valve] sensing line froze
 AR 260819, Crew Transient Evaluation for 'B' [Steam Generator Power-Operated Relief Valve] Transient

Work Orders

WO 1178362-01, Blow down PIC-487 sensing lines
WO 1178362-02, Insulate PIC-487 and sensing lines

Procedures

ADM-NGGC-0104, Work Management Process, Rev. 30
AOP-017, Loss of Instrument Air, Rev. 35
MMM-003, Maintenance Planning, Rev. 76
OMM-001-15, Operations Procedures, Rev. 30
OMM-001-2, Shift Routines And Operating Practices, Rev. 52
PRO-NGGC-0200, Procedure Use And Adherence, Rev. 8

Other Documents

Written statements prepared by involved control-room operators
Control-room operator logs for January 4, 2008
Specification L2-M-039, Piping and Equipment Thermal Insulation, Rev. 3

4OA5 Other Activities

Trentec Certificate of Successful Test Completion for Definite Time Static Single Phase Relay –
27N UV, dtd 9/12/07