UNITED STATES
NUCLEAR REGULATORY COMMISSION
REGION II
SAM NUNN ATLANTA FEDERAL CENTER
61 FORSYTH STREET, SW, SUITE 23T85
ATLANTA, GEORGIA 30303-8931

January 14, 2005

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

SUBJECT: H.B. ROBINSON STEAM ELECTRIC PLANT - NRC SUPPLEMENTAL INSPECTION REPORT 05000261/2004009

Dear Mr. Moyer:

On December 17, 2004, the US Nuclear Regulatory Commission (NRC) completed a supplemental inspection at your Robinson Steam Electric Plant Unit 2 of a performance indicator crossing the threshold from Green to White. The enclosed inspection report documents the inspection findings, which were discussed with members of your staff on December 17, 2004.

The purpose of this supplemental inspection was to examine your problem identification, root cause and extent-of-condition evaluation, and corrective actions associated with a White performance indicator in the barrier integrity cornerstone. The White performance indicator involved reactor coolant system identified leakage crossing the threshold from Green to White during the fourth quarter of calendar year 2004. 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, inspected selected plant components, and interviewed personnel.

Based on the results of this inspection, the NRC determined that the problem identification, root cause and corrective actions for the White finding were adequate. The inspectors identified one issue of very low safety significance (Green). This issue 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, the NRC is treating this issue as a non-cited violation (NCV), in accordance with Section VI.A.1 of the NRC's Enforcement Policy. If you contest this NCV, you should provide a response within 30 days of the date of this inspection report, with the basis for your denial, 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 10CFR 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 (the Public Electronic Reading Room).

Sincerely,

/RA/

Paul E. Fredrickson, Chief
Reactor Projects Branch 4
Division of Reactor Projects

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

Enclosure: NRC Inspection Report 05000261/2004009
w/Attachment : Supplemental Information

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NAME	R. Hagar	D. Jones					
DATE	01/14/2005	01/14/2005					
E-MAIL COPY?	YES NO	YES NO	YES NO	YES NO	YES NO	YES NO	YES NO
PUBLIC DOCUMENT	YES NO						

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U. S. NUCLEAR REGULATORY COMMISSION

REGION II

Docket No:	50-261
License No:	DPR-23
Report No:	05000261/2004009
Facility:	H. B. Robinson Steam Electric Plant, Unit 2
Location:	3581 West Entrance Road Hartsville, SC 29550
Dates:	December 13 - 17, 2004
Inspector:	R. Hagar, Senior Resident Inspector D. Jones, Resident Inspector
Accompanying Personnel	A. Muniz Gonzalez, NRR Intern
Approved by:	Paul E. Fredrickson, Chief Reactor Projects Branch 4 Division of Reactor Projects

Enclosure

SUMMARY OF FINDINGS

IR 05000261/2004-009; 12/13 - 12/17/2005; H.B. Robinson Steam Electric Plant, Unit 2; supplemental inspection IP 95001 for a White performance indicator in the barrier integrity cornerstone, other activities.

This inspection was conducted by a senior resident inspector and a resident inspector. One Green non-cited violation was 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 3, dated July 2000.

NRC-Identified and Self-Revealing Findings

Cornerstone: Barrier Integrity

This supplemental inspection was conducted to assess the licensee's evaluation associated with the Reactor Coolant System (RCS) Leakage Performance Indicator (PI) crossing the Green/White threshold during the 4th quarter of calendar year 2004. This PI is associated with the barrier integrity cornerstone. The PI became White because of excessive packing leakage from valve RC-525, a pressurizer spray bypass valve. Although the licensee's problem identification, extent-of-condition evaluation, and corrective actions were adequate, the inspectors identified some weaknesses in the licensee's root-cause evaluation.

Cornerstone: Initiating Events

Green. A non-cited violation of Technical Specification (TS) 5.4.1 was identified for failure to maintain a written procedure appropriate to the circumstances, involving the planning of maintenance work orders. This finding is more than minor because it affected the equipment performance attribute of the Initiating Events cornerstone objective of limiting the likelihood of events that upset plant stability and challenge critical safety functions, in that the finding resulted in a small loss of coolant within the capability of the RCS makeup systems. An inadequate work order developed from this procedure resulted in RCS Leakage PI becoming White because of packing leakage from valve RC-525, a pressurizer spray bypass valve.

This finding contributed to a small reactor coolant system (RCS) leak which did not exceed the TS-identified RCS leakage limit, and did not affect any other mitigating systems equipment. The finding did not contribute to the likelihood of a reactor trip or affect any mitigating system functions and had no impact on external event initiators. Therefore this finding screened as Green in the Initiating Events Cornerstone in the Phase 1 worksheet, a finding of very low risk significance. (Section 03)

REPORT DETAILS

01 INSPECTION SCOPE

The purpose of this supplemental inspection was to assess the licensee's evaluation associated with the Reactor Coolant System (RCS) Identified Leakage Performance Indicator (PI) crossing the threshold from Green to White during the fourth quarter of calendar year 2004. The RCS Identified Leakage PI is associated with the barrier integrity cornerstone of the reactor safety strategic performance area.

02 EVALUATION OF INSPECTION REQUIREMENTS

02.01 Problem Identification

a. Determination of who identified the issue and under what conditions

The licensee's evaluation into this issue was documented in Action Request (AR) 139933. That evaluation states that a small increase in unidentified RCS leakage was first observed on October 6, 2004. On October 12, 2004, the leakage rapidly increased to approximately 7 gallons per minute (gpm). Through a containment entry, the licensee discovered that the increased leakage was from the packing of pressurizer spray bypass valve RC-525. The inspector determined this leakage to be self-revealing.

b. Determination of how long the issue existed, and prior opportunities for identification

The licensee's evaluation determined that a slight upward trend in the containment vessel radiation monitor readings had been noted over a several-month period before October 12, and that the licensee had been implementing an action plan at that time to identify the source of the leak.

c. Determination of the plant-specific risk consequences (as applicable) and compliance concerns associated with the issues

The licensee's evaluation indicated that on October 12, before the source of the leakage was identified, the 7gpm leak rate had exceeded the technical specification (TS) limiting condition for operation (LCO) associated with unidentified leakage (1gpm). The inspectors confirmed that the licensee identified the source of the leak before the 4-hour action statement associated with that LCO expired. The evaluation also noted that after the leak was identified as coming from valve RC-525, the 7gpm leak rate was less than the TS LCO for identified leakage (10 gpm).

02.02 Root Cause and Extent-of-Condition Evaluation

a. Evaluation of methods used to identify root causes and contributing causes

For the packing leak from valve RC-525, the licensee used barrier analysis, cause-and-effect analysis, and personnel interviews to identify two root causes and one contributing cause. The root causes were:

- Failure to validate information upon which key decisions are made, in that the planner of the work order that installed the new RC-525 valve failed to validate information obtained from the vendor about the condition of the valve.

- Insufficient detail in guidance provided for pre-outage walkdowns, in that pre-outage implementer reviews of the subject work order did not identify the lack of a task for packing adjustment or the lack of a task for post-installation walkdown.

The contributing cause was:

- Corrective actions to a previously identified problem were inadequate to prevent recurrence, in that the scope of a corrective action from an earlier AR (to verify that work orders for welding in components other than piping include a separate task to verify the satisfactory as-left condition of those components) did not include the subject work order.

With respect to identifying root causes and contributing causes, the inspectors noted the following weaknesses in the licensee's evaluation:

- Although the evaluation had determined that a human performance deficiency had occurred in maintenance planning, the investigation of the training program using barrier analysis focused only on training for the maintenance craft; in particular, the investigation did not consider the adequacy of planner-specific training provided through the licensee's Maintenance Planner Development Program under the Planner On-The-Job Orientation Guide.

- The evaluation did not describe an evaluation of procedural use related to this event. The evaluation thus did not consider whether an inadequate procedure and/or failure to follow a procedure contributed to this event.

Subsequent to the inspection period, on January 13, 2005, the licensee acknowledged these weaknesses by re-opening the evaluation of this event under Assignment 23 of AR 139933, and by initiating AR 148013, Investigation Techniques and Quality of AR 139933.

b. Level of detail of the root cause evaluation

The inspectors determined that the level of detail provided in the evaluation report was adequate to support the first root cause and the contributing cause. However, the inspectors determined that the evaluation did not describe how the root cause of "Insufficient detail in guidance provided for pre-outage walk downs" was identified. This weakness was among the weaknesses that prompted the licensee to re-open the evaluation of this event under Assignment 23 of AR 139933, and to initiate AR 148013, Investigation Techniques and Quality of AR 139933.

c. Consideration of prior occurrences of the problem and knowledge of prior operating experience

The evaluation noted that a valve leakage problem had been previously identified in AR 81099, and that one of the corrective actions from that AR was to require that work orders include a separate task for site craft personnel to verify the satisfactory as-left condition of newly installed components welded in by contractor personnel. The evaluation determined that the work order that installed valve RC-525 had not been included in the scope of that corrective action, and therefore concluded that the subject corrective action had not been adequate to prevent recurrence. However, because the corrective action under AR 81099 required inspections of weld quality and did not include inspections of valve packing, the evaluation also acknowledged that such inspections would likely not have identified improper packing in a valve.

d. Consideration of potential common causes and extent of condition of the problem

The licensee noted that valve RC-525 was replaced in refueling outage (RFO) 22. Therefore, the licensee reviewed all valve replacement work packages for RFO 22 and a sampling of planned online valve replacements. Of twenty work packages reviewed, three valves were identified that did not have adequate instructions. The licensee visually inspected one of these valves with satisfactory results, and scheduled the remaining two to be inspected during the next refueling outage.

The licensee's evaluation did not explicitly address extent of cause. However, the inspectors noted a corrective action that suggests that extent of cause was considered, in that one corrective action requires maintenance, planning, engineering and procurement personnel to review major component types and procurement specifications, to identify similar error-likely situations.

02.03 Corrective Actions

a. Appropriateness of corrective actions

The licensee took prompt corrective action to stop the leak by shutting down the reactor and re-packing the valve. To address the root causes identified above, the licensee's corrective actions were to:

- Include written expectations for outage implementer reviews of work orders to verify appropriate support tasks are included;

- Provide remedial training to the responsible planner on appropriate minimal planning standards and use of human performance fundamentals;

- Revise procedure MMM-003, Maintenance Planning, to include minimum expectations for ensuring valves that are replaced are properly packed; and

- Verify that proper packing is installed in valves CVC-387A and CVC-484 (two valves which, like valve RC-525, were installed during the last outage).

To address the contributing cause, the licensee's corrective action was to review already planned work orders for valve replacements to ensure that valves are properly packed during valve replacement.

The inspectors determined that the licensee's corrective actions that included shutting down the reactor and re-packing the valve were appropriate and adequate to stop the leak, and that the corrective actions described above were appropriate and adequate to address the root and contributing causes.

b. Prioritization of corrective actions

The licensee properly prioritized the corrective actions, in that they promptly shut down the reactor, re-packed the valve, and thereby restored RCS boundary integrity. The corrective actions to address the root and contributing causes were scheduled to be completed before April, 2005, except for the review of corrective actions effectiveness. That activity was scheduled for February 15, 2006.

c. Establishment of a schedule for implementing and completing the corrective actions

The inspectors determined that the licensee's schedule for completing the corrective actions was reasonable.

d. Establishment of quantitative or qualitative measures of success for determining the effectiveness of the corrective actions to prevent recurrence

The licensee did not develop such measures that are specific to this issue. However, the generic template used by the licensee to document the effectiveness reviews required the reviewer to verify not only that the scheduled corrective actions were completed, but also that appropriate barriers were in place to prevent recurrence. It also required the reviewer to verify through reviewing corrective-action-program data and interviewing appropriate personnel that a repeat event had been prevented.

03 OTHER ACTIVITIES

Inadequate Maintenance Planning Procedure

a. Inspection Scope

As described above, the inspectors examined the circumstances associated with an unisolable leak which occurred in the reactor coolant system on October 12, 2004. That examination included a review of the licensee's evaluation of that leak, as documented in AR 139933.

b. Findings

Introduction The inspectors identified a Green non-cited violation of TS 5.4.1 associated with inadequate maintenance planning for replacement of pressurizer spray bypass valve RC 525. The valve was replaced on May 10, 2004.

Description In March, 2004, the licensee prepared and issued work order (WO) 00326484-02 in accordance with Procedure MMM-003, Maintenance Planning, Rev. 71. This WO provided instructions for replacing pressurizer spray bypass valve RC-525 (a single isolation valve on a 3/4" bypass line around one of the pressurizer spray valves) with a new valve.

Step 8.2.14.1 of Procedure MMM-003 included an instruction which required that correct packing be installed in new valves. Instead of including the requirements of Step 8.2.14.1, WO 00326484-02 included a note which stated that the new valve did not need to be repacked. Consequently, on May 10, 2004, when the new valve was installed under this WO, new packing was not installed in the valve. Later, the valve was placed in service, and the plant returned to full power. On October 12, 2004, after approximately 5 months of full-power operation, the packing in valve RC-525 failed, resulting in an unisolable leak from the reactor coolant system of approximately 7 gallons per minute. The licensee subsequently shutdown and depressurized the reactor to enable repair of the valve. The reactor was restarted and the plant returned to full power on October 14, 2004.

During this inspection, the inspectors noted that in addition to the requirements in Step 8.2.14.1, Procedure MMM-003 contained some conflicting guidance which may have contributed to the valve leakage event. Specifically, Step 8.2.14 included an instruction for planners to review Step 8.2.14.1 (and other steps) for applicability. Based on this review, the inspectors determined that the instruction in Procedure MMM-003, Step 8.2.14 for planners to review Step 8.2.14.1 for applicability was not appropriate for the circumstances, in that for some maintenance activities that involve valve replacement, the subject instruction allowed planners to prepare work orders which do not require that correct packing be installed. Specifically, that instruction allowed the planner who prepared WO 00326484-02 to not require that correct packing be installed in the new valve designated to become valve RC-525. The inspectors determined that Procedure MMM-003 had been revised to include the conflicting Steps 8.2.14 and 8.2.14.1, at some time prior to May 1999.

Analysis This finding is of very low safety significance. The performance deficiency was the licensee's issuance of Procedure MMM-003 with an instruction which specifically required that correct packing be installed in new valves, but also included an instruction that allowed planners to not require that correct packing be installed. The performance deficiency, which occurred some time before May 1999, allowed preparation and approval of WO 00326484-02 which provided instructions for installation of valve RC-525 without proper packing installed in the valve, and ultimately resulted in circumstances that prompted the licensee to shutdown and depressurize the

reactor to repair that valve. This finding is more than minor because it affected the equipment performance attribute of the Initiating Events cornerstone objective of limiting the likelihood of events that upset plant stability and challenge critical safety functions, in that this finding resulted in a small loss of coolant within the capability of the RCS makeup systems.

Using IMC 0609, Appendix A, Significance Determination of Reactor Inspection Findings for At-Power Situations, the inspectors determined that this finding did not apply to the Barrier Integrity cornerstone, because this finding did not degrade the RCS boundary as a mitigator following a plant upset. However, the inspectors also determined that this finding affected the Initiating Events cornerstone, in that this small RCS leak did not exceed the TS identified RCS leakage limit, and did not affect any other mitigating systems equipment. The finding did not contribute to the likelihood of a reactor trip or affect any mitigating system functions and had no impact on external event initiators. Therefore this finding screened as Green in the Initiating Events Cornerstone in the Phase 1 worksheet, a finding of very low risk significance.

Enforcement TS 5.4.1 requires, in part, that written procedures shall be established and maintained covering the topics included in Regulatory Guide 1.33, Revision 2, Appendix A. Regulatory Guide 1.33, Revision 2, Appendix A states, in part, that maintenance that can affect the performance of safety-related equipment should be properly preplanned in accordance with written procedures appropriate to the circumstances.

Contrary to the above, for preplanning maintenance that can affect the performance of safety-related equipment, the licensee failed to establish and maintain a written procedure appropriate to the circumstances of preplanning instructions for valve replacements, in that Procedure MMM-003, Maintenance Planning, includes instructions which inappropriately allow planners to determine that for some valve replacements, work orders may be prepared and issued which do not require that correct packing be installed in the new valves. In particular, those instructions allowed WO 00326484-02 to be prepared and issued to install valve RC-525 without requiring that correct packing be installed in that valve. Subsequently, on May 10, 2004, valve RC-525 was installed in the plant without correct packing. After that valve was placed in service and the plant returned to full power, the valve's packing failed, resulting in an unisolable leak from the RCS which required a plant shutdown to enable repair of the valve.

As described above, this violation was associated with a finding of very low safety significance. The licensee restored compliance as described in AR 146481 by removing the inappropriate instruction from Procedure MMM-003. The inspectors also determined that the violation was not repetitive as a result of inadequate corrective action, and found no indication of willfulness. For these reasons, this violation is being treated as a Non-Cited Violation (NCV), consistent with Section VI.A.1 of the NRC Enforcement Policy, and has been designated as NCV 05000261/2004009-01, Failure to establish and maintain a written procedure appropriate to the circumstances of preplanning valve replacements. The corrective action for this violation is in the licensee's corrective action program as AR 146481.

04 MANAGEMENT MEETINGS

Exit Meeting Summary

The inspectors presented the inspection results to Mr. W. Noll and other members of licensee management at the conclusion of the inspection on December 17, 2004. The inspectors re-exited selected inspection results to Mr. B. Clark, Ms. J. Lucas, Mr. E. Kapopolous, and other members of licensee management on January 13, 2005. The inspectors confirmed that proprietary information was not provided or examined during the inspection.

ATTACHMENT: SUPPLEMENTAL INFORMATION

SUPPLEMENTAL INFORMATION

KEY POINTS OF CONTACT

Licensee Personnel

N. Bach, Superintendent, Environmental & Chemistry
D. Blakeney, Superintendent - Mechanical Maintenance (also team lead for AR 139933)
G. Cappucio, Lead Engineer
R. Ivey, Manager, Operations
E. Kapopoulos, Manager, Outage & Scheduling
G. Ludlum, Training Manager

NRC Personnel

P. Fredrickson, Branch Chief, Division of Reactor Projects, Region II

ITEMS OPENED, CLOSED, AND DISCUSSED

Opened

None

Opened and Closed

05000261/2004009-01	NCV	Failure to establish and maintain a written procedure appropriate to the circumstances of preplanning valve replacements (Section 03)

Closed

None

Discussed

None

Attachment

LIST OF DOCUMENTS REVIEWED

Action Requests

139933, Packing Leak on RC-525 Resulted in Plant Shutdown
81099, R-OM-02-02 Issue 3. Mechanical Joint Leakage
148013, Investigation Techniques and Quality of AR 139933

Procedures

EST-083-2, Inservice Inspection Pressure Testing of the Reactor Coolant System (Refueling Shutdown Interval), Rev. 1
TMM-020, Inservice Pressure Testing Program, Rev. 14
PLP-111, Leak Reduction Program, Rev. 6
MMM-001, Maintenance Administration Program, Rev. 63
MMM-003, Maintenance Planning, Rev. 71
MMM-046, Valve Packing Reference Manual. Rev. 11
PLP-033, Post-Maintenance Testing Program, Rev. 33
ADM-NGGC-0104, Work Management Process, Rev. 27
CAP-NGGC-0205, Significant Adverse Condition Investigations, Rev, 2

Other Documents

Unit No. 2 Shift Logs, October 12 - October 13, 2004
Reactor Coolant System Leakage Performance Indicator Data, October - November, 2004
Action Plan for Increased [Containment Vessel Activity], Dated October 7, 2004
Work Order No. 326484-02, RC-525 Packing Has Boric Acid
Work Order No. 624544-01, RC-525 Has 5 [Gallon Per Minute] Packing Leak