



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

July 29, 2009

Carolina Power and Light Company  
ATTN: Mr. Eric McCartney  
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 INTEGRATED  
INSPECTION REPORT 05000261/2009003**

Dear Mr. McCartney:

On June 30, 2009, 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 July 15, 2009, with you 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.

This report documents one NRC-identified finding and two self-revealing findings of very low safety significance (Green). One of these findings was determined to involve violations of NRC requirements. However, because of the very low safety significance and because it is entered into your corrective action program (CAP), the NRC is treating the finding as non-cited violation (NCV) consistent with Section VI.A.1 of the NRC's Enforcement Policy. The other two Green issues are being treated as findings. If you contest any 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 addition, if you disagree with the characterization of any finding in this report, you should provide a response within 30 days of the date of this inspection report, with the basis for your disagreement, to the Regional Administrator, Region II, and the NRC Resident Inspector at the H. B. Robinson facility. The information you provide will be considered in accordance with Inspection Manual Chapter 0305.

In accordance with 10 CFR 2.390 of the NRC's "Rules of Practice," a copy of this letter, its enclosure, and your response (if any) 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 Website <http://www.nrc.gov/reading-rm/adams.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 05000261/2009003  
w/Attachment: Supplemental Information

cc w/encl.: (See page 3)

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**/RA/**

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Letter to Eric McCartney from Randall A. Musser dated July 29, 2009

SUBJECT: H. B. ROBINSON STEAM ELECTRIC PLANT - NRC INTEGRATED  
INSPECTION REPORT 05000261/2009003

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U. S. NUCLEAR REGULATORY COMMISSION

REGION II

Docket No: 50-261

License No: DPR-23

Report No: 005000261/2009003

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

Location: 3581 West Entrance Road  
Hartsville, SC 29550

Dates: April 1, 2009 – June 30, 2009

Inspectors: R. Hagar, Senior Resident Inspector  
E. Morris, Resident Inspector  
J. Zeiler, Senior Resident Inspector, Summer  
J. Polickoski, Resident Inspector, Summer  
C. Fletcher, Reactor Inspector (Section 1R07)  
A. Vargas Mendez, Reactor Inspector (Section 1R07)  
M. Bates, Senior Operations Engineer (Section 1R11)

Accompanied by:  
N. Smith, Project Engineer (Section 1R07)

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

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## SUMMARY OF FINDINGS

IR 05000261/2009003, Carolina Power and Light Company; on 4/1/2009-6/30/2009; H.B. Robinson Steam Electric Plant, Unit 2; Operability Evaluations, Identification and Resolution of Problems.

The report covered a three-month period of inspection by resident inspectors and an announced inspection by reactor inspectors and an in-office review by an operations engineer. One violation and two findings were identified. The significance of most findings is indicated by their color (Green, White, Yellow, Red) using Inspection Manual Chapter (IMC) 0609, "Significance Determination Process" (SDP). The cross-cutting aspect was determined using IMC 0305, Operating Reactor Assessment Program. Findings for which the SDP does not apply may be Green or be assigned a severity level after NRC management review.

### A. NRC-Identified and Self-Revealing Findings

#### **Cornerstone: Initiating Events**

- Green. A green self-revealing finding was identified for the licensee's failure to identify the environmental conditions that temperature sensors in certain freeze-protection circuits could experience after routine installation of cold-weather enclosures during cold-weather operation. Although a violation of regulatory requirements was not identified, this failure was a performance deficiency with respect to the licensee's procedure EGR-NGGC-0005 ("Engineering Change") which requires, in part, that the licensee identify the functional performance requirements of each structure, system and component being modified in all possible operational configurations. In this circumstance, the licensee's modification to the freeze-protection circuits for the steam generator power operated relief valve sensing lines, installed the freeze-protection temperature sensors in a location where a heated enclosure is routinely installed for cold-weather protection. With the heated enclosure surrounding the temperature sensors the freeze protection circuitry failed to energize during freezing conditions and subsequently allowed the sensing line for the B steam generator power operated relief valve to freeze, which in turn caused the B steam generator power operated relief to open at full power operation. This finding is in the licensee's corrective action program as AR 339914. At the end of this inspection period, the licensee had not yet completed their evaluation of this finding, and had consequently not yet developed corresponding corrective actions.

This finding is more-than-minor because it is associated with the Equipment Performance attribute of the Initiating Events cornerstone and affected the cornerstone objective of limiting the likelihood of those events that upset plant stability and challenge critical safety functions during power operations, in that this finding created conditions which caused an event that upset plant stability during power operations. Using Appendix A of the Significance Determination Process (SDP) described in MC 0609, this finding did not screen as green because it was a transient initiator contributor and because the finding contributed to both the likelihood of a reactor trip and the likelihood that mitigation equipment or functions will not be available, in that this finding created

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conditions that caused a S/G PORV to open during power operation, and rendered inoperable the automatic functions of that PORV. A regional Senior Reactor Analyst performed a Phase 3 evaluation under the Significance Determination Process. The performance deficiency was determined to be of very low safety significance (Green). The evaluation was accomplished using the NRC's Probabilistic Risk Assessment computer model of the plant with basic event MSS-ADV-CC-RV1-2, FAILURE OF SG-B PORV RV1-2, set to always fail. The model was quantified with a one day exposure period. The dominant accident sequences involved Steam Generator Tube Ruptures with complications, partially due to the finding, in depressurizing and cooling down. Consequently, the Residual Heat Removal System was not placed into service resulting in core damage and a Large Early Release. The major assumptions included that recovery of the failed component was possible and common cause inclusion was not appropriate. This finding has a cross-cutting aspect in the Resources component of the Human Performance area because the licensee did not provide and ensure that complete, accurate, up-to-date design documentation were available and adequate to plant personnel, in that the licensee did not ensure that Attachment 7 to EGR-NGGC-005 was adequate to enable engineers to identify a potential interference between the modification described in EC 70032 and the program described in OP-925 ("Cold Weather Preparations"). (H.2(c)) (Section 40A2.2)

### **Cornerstone: Mitigating Systems**

- Green. The inspectors identified a green non-cited violation of Technical Specification (TS) 5.4.1, Administrative Controls (Procedures) associated with two events in which maintenance technicians performed maintenance on the A emergency diesel generator (EDG) without pre-planning and performing the activity in accordance with written procedures, documented instructions, or drawings appropriate to the circumstances. In both instances maintenance technicians tightened a fuel oil fitting on the A emergency diesel generator which caused increased leakage from that fitting and the unplanned unavailability and inoperability of the diesel generator. In response to this finding, the licensee revised their Maintenance Administration Program to clearly communicate that "skill of the craft" work on safety related equipment is prohibited without a procedure/work order, and held stand-down meetings to retrain all maintenance and planning personnel on work practices for safety related structures, systems and components. This finding is in the licensee's corrective action program as AR 325384.

This finding was more-than-minor because it is associated with the Equipment Performance attribute of the Mitigating Systems cornerstone and affected the availability of the emergency diesel generator to respond to a loss of offsite power event. Using Attachment 4 of MC 0609, Significance Determination Process, this finding screened as having very low safety significance (Green) because the finding was not a design or qualification deficiency confirmed not to result in loss of operability or functionality, did not represent a loss of a system safety function, did not represent an actual loss of safety function of a single train, did not represent an actual loss of safety function of one or more non-Tech Spec Trains of equipment designated as risk-significant, and did not screen as potentially risk significant due to a seismic, flooding, or severe weather initiating event. This finding has a cross-cutting aspect in the Work Practices component of the Human Performance cross cutting area because personnel work practices did not

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support human performance, in that the licensee's work practices did not ensure supervisory and management oversight of work activities such that nuclear safety is supported. (H.4(c)) (Section 1R15.2)

- Green. A self-revealing finding was identified for the licensee's failure to follow procedures while restoring auxiliary building evaporative air coolers to service. Although a violation of regulatory requirements was not identified, this failure was a performance deficiency with respect to licensee procedure PRO-NGGC-0200, Procedure Use and Adherence, Rev. 10, which requires all personnel who use procedures to understand the impact of their actions on personnel or equipment before taking action. As a result, the A emergency diesel generator (EDG) was declared unavailable and inoperable. At the end of this inspection period, the licensee had not yet completed their evaluation of this finding, and had consequently not yet developed corresponding corrective actions. This finding is in the licensee's corrective action program as AR 332970.

This finding is more-than-minor because it affected the Equipment Performance attribute of the Mitigating Systems cornerstone, and affected the cornerstone objective of ensuring the availability, reliability, and capability of systems that respond to initiating events to prevent undesirable consequences, in that this finding resulted in unplanned unavailability of an emergency diesel generator. Using Attachment 4 of IMC 0609, the significance of this finding was determined to be of very low safety significance (GREEN), because although the finding could degrade the Emergency AC power function in the Mitigating Systems cornerstone, the finding was not a design or qualification deficiency confirmed not to result in loss of operability or functionality, did not represent a loss of system safety function, did not represent actual loss of safety function of a single train for longer than its TS Allowed Outage Time, did not represent an actual loss of safety function of one or more non-TS Trains of equipment designated as risk-significant, and did not screen as potentially risk significant due to a seismic, flooding, or severe weather initiating event. This finding has a cross-cutting aspect in the Work Practices component of the Human Performance area because the licensee did not communicate human error prevention techniques such that work activities were performed safely, in that the licensee did not communicate instructions for the sequence of valve operations during the pre-job brief and the licensee proceeded in the face of uncertainty by operating system components when the current system alignment was not verified. (H.4(a)) (Section 1R15.1)

#### B. Licensee-Identified Violations

None.

## REPORT DETAILS

Summary of Plant Status The unit began the inspection period at rated thermal power. On April 3, the licensee shut the plant down to Mode 3 to perform maintenance on the main turbine shaft. They restarted the plant on April 4 and operated at full power for the remainder of the inspection period.

### 1. REACTOR SAFETY

Cornerstones: Initiating Events, Mitigating Systems, Barrier Integrity

#### 1R01 Adverse Weather Protection

##### .1 Readiness For Impending Adverse Weather Condition – Tornado Watch

###### a. Inspection Scope

Since tornadoes with high winds were forecast in the vicinity of the facility for April 6, 2009, the inspectors reviewed the licensee's overall preparations for the expected weather conditions. On April 6 the inspectors walked down condensate storage tank and diesel fuel oil system, and the licensee's emergency alternating current (AC) power systems, because their safety-related functions could be affected or required as a result of high winds or tornado-generated missiles or the loss of offsite power. The inspectors evaluated the licensee staff's preparations against the site's procedures. During the inspection, the inspectors focused on plant specific design features and the licensee's procedures used to respond to specified adverse weather conditions. The inspectors also toured the plant grounds to look for any loose debris that could become missiles during a tornado. The inspectors evaluated operator staffing and accessibility of controls and indications for those systems required to control the plant. Additionally, the inspectors reviewed the Updated Final Safety Analysis Report (UFSAR) and performance requirements for systems selected for inspection, and verified that operator actions were appropriate as specified by plant specific procedures. The inspectors also reviewed a sample of corrective action program items to verify that the licensee identified adverse weather issues at an appropriate threshold and entered them into the corrective action program in accordance with station corrective action procedures. Specific documents reviewed during this inspection are listed in the Attachment.

###### b. Findings

No findings of significance were identified.

##### .2 Readiness of Offsite and Alternate AC Power Systems

###### a. Inspection Scope

The inspectors verified that plant features and procedures for operation and continued availability of offsite and alternate alternating current (AC) power systems during adverse weather were appropriate. The inspectors reviewed the licensee's procedures affecting these areas and the communications protocols between the transmission

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system operator (TSO) and the plant to verify that the appropriate information was being exchanged when issues arose that could impact the offsite power system. Examples of aspects considered in the inspectors' review included:

- The coordination between the TSO and the plant during off-normal or emergency events;
- The explanations for the events;
- The estimates of when the offsite power system would be returned to a normal state; and
- The notifications from the TSO to the plant when the offsite power system was returned to normal.

The inspectors also verified that plant procedures addressed measures to monitor and maintain availability and reliability of both the offsite AC power system and the onsite alternate AC power system prior to or during adverse weather conditions. Specifically, the inspectors verified that the procedures addressed the following:

- The actions to be taken when notified by the TSO that the post-trip voltage of the offsite power system at the plant would not be acceptable to assure the continued operation of the safety-related loads without transferring to the onsite power supply;
- The compensatory actions identified to be performed if it would not be possible to predict the post-trip voltage at the plant for the current grid conditions;
- A re-assessment of plant risk based on maintenance activities which could affect grid reliability, or the ability of the transmission system to provide offsite power; and
- The communications between the plant and the TSO when changes at the plant could impact the transmission system, or when the capability of the transmission system to provide adequate offsite power was challenged.

Documents reviewed are listed in the Attachment to this report. The inspectors also reviewed corrective action program items to verify that the licensee was identifying adverse weather issues at an appropriate threshold and entering them into their corrective action program in accordance with station corrective action procedures.

b. Findings

No findings of significance were identified.

1R04 Equipment Alignment

a. Inspection Scope

Partial System Walkdowns:

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

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<u>System Walked Down</u>	<u>SSC Out of Service</u>	<u>Date Inspected</u>
A emergency diesel generator	B emergency diesel generator	April 20
B train control room HVAC	A water cooled condensing unit	April 28
A & B emergency diesel generator	dedicated shutdown diesel generator	May 27

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.

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 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>
5	component cooling pump room
8	boron injection tank room
1	B emergency diesel generator room
20	E1 / E2 electrical switchgear room
25A & B	turbine building ground floor

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

- 323794, Fire door to motor driven auxiliary feedwater pump room failed to close
- 294126, Jockey pump found not running
- 315081, Failure of fire brigade foam equipment

b. Findings

No findings of significance were identified.

1R07 Biennial Heat Sink Performance

a. Inspection Scope

The inspectors reviewed inspection records, clean and inspect results, corrective action program documents, and other documentation to ensure that heat exchanger (HX) deficiencies that could mask or degrade performance were identified and corrected. Procedures and records were also reviewed to verify that these were consistent with Generic Letter (GL) 89-13 licensee commitments, and industry guidelines. Risk significant heat exchangers (HX) reviewed included the Component Cooling Water (CCW) HXs, Non-Regenerative HXs, Residual Heat Removal (RHR) HXs and Safety Injection (SI) Pump Coolers.

The inspectors reviewed HX inspection and cleaning work instructions, work maintenance history, and completed inspection records for all the safety related HXs selected. The documents were reviewed to verify inspection methods were consistent with industry standards, to verify HX design margins were being maintained, and to verify performance of the HXs under the current maintenance frequency was adequate.

The inspectors also reviewed general health of the service water system via review of design basis documents, system health reports, inservice testing requirements, heat exchanger performance testing calculations, and discussions with the service water (SW) system engineer. These documents were reviewed to verify the design basis was being maintained and to verify adequate SW system performance under current preventive maintenance, inspections, and test frequencies. The inspectors physically walked down accessible portions of the SW system including the heat exchangers, SW discharge canal, Lake Robinson dam and tainter gates. The inspectors reviewed the dam inspection reports and spoke with engineers regarding the health of Lake Robinson with respect to Zebra Mussels and Asiatic Clams.

The inspectors also verified SW system corrosion and degradation were being monitored and addressed via review of corrosion control program procedures, SW pipe replacement and material condition action plans, and discussions of coatings with applicable engineers.

Corrective action program documents, Action Reports (AR), were reviewed for potential common cause problems and problems that could affect system performance, and to confirm that the licensee was entering problems into the corrective action program and initiating appropriate corrective actions.

Documents reviewed are listed in the Attachment.

b. Findings

No findings of significance were identified.

1R11 Licensed Operator Regualification

1. Quarterly Review of Licensed Operators' Regualification Testing and/or Training Activities

a. Inspection Scope

On April 16, the inspectors observed licensed-operator performance during regualification simulator training for crew four to verify that operator performance was consistent with expected operator performance, as described in Licensed Operator Continued Training scenario LOCT 01-1, Rev. 3. 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 the failure of a steam generator pressure channel, loss of main condenser vacuum, reactor trip, safety injection, and steam generator tube rupture. The inspectors focused on clarity and formality of communication, the use of procedures, alarm response, control board manipulations, group dynamics, and supervisory oversight.

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

Documents reviewed are listed in the Attachment.

b. Findings

No findings of significance were identified.

2. Annual Review of Licensee Qualification Examination Results

a. Inspection Scope

On March 12, 2009, the licensee completed the comprehensive biennial regualification written examinations and annual regualification operating tests required to be administered to all licensed operators in accordance with 10 CFR 55.59(a)(2). The inspectors performed an in-office review of the overall pass/fail results of the written examinations, individual operating tests and the crew simulator operating tests. These results were compared to the thresholds established in Manual Chapter 0609 Appendix I, Operator Regualification Human Performance Significance Determination Process.

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>
B emergency diesel generator tripped from full load condition	283403
A boric acid transfer pump tripped during operation	317832
Control room ventilation cooler, WCCU-1B, tripped during testing	313186

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



- April 13 – April 17, including emergent corrective maintenance activities on control room annunciator panel APP-036
- April 20 – April 24, including Yellow risk conditions due to emergent corrective maintenance on the B emergency diesel generator, severe thunderstorm conditions, and scheduled preventive maintenance on the C charging pump
- May 2 – May 8, including a Yellow risk condition due to surveillance testing of the A emergency diesel generator
- May 23 – May 29, including a Yellow risk condition due to preventive maintenance that affected the dedicated shutdown diesel generator
- June 8 – June 12, including a Yellow risk conditions due to crane activity near off-site power lines to the start-up transformer

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

- 332510, B spent fuel pool cooling pump was not protected while A spent fuel pool cooling pump was out of service for maintenance
- 337483, Worst case risk scenario performing [maintenance surveillance test procedure] MST-901, "Radiation Monitoring System"

b. Findings

No findings of significance were identified.

1R15 Operability Evaluations

.1 Baseline Inspections of Operability Evaluations

a. Inspection Scope

The inspectors reviewed the six operability determinations associated with the ARs 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, and 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:

- 330867, steam driven auxiliary feedwater pump steam leak from throttle valve upper bonnet

- 331321, steam driven auxiliary feedwater pump drain valve, AFW-18, leaking past seat
- 325384, A emergency diesel generator past operability evaluation when fuel oil fitting was tightened without a work order
- 332609, cotter pin in emergency diesel generator output breakers may prevent breaker from closing on demand
- 332970, water intrusion into A emergency diesel generator room resulting in DC grounds
- 335401, broken stud on B charging pump pulsation damper baseplate

Documents reviewed are listed in the Attachment.

b. Findings

Introduction: A self-revealing Green finding was identified for the licensee's failure to follow procedure OP-925, Cold Weather Operation while restoring auxiliary building evaporative air coolers to service. Consequently, licensee personnel opened service water isolation valves with downstream vent plugs removed and drain valves open, causing water to overflow onto the A EDG electrical components and cause grounds on the DC Bus. As a result, the A EDG was declared unavailable and inoperable.

Description: On April 28 the licensee took actions in accordance with Procedure OP-925, Cold Weather Operation, to restore auxiliary building systems from cold weather provisions. Step 8.3.2.6 of OP-925 directs operators to cancel the clearance installed for freeze protection and restore the water supplies to the evaporative air coolers in accordance with Attachment 10.6. Attachment 10.6 directs the operator to reinstall drain plugs and close drain valves before aligning the service water flow path. Contrary to that direction, the licensee failed to install drain plugs and close drain valves prior to aligning the service water flow path. This failure improperly aligned the system and allowed service water to flow out of the open plugs and drain valves and into the A emergency diesel generator control cabinet. As a result, two control room annunciators alarmed indicating ground faults in that cabinet. Approximately thirty minutes later, the control room operators received a report from the work control center that: 1) water was found in the A EDG room as a result of restoring the OP-925 clearance, 2) the source of the water was isolated, and 3) water was discovered on and around the A EDG control cabinet. The licensee declared the A EDG inoperable due to water intrusion and DC grounds, resulting in approximately twenty-one hours of EDG inoperability.

Although a violation of regulatory requirements was not identified, this failure was a performance deficiency with respect to the licensee's Procedure PRO-NGGC-0200, Procedure Use and Adherence, Rev. 10, which requires all personnel who use procedures to understand the impact of their actions on personnel or equipment before taking action.

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Analysis: Failing to use established procedures to align the auxiliary building evaporative air coolers for service is a performance deficiency. This finding is more-than-minor because it affected the Equipment Performance attribute of the Mitigating Systems cornerstone, and affected the cornerstone objective of ensuring the availability, reliability, and capability of systems that respond to initiating events to prevent undesirable consequences. Using Attachment 4 of IMC 0609, the significance of this finding was determined to be of very low safety significance (GREEN), because although the finding could degrade the Emergency AC power function in the Mitigating Systems cornerstone, the finding:

- was not a design or qualification deficiency confirmed not to result in loss of operability or functionality,
- did not represent a loss of system safety function,
- did not represent actual loss of safety function of a single Train, for longer than its TS Allowed Outage Time,
- did not represent an actual loss of safety function of one or more non-TS Trains of equipment designated as risk-significant per 10 CFR 50.65, for >24 hrs, and
- did not screen as potentially risk significant due to a seismic, flooding, or severe weather initiating event.

This finding is in the licensee's corrective action program as AR 332970.

This finding has a cross-cutting aspect in the Work Practices component of the Human Performance area because the licensee did not communicate human error prevention techniques such that work activities were performed safely, in that the licensee did not communicate instructions for the sequence of valve operations during the pre-job brief and the licensee proceeded in the face of uncertainty by operating system components when the current system alignment was not verified. (H.4(a))

Enforcement: Enforcement action does not apply because the performance deficiency did not involve a violation of regulatory requirements. Because this finding does not involve a violation of regulatory requirements and has a very low safety significance, it is characterized as a finding and is designated FIN 05000261/2009003-01, Failure to follow procedures while restoring service water to the evaporative air coolers resulting in emergency diesel generator inoperability.

.2 Unresolved Item (URI) 2009-002-01, "Operability of the A emergency diesel generator from February 9 to March 10, 2009."

a. Inspection Scope

As described in section 1R15.1 of Inspection Report 500261/2009002, this unresolved item had been opened to determine whether the A emergency diesel generator (EDG)

was operable during the period from February 9 through March 10 with a leaking fitting on a fuel oil line. Specifically, that section said that further inspection was required to review any analyses produced by the licensee and/or evidence gathered by the licensee that relates to the operability of the A EDG during the subject period, and subsequently determine whether those results demonstrate that the A EDG was operable during that period.

As part of the further investigation mentioned above, on June 10 and June 15, the inspectors observed shop tests that produced results that relate directly to this issue. The inspectors also reviewed the licensee's analysis of the test results, as described in Engineering Determination (ED) 73169, Rev. 2.

To enable the test, the licensee prepared and used a test assembly to model the configuration of the affected fuel oil fitting, using water as a test fluid. During the test, the licensee measured leak rates from the fitting with the fitting in the following three configurations:

- First, the licensee established test conditions (fluid pressure, fluid flow rate, and fluid leak rate) that were similar to those that would have existed in the affected fitting during an emergency start of the EDG after February 9 and before March 10. The licensee then measured that leak rate.
- Next, the licensee tightened the fitting slightly, to simulate the fitting check that had occurred on March 10, and measured the resulting leak rate.
- Finally, the licensee tightened the fitting as tight as possible without straining, and measured the resulting leak rate.

The licensee conducted nine such tests. The inspectors observed eight of those tests. The tests were conducted in accordance with work order 1553319, and the test results were incorporated into ED 73169 Rev. 2.

The inspectors determined that the test assembly adequately represented the configuration of the affected fitting. However, the inspectors noted that the tested fitting did not exactly match the fitting that had failed, in that the failed fitting had been cracked, and in the tested fitting, the crack had been simulated by a machine-cut slot. In the inspectors' judgment, the leak rate from the tested fitting would be greater than the leak rate that would have resulted from a cracked fitting, simply because the machine-cut slot offered a less-restrictive flow path than did a crack. The inspectors therefore considered the test results to be bounding rather than representative, and could be used to support conclusions regarding A EDG operability.

In the analysis described in ED 73169, Rev. 2, the licensee noted that during the subject tests, no flow rate greater than 0.1 gpm had been observed, and concluded that 0.1 gpm represented the maximum leak rate that would have resulted if a mechanic had attempted to tighten the fitting during the period from February 9 through March 10. The licensee determined that a leak rate of 0.1 gpm would not have rendered the EDG inoperable, and that without a mechanic's intervention, the leak rate would not have

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increased due to vibration or other effects. Through their review, the inspectors determined that the analyses described in ED 73169 were valid, and therefore concluded that the A EDG had remained operable during the period from February 9 through March 10. This URI is therefore closed. However, in related circumstances, the inspectors identified the violation described below.

b. Findings

Introduction: The inspectors identified a green non-cited violation of Technical Specification 5.4.1, Administrative Controls (Procedures) associated with two events in which maintenance technicians failed to follow site procedure ADM-NGGC-0104, Work Management Process, (which implements written procedures covering section 9 of Appendix A of Regulatory Guide 1.33) by tightened fuel oil fittings on the A emergency diesel generator (EDG) without pre-planning and performing the activity in accordance with written procedures, documented instructions, or drawings appropriate to the circumstances. Consequently, the tightening of the fuel oil fitting resulted in the fuel oil leakage to increase and the unplanned inoperability and unavailability of the emergency diesel generator.

Description: On February 9, after the licensee started the A EDG for a routine surveillance test, operators noted a fuel oil leak of approximately 5 drops/minute from the inboard fitting on the fuel oil line from the duplex filter to the fuel injector for the #1 cylinder. After the control-room staff determined that a leak of that magnitude did not render the EDG inoperable, they completed the surveillance test and then initiated work request 369565 to repair the leaking fitting. After the test was complete, as directed by a maintenance supervisor, without any written instructions, and without the knowledge of the control-room staff, a maintenance technician tightened the leaking fitting with a wrench and reported to his supervisor "some nut movement". The next day, work order 1496721 was first initiated in response to the subject work request and then cancelled with the note that "per the system engineer, there is no concern at this time."

On March 9, after the licensee started the A EDG for another surveillance test, operators noted a fuel oil leak of approximately 100 drops/minute from the same fitting that had leaked during the February 9 test. While the March 9 test was underway, after Operations asked Maintenance to investigate the leak, and as directed by a maintenance supervisor, a maintenance technician used a wrench to check the fitting for tightness. Although the technician reported no nut movement, as a result of this activity the leak flow rate increased to what the licensee characterized as "a steady stream." Following this increase in the leak rate, the control-room staff shut down the EDG and declared it inoperable. The licensee initiated a work request to repair the leak, converted that work request to a corresponding work order, and then under that work order replaced the leaking fitting on March 10. After removal, visual examination of the subject fitting revealed that the ferrule inside the fitting was cracked. After reviewing the related circumstances, the licensee determined that the February 9 maintenance activity had probably cracked the ferrule.

Analysis: The February 9 and March 9 maintenance activities were both performance deficiencies with respect to TS 5.4.1, because:

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- TS 5.4.1 requires, in part, that the licensee implement written procedures covering the applicable procedures in Regulatory Guide 1.33, and Regulatory Guide 1.33, Appendix A, section 9, Procedures for Performing Maintenance, states that maintenance that can affect the performance of safety-related equipment should be properly pre-planned and performed in accordance with written procedures, documented instructions, or drawings appropriate to the circumstances; and because
- the February 9 and March 9 maintenance activities each involved maintenance on a safety-related component that was not pre-planned and performed in accordance with written procedures, documented instructions, or drawings.

This finding is more-than-minor because it is associated with the Equipment Performance attribute of the Mitigating Systems cornerstone and affected the availability of the emergency diesel generator to respond to a loss of offsite power event. Using Attachment 4 of MC 0609, Significance Determination Process, this finding screened as having very low safety significance (Green) because the finding was not a design or qualification deficiency confirmed not to result in loss of operability or functionality, did not represent a loss of a system safety function, did not represent an actual loss of safety function of a single train, did not represent an actual loss of safety function of one or more non-Tech Spec Trains of equipment designated as risk-significant, and did not screen as potentially risk significant due to a seismic, flooding, or severe weather initiating event.

The inspectors determined that the apparent cause of this finding was that management did not provide oversight that was adequate to ensure that maintenance technicians completed maintenance on safety-related components only in accordance with approved procedures. This finding therefore has a cross-cutting aspect in the Work Practices component of the Human Performance area because personnel work practices did not support human performance, in that the licensee's work practices did not ensure supervisory and management oversight of work activities such that nuclear safety is supported. (H.4(c))

Enforcement: TS 5.4.1 requires, in part, that the licensee implement written procedures covering the applicable procedures recommended in Regulatory Guide 1.33. Regulatory Guide 1.33, Appendix A, section 9, Procedures for Performing Maintenance, states that maintenance that can affect the performance of safety-related equipment should be properly pre-planned and performed in accordance with written procedures, documented instructions, or drawings appropriate to the circumstances. Site procedure ADM-NGGC-0104, Work Management Process, section 9.8.1 requires the use of an approved procedure to perform a maintenance activity on safety-related equipment. Contrary to the above, on February 9, 2009, and on March 9, 2009, maintenance personnel completed maintenance that affected the performance of safety-related equipment which was not pre-planned and performed in accordance with written procedures, documented instructions, or drawings appropriate to the circumstances. On both of those dates and in an effort to stop leakage from a fuel oil line on the A EDG, maintenance personnel adjusted that fitting without reference to a procedure, instruction, or drawing, and in

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doing so increased the leak rate from that fitting. In response to this finding, the licensee revised their Maintenance Administration Program to clearly communicate that “skill of the craft” work on safety related equipment is prohibited without a procedure/work order, and held stand-down meetings to retrain all maintenance and planning personnel on work practices for safety related structures, systems and components. This finding is in the licensee’s corrective action program as AR 325384.

Because this violation was of very low safety significance and it was entered into the licensee’s corrective action program, this violation is being treated as a non-cited violation (NCV), consistent with the NRC Enforcement Policy. This violation is therefore designated as NCV 05000261/2009003-02, Failure to follow procedures while performing maintenance on an emergency diesel generator.

1R18 Plant Modifications

.1 Temporary Modification

a. Inspection Scope

The inspectors reviewed the temporary modification described in Engineering Change 73334, temporary support changes for B charging pump component removal, to verify that the modification did not affect the safety functions of important safety systems, and to verify 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.

.2 Permanent Modification

a. Inspection Scope

The inspectors reviewed the permanent modification described in Engineering Change 71726 and 72581, install boric acid transfer pump flowmeter for A boric acid transfer pump, to verify that the modification design, implementation, and testing did not degrade the design basis, licensing basis, and performance capabilities of risk significant equipment and did not place the plant in an unsafe or unanalyzed condition. The inspectors also verified 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 Testinga. 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>
OP-301	Chemical and Volume Control System (CVCS)	Repair CVC-342 body to bonnet leak	April 8
OST-409-2	[Emergency Diesel Generator] "B" Fast Speed Start	Replace breaker 52/27B "B" emergency diesel generator output breaker	April 21
OP-604	Diesel Generators "A" & "B"	Replace several switches in the output breaker control circuit of B emergency diesel generator	April 23
OP-602	Dedicated Shutdown System	Complete 18-month preventive-maintenance overhaul of the diesel engine and various bus-related tasks	May 28
OST-402-1	[Emergency Diesel Generator] A Diesel Fuel Oil System Flow Test	Replace diesel fuel oil solenoid valve, EV-1963A-2	June 1
OST-908	Component Cooling System Component Test	Replace shaft seal on C component cooling water pump	June 25

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

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- 329859, Post maintenance test not specified in work instructions for CVC-342 maintenance

b. Findings

No findings of significance were identified.

1R20 Refueling and Outage Activities

a. Inspection Scope

For the plant shutdown that began on April 3 and ended on April 4, the inspectors evaluated licensee shutdown and startup activities to verify that the licensee considered risk in developing outage schedules, adhered to administrative risk reduction methodologies they developed to control plant configuration, and adhered to operating license and technical specification requirements that maintained defense-in-depth.

b. Findings

No findings of significance were identified.

1R22 Surveillance Testing

a. Inspection Scope

For the six 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-202*	Steam Driven Auxiliary Feedwater System Component Test	April 15
OST-409-2	[Emergency Diesel Generator] "B" Fast Speed Start	April 20
OST-252-2	[Residual Heat Removal] System Valve Test – Train B	April 27
OST-201-1	[Motor Driven Auxiliary Feedwater] System Component Test – Train A	May 13
OST-910	Dedicated Shutdown Diesel Generator (Monthly)	May 28

OST-750-1                      Control Room Emergency Ventilation      June 4  
 System – Train “A” (Monthly)

\*This procedure included inservice testing requirements.

b. Findings

No findings of significance were identified.

Cornerstone: Emergency Preparedness

1EP6 Drill Evaluation

a. Inspection Scope

On April 14, the inspectors observed an emergency preparedness drill to verify licensee self-assessment of classification, notification, and protective action recommendation development in accordance with 10 CFR 50, Appendix E. The inspectors also attended the post-drill critique to verify that the licensee properly identified failures in classification, notification and protective action recommendation development activities. Documents reviewed are listed in the Attachment.

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 those data to the actual data, as described below. The inspectors also compared the licensee’s basis in reporting each data element to the PI definitions and guidance contained in NEI 99-02, “Regulatory Assessment Indicator Guideline,” Rev. 5. In addition, the inspectors interviewed licensee personnel associated with collecting, evaluating, and distributing these data.

Mitigating Systems Cornerstone

- Mitigating Systems Performance Index, Residual Heat Removal
- Safety System Functional Failures

For the period from the first quarter of 2008 through the first quarter of 2009, the inspectors reviewed Licensee Event Reports (LERs), records of inoperable equipment,

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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 licensee's basis for identifying unavailability hours.

Documents reviewed are listed in the Attachment.

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

For detailed review, the inspectors selected the following ARs:

- 322180: This AR relates to operator workarounds, in that it identifies that the operator workaround goal was not met. The inspectors reviewed this report to verify that the licensee is identifying operator workaround problems at an appropriate threshold and entering them in the corrective action program, and has proposed or implemented appropriate corrective actions.
- 315777: This AR relates to the initiating events cornerstone, in that it involves the unexpected lifting of a steam-generator power-operated relief valve during power operation.

During these reviews, the inspectors also verified compliance with the requirements of the CAP as described 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

Failure to address environmental conditions associated with freeze-protection temperature sensors

Introduction: A self-revealing Green finding was identified for the licensee's failure to identify the environmental conditions that temperature sensors in certain freeze-protection circuits could experience after routine installation of cold-weather enclosures during cold-weather operation. This failure was determined to be a performance

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deficiency with respect to licensee procedure EGR-NGGC-0005, Engineering Change, which requires that the licensee identify the functional performance requirements of each system, structure, or component being modified in all possible configurations. As a result, installation of temperature sensors followed by installation of those enclosures created a condition that caused the freeze-protection circuits to not actuate during cold weather, which in turn caused fluid in affected pressure-sensing line to freeze, which caused a steam generator power-operated relief valve (SG PORV) to open during power operation.

Description: On October 31, 2008, the licensee completed installation of Engineering Change (EC) 70032, which included two new freeze-protection circuits intended to protect from freezing the fluid in the pressure-sensing line for controller for the B SG PORV. In accordance with that EC, the new temperature sensors for those circuits were installed in the vicinity of the cabinet that housed the main steam line pressure transmitters. Also, in the few days before October 31, 2008, maintenance personnel completed installation of several cold-weather enclosures in accordance with procedure OP-925, "Cold Weather Preparations". One of those enclosures was installed to protect the cabinet that housed the main steam line pressure transmitters, and included a temporary heater. After installation of that enclosure, the temperature sensors installed in accordance with EC 70032 were inside the enclosure.

At approximately 0700 on January 20, 2009, temperature at the site fell below freezing and remained below freezing for at least the next 24 hours. In response and in accordance with OP-925, operators turned on the heater inside the cold-weather enclosure installed to protect the cabinet that housed the main steam line pressure transmitters. At 0753 on January 21, while the plant was operating at near full power, the B SG PORV opened. Operators took manual control of the PORV to close it, thus rendering inoperable the PORV's automatic function.

The licensee's investigation of this event determined that:

- the PORV had opened because the PORV's controller had sensed an increase in steam line pressure;
- the PORV's controller had sensed an increase in steam line pressure because fluid in the sensing line had expanded while becoming frozen;
- fluid in the sensing line had frozen because ambient temperatures were below freezing and because the freeze-protection circuits installed in accordance with EC 70032 had not actuated; and
- the subject freeze-protection circuits had not actuated because the temperature sensors for those circuits were inside the heated cold-weather enclosure installed to protect the cabinet that housed the main steam line pressure transmitters, and thus didn't sense temperatures below freezing.

The inspectors determined that the temperature sensors for those circuits were inside the heated cold-weather enclosure primarily because the personnel who prepared EC

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70032 had not identified and considered the program under which the cold-weather enclosures had been installed, and had therefore not either accounted in that EC for the effects of those enclosures on the operation of the freeze-protection circuits, or modified OP-925 to ensure that those enclosures would not affect the freeze-protection circuits.

Although a violation of regulatory requirements was not identified, this failure was a performance deficiency with respect to the licensee's Procedure EGR-NGGC-0005 ("Engineering Change") which requires, in part, that the licensee identify the functional performance requirements of each SSC being modified in all possible operational configurations. As described below, the licensee did not identify the performance requirements of certain freeze-protection circuits in a possible operational configuration, in that they did not identify those requirements in the configuration that would exist after cold-weather enclosures were installed in accordance with Procedure OP-925 ("Cold Weather Preparations"), and therefore did not identify the environmental conditions that temperature sensors in the freeze-protection circuits could experience after installation of those enclosures.

Analysis: The failure while developing EC 70032 to consider the program which installs cold-weather enclosures and the effects of those enclosures on the operation of the freeze-protection circuits is a performance deficiency with respect to a licensee procedural requirement and therefore constitutes a finding. The associated procedural requirement is that Procedure EGR-NGGC-0005 ("Engineering Change") requires, in part, that the licensee identify the functional performance requirements of each SSC being modified under various modes of operation, and in all possible operational configurations. With respect to this requirement, the subject failure represents a failure to identify the functional performance requirements of the freeze-protection circuits in the operational configuration that would result from the temperature sensors being sheltered by a cold-weather enclosure.

This finding is more-than-minor for two reasons:

- it is associated with the Equipment Performance attribute of the Initiating Events cornerstone and affected the cornerstone objective of limiting the likelihood of those events that upset plant stability and challenge critical safety functions during power operations, in that this finding created conditions which caused an event that upset plant stability during power operations; and
- it is associated with the Equipment Performance attribute of the Mitigating Systems cornerstone and affected the cornerstone objective of ensuring the availability, reliability, and capability of systems that respond to initiating events to prevent undesirable consequences, in that this finding created conditions which rendered inoperable the automatic function of the B SG PORV.

Using Appendix A of the Significance Determination Process (SDP) described in MC 0609, this finding did not screen as green because it was a transient initiator contributor and because the finding contributed to both the likelihood of a reactor trip and the likelihood that mitigation equipment or functions will not be available, in that this finding created conditions that caused a S/G PORV to open during power operation, and

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rendered inoperable the automatic functions of that PORV. A regional Senior Reactor Analyst performed a Phase 3 evaluation under the Significance Determination Process. The performance deficiency was determined to be of very low safety significance (Green). The evaluation was accomplished using the NRC's Probabilistic Risk Assessment computer model of the plant with basic event MSS-ADV-CC-RV1-2, FAILURE OF SG-B PORV RV1-2, set to always fail. The model was quantified with a one day exposure period. The dominant accident sequences involved Steam Generator Tube Ruptures with complications, partially due to the finding, in depressurizing and cooling down. Consequently, the Residual Heat Removal System was not placed into service resulting in core damage and a Large Early Release. The major assumptions included that recovery of the failed component was possible and common cause inclusion was not appropriate.

This finding is in the licensee's corrective action program as AR 339914.

The inspectors determined that the apparent cause of this finding was that the method used in the EC process to identify affected programs (Attachment 7 to EGR-NGGC-0005, "EC Screening Criteria") was unwieldy to use, in that it includes more than 600 criteria distributed over 29 pages, and in that many of those criteria are so general as to not readily enable engineers to identify affected programs. In particular, the criterion that most likely would have enabled engineers to identify that EC 70032 could be affected by the licensee's program for installing cold-weather enclosures is one that reads, "*[Does the EC] Affect any [Plant Operations Manual] procedure or other controlled document ... for which Operations has responsibility?*" This finding therefore has a cross-cutting aspect in the Resources component of the Human Performance area because the licensee did not provide and ensure that complete, accurate, up-to-date design documentation were available and adequate to plant personnel, in that the licensee did not ensure that Attachment 7 to EGR-NGGC-005 was adequate to enable engineers to identify a potential interference between the modification described in EC 70032 and the program described in OP-925 ("Cold Weather Preparations"). (H.2(c))

Enforcement: Enforcement action does not apply because the performance deficiency did not involve a violation of regulatory requirements. Because this finding does not involve a violation of regulatory requirements and has a very low safety significance, it is characterized as a finding and is designated as FIN 05000261/2009003-03, Failure to address environmental conditions associated with freeze-protection temperature sensors.

### .3 Semi-Annual Trend Review

#### a. Inspection Scope

The inspectors performed a review of the CAP and associated documents to identify trends that could indicate the existence of a more significant safety issue. The inspector's review focused on repetitive equipment issues, but also considered the results of daily inspector CAP item screening discussed in Section 40A2.1, licensee trending efforts, and licensee human performance results. The inspector's review nominally considered the six month period of January, 2009, through June, 2009,

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although some examples expanded beyond those dates when the scope of the trend warranted. The review included issues documented outside the normal CAP in major equipment problem lists, repetitive and/or rework maintenance lists, departmental problem/challenges lists, system health reports, quality assurance audit/surveillance reports, self assessment reports, and Maintenance Rule assessments. The inspectors compared and contrasted their results with the results contained in the latest monthly and quarterly trend reports. Corrective actions associated with a sample of the issues identified in the trend reports were reviewed for adequacy. The specific documents reviewed are listed in the Attachment.

The inspectors also evaluated the trend reports against the requirements of the CAP as specified in 10 CFR 50, Appendix B, Criterion XVI, and in Procedures CAP-NGGC-0200, Corrective Action Program, and CAP-NGGC-0206, Corrective Action Program Trending and Analysis.

b. Assessment and Observations

No findings of significance were identified. The inspectors evaluated trending methodology and observed that the licensee had performed a detailed review. The licensee routinely reviewed cause codes, involved organizations, key words, and system links to identify potential trends in their CAP data. Through their daily reviews and other inspections, the inspectors identified two trends that were noteworthy:

- The inspectors identified a trend in priority-2 adverse-condition evaluations in which evaluators had identified but had not adequately addressed causes of adverse conditions. These inadequate evaluations are performance deficiencies with respect to CAP-NGGC-0200, Corrective Action Program; however none of these performance deficiencies were determined to be more-than-minor. In response to this inspector-identified trend, the licensee completed a self-assessment of completed priority-2 adverse-condition evaluations, to determine whether those evaluations had adequately addressed the causes of the identified conditions. That self-assessment examined 56 of those evaluations, and found that 58 percent included some type of error, and 28 percent included major errors. Subsequently, the licensee integrated those assessment results into the self-assessment described in AR 310373, and initiated AR 334843 to develop corrective actions to address this trend.
- The inspectors determined that the violation of TS 5.4.1 described in section 1R15.2 represented a continuation of a long-standing licensee-identified trend in procedural non-compliance within the site maintenance organization, and that the licensee had not related that violation to that trend. The inspectors noted that the subject trend had been identified in a maintenance assessment in 2005, in multiple Nuclear Assessment Section roll-up reports in 2006, and in another maintenance assessment in 2007. Corrective actions to address this trend are described in AR 325384.

#### 4OA5 Other Activities

##### .1 Quarterly Resident Inspector Observations of Security Personnel and Activities

###### a. Inspection Scope

During the inspection period, the inspectors observed Security force personnel and activities to ensure that the activities were consistent with licensee security procedures and regulatory requirements relating to nuclear plant security. These observations took place during both normal and off-normal plant working hours.

These quarterly resident inspector observations of security force personnel and activities did not constitute any additional inspection samples. Rather, they were considered an integral part of the inspectors' normal plant status review and inspection activities.

###### b. Findings

No findings of significance were identified.

#### 4OA6 Meetings, Including Exit

On July 15, 2009, the resident inspectors presented the inspection results to Mr. Eric McCartney and other members of his staff. The inspectors confirmed that proprietary information was not provided or examined during the inspection.

An exit was conducted on June 4, 2009 to discuss the findings of the Heat Sink Performance inspection. The inspectors confirmed that proprietary information was not provided or examined during the inspection.

ATTACHMENT: SUPPLEMENTAL INFORMATION

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## **SUPPLEMENTAL INFORMATION**

### **KEY POINTS OF CONTACT**

#### Licensee personnel

C. Baucom, Manager, Support Services - Nuclear  
W. Farmer, Engineering Manager  
J. Huegel, Maintenance Manager  
K. Jensen, Maintenance Manager  
K. Jones, Operations Manager  
J. Lucas, Nuclear Oversight Manager  
E. McCartney, Vice President  
J. Rhodes, Radiation Protection Superintendent  
S. Saunders, Plant General Manager  
K. Smith, Training Manager

#### NRC personnel

R. Musser, Chief, Reactor Projects Branch 4

## LIST OF ITEMS OPENED, CLOSED, AND DISCUSSED

### Opened

None

### Closed

05000261/2009-002-01    URI    Operability of the A emergency diesel generator from February 9 to March 10, 2009. (1R15.2)

### Opened & Closed

05000261/2009003-01    FIN    Failure to properly restore service water to the evaporative air coolers resulting in emergency diesel generator inoperability (1R15.1)

05000261/2009003-02    NCV    Failure to follow procedures while performing maintenance on an emergency diesel generator. (1R15.2)

05000261/2009003-03    FIN    Failure to address environmental conditions associated with freeze-protection temperature sensors. (4OA2.2)

### Discussed

None

## LIST OF DOCUMENTS REVIEWED

### **Section 1R01: Adverse Weather Protection**

#### Procedures

OMM-021, Operation During Adverse Weather Conditions, Rev. 36  
EMG-SUBS-00006, General Load Reduction and System Restoration Plan, Rev. 7  
Systems Operational Reference Manual Carolinas  
OMM-001-2, Shift Routines and Operating Practices, Rev. 61  
OMM-048, Work Coordination and Risk Assessment, Rev. 41  
NGGM-IA-0003, Transmission Interface Agreement for Operation, Maintenance, and Engineering Activities at Nuclear Plants, Rev. 7  
OP-604, Diesel Generators “A” and “B”, Rev. 77

#### UFSAR Sections

10.4.8, Auxiliary Feedwater System  
3.3, Wind and Tornado Loadings  
15.2.2, Loss of External Electrical Load

### **Section 1R04: Equipment Alignment**

#### Partial System Walkdown

A Emergency Diesel Generator system:

Procedure OP-604, Diesel Generator “A” and “B”, Rev. 77  
Procedure OWP-007, Diesel Generators, Rev. 61  
System Description, SD-005, Emergency Diesel Generators, Rev. 13  
Drawing G-190204-A, Emergency Diesel Generator System Flow Diagram, sheet 1 of 3, Rev. 19  
Drawing G-190204-A, Emergency Diesel Generator System Flow Diagram, sheet 3 of 3, Rev. 31

Train B Control Room HVAC system:

Procedure OP-906, Heating, Ventilation, and Air Conditioning, Rev. 52  
Procedure OWP-019, Ventilation, Rev. 17  
System Description, SD-036, HVAC, Rev. 11  
Drawing G-190304, HVAC – Turbine, Fuel, Auxiliary, Reactor, and Radwaste Building System Flow Diagram, sheet 4 of 4, Rev. 7

### **Section 1R05: Fire Protection**

#### UFSAR Sections of Appendix 9.5.1A

3.3 Component Cooling Pump Room  
3.1.8.1 Boron Injection Tank Room  
3.7.1 Fire Zone 25A - Turbine Building East Ground Floor  
3.7.2 Fire Zone 25B - Turbine Building West Ground Floor

Procedures

Results from OST-611-1, Low Voltage Fire Detection and Actuation System Zones 1 & 2 (Semi-Annual), Rev. 7, dated 2/28/09

Results from OST-611-2, Low Voltage Fire Detection and Actuation System Zones 3, 4, 5 (Semi-Annual), Rev. 3, dated 3/6/09

Results from OST-611-4, Low Voltage Fire Detection and Actuation System Zones 8 & 28 (Semi-Annual), Rev. 3, dated 1/7/09

Results from OST-611-11, Low Voltage Fire Detection and Actuation System Zones 19 & 20 (Semi-Annual), Rev. 6, dated 12/14/08

Results from OST-620, Carbon Dioxide Suppression System Weight Test (Semiannual), Rev. 27, dated 12/29/08

Results from OST-621, Diesel Generator CO<sub>2</sub> System Cylinder Weight Test (Semi-Annual), Rev. 25, dated 2/6/09

Results from OST-624, Fire Damper Inspection (18-Month), Rev. 21, dated 11/12/08

Results from OST-627, Functional Test of the Emergency Diesel Generators CO<sub>2</sub> Cardox Suppression System (Annual), Rev. 30, dated 3/29/09

Results from OST-628, Functional Test of the Halon 1301 System (Annual), Rev. 21, dated 9/18/08

Results from OST-630, Halon 1301 Suppression System Weight Test (Semi-Annual), Rev. 29, dated 12/31/08

Results from OST-648, [Component Cooling Water] One-Hour Rated Fire Barrier Wrap Inspection (18 Months), Rev. 5, dated 2/1/09

Results from OST-656, [Component Cooling Water] Pump Room Sprinkler System Drain and Alarm Test (Semi-Annual), Rev. 5, dated 3/4/09

Drawings

G-190181, General Arrangement Turbine Building Ground Floor Plan

Other documents

Work Order 1333276, repair fire door to motor driven auxiliary feedwater pump room

Transient & Permanent Combustibles Database

Calculation, CPL025.0200.0001, Combustible Loading Calculation, Rev. 26

Action Requests

274812, fire door to motor driven auxiliary feedwater pump room failed to close

**Section 1R07: Heat Sink Performance**Procedures

AOP-022, Loss of Service Water, Revision 31

SP-1479, Service Water Pipe Replacement for the CCW HX Return Piping Project Coordination for RO-20, Rev. 3

CP-009, Chlorination, Rev. 37

EGR-NGGC-0010, System and Component Trending Program and System Notebooks, Rev. 13

EST-094, Inservice Inspection Pressure Testing of the Service Water System (Each ISI Program Inspection Period), Rev. 17

CP-206, Chlorination of Circulating Water Pump Cooling Water Lines, Rev. 8

CM-201, Safety Related and Non-Safety Related Heat Exchanger Maintenance, Rev. 42

TMM-104, System Walkdown Procedure, Rev. 21  
 SD-013, Component Cooling Water System, Rev. 10  
 EST-116, Service Water Piping Inspection, Rev. 6  
 CP-001, Chemistry Monitoring Program, Rev. 93

#### Adverse Condition Investigation

209486, Leakage discovered coming from the upstream side of SW-876, WCCU-1A and WCCU-1B return head drain.  
 317982, Abnormal sound in the motor area of B service water pump  
 318565, Scheduled performance test of C SW pump NW horizontal vibration reading was 0.242 inch/sec.  
 212321, Horizontal vibration point increased since motor replaced.  
 301890, Weld above SW-876 has a through wall leak of about 10dpm.  
 297141, Service Water temperature was being recorded from instruments installed on the North and South Service Water header.  
 232813-19, Service Water Booster Pump Seal leak-off drain lines continue to clog causing water to overflow onto the auxiliary building floor.  
 188462, Performance monitoring of some safety related heat exchangers is insufficient to detect some potential degradation mechanisms.

#### Miscellaneous

5095, Emergency Diesel Generator Health Report, 01/28/2009  
 5050, Main Generator Hydrogen Cooling Health Report, 01/26/2009  
 3065, Auxiliary Feedwater Health Report, 02/04/2009  
 4080, Component Cooling Water Health Report, 02/17/2009  
 4060, Service Water Health Report, 01/29/2009  
 MACTECT Project 6468-08-2087 (05), Report of 2008 Limited (annual) Field Inspection Cooling Lake Dam and Ash Pond Dam, H.B. Robinson Steam Electric Plant  
 Response to request for Additional Information Regarding Generic Letter 96-06, 8/27/2002  
 Request for Technical Specifications Change Ultimate Heat Sink (UHS), 5/27/1999  
 Response to NRC Generic Letter 89-13, 01/26/1990  
 Service Water Generic Letter 89-13 Item IV, Single Failure Analysis, 01/23/1991  
 B CCW Re-tubing Report for RO-25  
 DBD/R87038/SD04, Design Basis Document for Service Water, Rev. 0  
 Work Order 00738503, Cleaning and Inspection of A CCW H

### **Section 1R11: Licensed Operator Requalification**

#### Procedures

AOP-025, [Reactor Turbine Gauge Board] Instrument Failure, Rev. 12  
 OWP-025, Steam Generator Pressure, Rev. 13  
 AOP-012, Partial Loss of Condenser Vacuum or Circulating Water Pump Trip, Rev. 21  
 PATH-1, Rev. 18  
 PATH-2, Rev. 17  
 EPP-12, Post [Steam Generator Tube Rupture] Cooldown Using Backfill, Rev. 14

**Section 1R12: Maintenance Effectiveness**Action Requests

283403, B [Emergency Diesel Generator] trip from full load condition during OST-401-2  
 317832, A boric acid transfer pump tripped during operation  
 308566, A boric acid transfer pump tripped during post maintenance testing

Procedures

OST-401-2, B [Emergency Diesel Generator] Slow-Speed Start, Rev. 37, completed August 16, 2008  
 CM-012, Crane Series G Chempump, Models GB, GE, GVH, GVH(S), and GLD overhaul, Rev. 12

Maintenance Rule Documents

For system 5095 (Emergency Diesel Generator System):

- Event Log Report for 10/25/07 – 03/27/09
- Scoping and Performance Criteria

For system 2060 (Chemical and Volume Control System):

- Event Log Report for 12/03/07 – 02/23/09
- Scoping and Performance Criteria

For system 8220 (HVAC – Control Room Area System):

- Event Log Report for 12/20/07 – 5/8/09
- Scoping and Performance Criteria

Other Documents

Control-room log for August 16, 2008  
 Engineering Change 70556, Diesel Generator B Jacket Water Low Pressure Trip/Alarm, Rev. 0  
 Engineering Change 70574, Diesel Generator A Jacket Water Low Pressure Trip/Alarm, Rev. 0  
 Vendor Technical Manual 727-907-88, Crane Series G Chempump Instruction Manual  
 Work Order 1493050, A boric acid transfer pump tripped on thermal cutoff  
 Work Order 1065475, Calibrate WCCU-1B instrumentation

**Section 1R13: Maintenance Risk Assessments and Emergent Work Evaluation**

Procedure OMM-048, Work Coordination and Risk Assessment, Rev. 41

**Section 1R15: Operability Evaluations**UFSAR Sections

10.4.8, Auxiliary Feedwater System  
 3.1, Conformance with General Design Criteria

Drawings

G-190197, Feedwater Condensate and Air Evacuation System Flow Diagram, sheet 4 of 4, Rev.

5379-685, Chemical and Volume Control System Purification and Make-Up Flow Diagram,  
Sheet 2 of 3, Rev. 57

Procedures

OST-202, Steam Driven Auxiliary Feedwater System Component Test, Rev. 72

Other Documents

Technical Specification 3.7.4, Auxiliary Feedwater System  
Technical Specification Bases B3.7.4, Auxiliary Feedwater System  
Control Room Logs, dated 5/12/09

**Section 1R18: Plant Modifications**

Design Basis Documents

GID/R87038/0003, Seismic Qualification, Rev. 2  
DBD/R87038/SD21, Chemical & Volume Control System, Rev. 5  
DBD 87038/SD16, Electrical Power Distribution System, Rev. 3

Calculations

CH-12-9076&CH-13-8076, Stress Isos CH-12 & CH-13 for CH Piping from Charging Pumps to  
Penetration #24, Rev. 8  
RNP-M/MECH-1571, [Net Positive Suction Head] for Boric Acid Transfer Pumps, Rev. 1  
93-0045, Determination of Minimum Required Boric Acid Transfer Pump Flow Rate for the  
Robinson Nuclear Plant, Rev. 0

Procedures

EGR-NGGC-0005, Engineering Change, Rev. 28  
EST-093, Inservice Inspection Pressure Testing of the Chemical and Volume Control System  
(Each ISI Program Inspection Period), Rev. 12  
OST-108-1, Boric Acid Pump A Inservice Test, Rev. 21  
OST-108-3, Comprehensive Flow Test for Boric Acid Pump A, Rev. 9

UFSAR Sections

3.1, Conformance with General Design Criteria  
3.2.1, Seismic Classification  
9.3.4, Chemical and Volume Control System

**Section 1R19: Post Maintenance Testing**

Procedures

OP-301, Chemical and Volume Control System (CVCS), Rev. 95  
OP-602, Dedicated Shutdown System, Rev. 48  
OP-604, Diesel Generators "A" & "B", Rev. 77  
OST-409-2, EDG "B" Fast Speed Start, Rev. 39  
OST-402-1, EDG A Diesel Fuel Oil System Flow Test, Rev. 27  
NGG-PMB-SOV-01, NGG Equipment Reliability Template Solenoid Operated Valves, Rev. 0  
OST-908, Component Cooling System Component Test, rev. 66

Drawings

5379-1166, Fuel Oil System Schematic, Rev. 1

G-190204D, Fuel Oil System Flow Diagram, sheet 2 of 4, Rev. 23

Action Requests

329859, Post maintenance test not specified in work instructions for CVC-342 maintenance

337956, [Dedicated Shutdown Diesel Generator] enclosure fans tripped during OP-602 run

Other Documents

Work Order 1532763, Replace B EDG output breaker 52/27B

Vendor Technical Manual, 739-837-85, ASCO Manuals and Bulletins, Rev. 12

Work Order 1441481, Replace solenoid EV-1963A-2

Work Order 1564144, C component cooling water pump outboard seal leakage 180 drops per minute

**Section 1R22: Surveillance Testing**Procedures

OST-201-1, [Motor Driven Auxiliary Feedwater] System Component Test – Train B, Rev. 25

OST-202, Steam Driven Auxiliary Feedwater System Component Test, Rev. 72

OST-252-2, [Residual Heat Removal] Valve Test – Train B, Rev. 18

OST-409-2, [Emergency Diesel Generator] “B” Fast Speed Start, Rev. 39

OST-750-1, Control Room Emergency Ventilation System – Train “A” (Monthly), Rev. 16

OST-910, Dedicated Shutdown Diesel Generator, Rev. 44

**Section 1EP6: Drill Evaluation**

Drill Scenario for April 14, 2009

**Section 4OA1: Performance Indicator Verification**Procedures

REG-NGGC-0009, NRC Performance Indicators and Monthly Operating Report Data, Rev. 5

ADM-NGGC-0101, Maintenance Rule Program, Rev. 20

Other Documents

NEI 99-02, Regulatory Assessment Performance Indicator Guidance, Rev. 5

RNP-F/PSA-0057, NRC Mitigating System Performance Index (MSPI) Basis Document, Rev. 8

Consolidated Date Entry 3.0 MSPI Derivation Report, MSPI Residual Heat Removal System Unreliability Index, generated 4/14/2009

Consolidated Date Entry 3.0 MSPI Derivation Report, MSPI Residual Heat Removal System Unavailability Index, generated 4/14/2009

Maintenance Rule event reports that cover the previous 18 months, for the following systems:  
2045 (Residual Heat Removal)

**Section 4OA2: Identification and Resolution of Problems**Procedures

AP-008, Cold Weather Preparations, Rev. 0



AP-008, Cold Weather Preparations, Rev. 18  
 CAP-NGGC-0200, Corrective Action Program, Rev. 27  
 CAP-NGGC-0206, Corrective Action Program Trending and Analysis, Rev. 3  
 EGR-NGGC-0005, Engineering Change, Rev. 28  
 EGR-NGGC-0011, Engineering Product Quality, Rev. 12  
 EGR-NGGC-0154, Single Failure Analysis, Rev. 5  
 EPP-1, Loss of All AC Power, Rev. 40  
 OMM-001-8, Control of Equipment and System Status, Rev. 41

#### Action Requests

260741, Unanticipated [limiting condition for operation] entry, 'B' [steam generator] [power-operated relief valve] sensing line froze.  
 315777, Unanticipated entry into [abnormal operating procedure] AOP-025 due to "B" [power-operated relief valve] lifting  
 321136, 'B' [Component Cooling Water] Pump Low Pressure Relay, Operator Workaround  
 322180, [Operator Workaround] goal not met

#### Job Performance Measures

IP-018, Control Steam Generator [Power-Operated Relief Valves] at Secondary Control Panel, Rev. 12  
 IP-114, Transfer Steam Line [Power-Operated Relief Valve] Control at the Secondary Control Panel [in accordance with procedure] EPP-1 Attachment 1, Rev. 3

#### Other Documents

"Monthly Aggregate Assessment of Operator Burdens", 3/28/09  
 Engineering Change 70032, Redesign Main Steam [Power-operated relief valve] Sensing Line Freeze Protection Circuits FPP-28 circuits 28 & 29A, Rev. 13  
 Maintenance Rule Expert Panel Meeting Minutes for System 5266  
 Maintenance Rule Scoping & Performance Criteria for System 5266 (Freeze Protection)  
 Work Order 1146809, Freeze Protection – Plant Equipment