



**UNITED STATES
NUCLEAR REGULATORY COMMISSION**
REGION II
245 PEACHTREE CENTER AVENUE NE, SUITE 1200
ATLANTA, GEORGIA 30303-1257

March 4, 2011

Mr. David A. Heacock
President and Chief Nuclear Officer
Virginia Electric and Power Company
Innsbrook Technical Center
5000 Dominion Boulevard
Glen Allen, VA 23060

**SUBJECT: NORTH ANNA POWER STATION – NRC SUPPLEMENTAL INSPECTION
REPORT 05000339/2011009**

Dear Mr. Heacock:

On February 3, 2011, the U. S. Nuclear Regulatory Commission (NRC) completed a supplemental inspection pursuant to Inspection Procedure 95001, "Inspection for One or Two White Inputs in a Strategic Performance Area," at your North Anna Power Station Unit 2. The enclosed inspection report documents the inspection results, which were discussed at the exit meeting on February 3, 2011, with Mr. Mladen and other members of your staff.

As required by the NRC Reactor Oversight Process Action Matrix, this supplemental inspection was performed because of an identified White Performance Indicator involving Unit 2 exceeding three reactor scrams per 7000 critical hours. This issue was documented previously in the Mid-Cycle letter dated September 1, 2010. The NRC was informed in December 2010 of your staff's readiness for this inspection.

The objectives of this supplemental inspection were to provide assurance that: (1) the root and contributing causes are understood; (2) the extent of condition and extent of cause are identified; and (3) corrective actions were or will be sufficient to address the root and contributing causes and to preclude repetition. The inspection consisted of examination of activities conducted under your license as they related to safety, compliance with the commission's rules and regulations, and the conditions of your operating license.

The inspector determined that, in general, the problem identification, root cause analysis, and corrective actions were adequate. As stated in your staff's evaluation, the identified primary root cause for the issue was that a less than adequate prioritization of work has caused resources to be diluted among too many simultaneous tasks and as a result, less than adequate resources, supervision, review and approval was applied to the higher risk more complex work. Based on the results of this inspection, no findings were identified.

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 the 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/

Gerald J. McCoy, Chief
Reactor Projects Branch 5
Division of Reactor Projects

Docket Nos. 50-339
License Nos. NPF-7

Enclosure: Inspection Report 05000339/2011009
w/ Attachment: Supplemental Information

cc w/ encl. (See next page)

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E-MAIL COPY?	YES NO	YES NO	YES NO	YES NO	YES NO	YES NO	YES NO

VEPCO

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Letter to David A. Heacock from Gerald J. McCoy dated March 4, 2011

SUBJECT: NORTH ANNA POWER STATION – NRC SUPPLEMENTAL INSPECTION
REPORT 05000339/2011009

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U.S. NUCLEAR REGULATORY COMMISSION

REGION II

Docket No.: 50-339

License No.: NPF-7

Report No: 05000339/2011009

Licensee: Virginia Electric and Power Company (VEPCO)

Facility: North Anna Power Station, Unit 2

Location: 1022 Haley Drive
Mineral, Virginia 23117

Dates: January 31, 2011 through February 3, 2011

Inspectors: K. Ellis, Resident Inspector, Oconee Nuclear Station

Approved by: Gerald J. McCoy, Chief
Reactor Projects Branch 5
Division of Reactor Projects

Enclosure

SUMMARY OF FINDINGS

Inspection Report (IR) 05000339/2011009; 1/31/2011 – 2/3/2011; North Anna Power Station, Unit 2; Supplemental Inspection for a White Performance Indicator (PI)

This inspection was conducted by a resident inspector. No findings were identified. The NRC's program for overseeing the safe operation of commercial nuclear power reactors is described in NUREG-1649, "Reactor Oversight Process," Revision 4, dated December 2006.

Cornerstone: Initiating Events

This supplemental inspection was performed in accordance with Inspection Procedure (IP) 95001, "Inspection for One or Two Inputs in a Strategic Performance Area," to assess the licensee's evaluation associated with a White Performance Indicator in the Initiating Events cornerstone associated with greater than three reactor trips in 7000 critical hours.

Based on the results of this inspection, the inspector determined that the cause evaluation was generally adequate and corrective actions were comprehensive and properly prioritized. The licensee's root cause evaluation for the white performance indicator identified the primary root cause to be a less than adequate prioritization of work, causing resources to be diluted among too many simultaneous tasks and as a result, less than adequate resources, supervision, review and approval was applied to the higher risk more complex work. Corrective actions for this white performance indicator included conducting a Leadership alignment for North Anna Power Station (NAPS) Leadership team using the root cause evaluation (RCE) as a case study for identifying examples of non-compliance with work management, plant health committee, engineering analyses, and corrective action processes; communicate the results of the RCE to all NAPS workers emphasizing the need for proper prioritization of work, ensuring the proper rigor is completed for all activities, and the need to communicate barriers that could prevent doing the proper rigor; define core business for engineering and the expectations of work prioritization to ensure resources are applied based on a determined priority and less important work does not conflict with higher importance work.

Given the licensee's adequate evaluation addressing the white Performance Indicator (PI), it will no longer be considered an input in assessing plant performance since the PI for trips in 7000 critical hours has reverted to Green and the 95001 Inspection has been completed successfully in accordance with the guidance in Inspection Manual Chapter (IMC) 0305, "Operating Reactor Assessment Program." The implementation and effectiveness of the licensee's corrective actions will be reviewed during future inspections future inspections.

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REPORT DETAILS

4. OTHER ACTIVITIES

4OA4 Supplemental Inspections

.1 Inspection Scope

The supplemental inspection was performed in accordance with IP 95001 to assess the licensee's evaluation of a White PI which affected the Initiating Events cornerstone objective in the Reactor Safety strategic performance area. The White PI is associated with having greater than three reactor trips in 7000 critical hours. On June 16, 2010, the indicator transitioned from Green to White when Unit 2 had an automatic reactor trip due to a lightning strike. The licensee notified the NRC in December 2010 that they were ready for this supplemental inspection. The inspection objectives were to:

- Provide assurance that the root and contributing causes are understood;
- Provide assurance that the extent of condition and extent of cause are identified; and
- Provide assurance that the licensee's corrective actions were or will be sufficient to address the root and contributing causes and to preclude repetition.

The inspector reviewed root cause evaluation RCE1017. This root cause evaluated RCE 995, 1007, 1012, and 1015 in the aggregate to determine the collective root cause of the four scrams, any collective contributing causes of the four scrams, and the corrective actions required to improve performance and prevent recurrence. The inspector reviewed the root and contributing causes as well as the corrective actions taken or planned to be taken. The inspector also held discussions with licensee personnel to ensure that the root and contributing causes and the contribution of safety culture components were understood and corrective actions taken or planned were appropriate to address the causes and preclude repetition.

.2 Evaluation of the Inspection Requirements

2.01 Problem Identification

- a. Determine that the evaluation identifies who (i.e. licensee, self revealing, or NRC), and under what conditions the issue was identified

The inspector determined that the event evaluation was sufficiently detailed to identify who and under what conditions the issue was identified.

On June 16, 2010, as a result of a reactor trip due to a lightning strike, the PI for having greater than three reactor trips in 7000 critical hours transitioned from Green to White. This trip, combined with three other automatic scrams, produced the White indicator. The four events involved are (1) RCE1015 Lightning Strike OT delta T trip on 6/16/2010,

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(2) RCE1012 Low RCS flow trip from loss of B SS Bus on 5/28/2010, (3) RCE1007 Automatic Voltage Regulator Software Trip on 4/27/2010, (4) RCE995 Loss of C RSST trip on 12/9/2009. These four reactor trips were classified as self revealing events while the White PI associated with the trips was classified as a licensee identified event. In response to the PI crossing the White threshold, the licensee performed a root cause evaluation and reviewed, in the aggregate, the four individual root cause evaluations and determined the collective root cause, contributing cause(s), and corrective actions to prevent recurrence.

- b. Determine that the evaluation documents how long the issue existed, and prior opportunities for identification

The cumulative root cause does not specifically address how long the issue existed or if there were prior opportunities for identification. However, a repeat event review was performed to determine if the identified deficiency was a recurring event. In addition, the root cause is global in nature and as such the corrective actions associated with the root cause will address the licensee's ability to identify and correct an issue of this nature in the future. In addition, the root cause associated with each individual reactor trip addresses how long the issue existed and prior opportunities for identification.

- c. Determine that the evaluation documents the plant risk specific consequences (as applicable) and compliance concerns associated with the issue

The inspector determined that the evaluation for the event adequately documented the risk consequences and compliance concerns.

A probabilistic risk assessment analysis was completed by the licensee to determine any increase in core damage frequency for each individual reactor trip and to analyze the cumulative effect. The core damage frequency for each individual trip and the cumulative change were below the regulatory threshold.

The licensee implemented several corrective actions to address risk including a corrective action to prevent recurrence (CAPR) to ensure that work is adequately prioritized such that resources will not to be diluted among too many simultaneous tasks and as a result, adequate resources, supervision, review and approval may be applied to the higher risk more complex work. There were no compliance concerns associated with the White PI and the compliance concerns with each individual reactor trip has been documented in the baseline quarterly inspection reports.

- d. Findings

No findings were identified.

2.02 Root Cause, Extent of Condition, and Extent of Cause Evaluation

- a. Determine that the problem was evaluated using a systematic method(s) to identify root cause(s) and contributing cause(s)

The inspector determined that the systematic methods used were adequate for the root cause evaluation.

The collective root cause, RCE1017, utilized the systematic methods of Events and Casual Factors Analysis, Why Diagram, and Barrier Analysis.

- b. Determine that the root cause evaluation was conducted to a level of detail commensurate with the significance of the problem

The inspector determined that the level of detail was commensurate with the significance of the problem and adequate for the root cause evaluation.

The collective root cause evaluation reviewed the four reactor trips in the aggregate to determine the collective root cause of the four scrams, any collective contributing causes of the four scrams, and the corrective actions required to improve performance and prevent recurrence.

The licensee determined that management has not consistently followed the approved processes for work management, the plant health committee, engineering technical analysis, and corrective actions. Examples for each of these areas were found within the four events. The licensee determined the root cause of this event to be that less than adequate prioritization of work has caused resources to be diluted among too many simultaneous tasks. As a result, there are less than adequate resources, supervision, and review/approval applied to higher risk or more complex work. Management has not consistently followed the approved processes for work management, the plant health committee, engineering technical analyses, and corrective actions.

- c. Determine that the root cause evaluation included a consideration of prior occurrences of the problem and knowledge of prior operating experience

The inspector determined that the evaluation for the event considered prior occurrences and operating experience.

External and internal searches for applicable operating experience were performed to determine if applicable lessons have been applied to the issues identified in this root cause. Since this root cause is not a specific event, but a collective review of past events, two separate approaches were used; (1) A review was performed on how OE was reviewed and analyzed the individual root causes for each reactor trip (2) A review determined if external and internal OE applied to this series of events in the collective.

- d. Determine that the root cause evaluation addressed the extent of condition and the extent of cause of the of the problem

The inspector determined that the evaluation for the event adequately addressed extent of condition and extent of cause.

The extent of condition from each individual event was evaluated within the root cause evaluation performed for that particular event. The licensee determined the extent of cause for this event to be limited to other NRC Performance Indicators that could potentially be changing to White status. The licensee will continue to monitor Performance Indicators and the actions specified in the collective root cause are intended to change behaviors to improve the overall plant performance.

The extent of cause from each individual event was evaluated within the root cause evaluation performed for that particular event. The licensee considers the extent of cause global do to the multiple events reviewed and the common issues identified. As such, the corrective actions specified address the common causes identified, and coupled with the original RCEs capture the full extent of cause.

- e. Determine that the root cause evaluation, extent of condition, and extent of cause appropriately considered the safety culture components as described in IMC 0305

The inspector determined that the safety culture components were appropriately considered and reviewed for the event.

The licensee as part of the root cause evaluation process performed the assessment of safety culture by (1) reviewing the individual root cause section for assessment of safety culture to determine if the actions already specified are adequate and (2) the collective root cause team independently categorized, with input from an outside causal analysis consultant, the root and common causes to validate or refute those identified by the individual root cause teams.

The inspector identified an area of weakness within the RCE process. Specifically, a review is not required nor was one performed of recent safety culture surveys during the root cause process. Reviewing the results of the survey may have helped to cement the underlying issues that exist organizationally. CR 412502 was written to evaluate whether RCE's should review the safety culture survey results when completing the safety culture section of the RCE.

- f. Findings

No findings were identified.

2.03 Corrective Actions

- a. Determine that appropriate corrective action(s) are specified for each root/contributing cause or that there is an evaluation that no actions are necessary

The corrective actions included the following:

- Conduct a Leadership alignment for NAPS Leadership team using the RCE as a case study for identifying examples of non-compliance with work management, plant health committee, engineering analyses, and corrective action processes
- Complete updates to Plant Health Issues List to ensure proper activities are included on the list, are up to date, and are properly prioritized
- Revise the root cause evaluation procedure to have an organizational effectiveness advocate on all RCE teams and to require an organizational and programmatic section be included in the RCE
- Communicate the results of the RCE to all NAPS workers emphasizing the need for proper prioritization of work, ensuring the proper rigor is completed for all activities, and the need to communicate barriers that could prevent doing the proper rigor
- Define core business for engineering and the expectations of work prioritization to ensure resources are applied based on a priority determined and less important work does not conflict with higher importance work.

The inspector identified two areas of weakness within the corrective actions specified in the collective root cause. Specifically, the inspector identified that a corrective action did not exist to address the failure of the grading process of the root cause. As part of the RCE process prior to the corrective action review board reviewing the RCE the Station Root Cause coordinator grades the RCE to ensure it meets all standards. The licensee identified deficiencies in all four individual RCEs associated with the white indicator. CR 412504 was written to address the Station Root Cause Coordinators grading practices.

The inspector also identified that a corrective action was not developed to review any recent RCE's performed beside those that lead up to the White PI. The licensee identified deficiencies in all four individual RCEs associated with the white indicator. The major weaknesses noted was misidentification of the root cause in three of the four root causes reviewed and inadequate investigation of organizational and programmatic attributes. CR412442 was written to evaluate the last 3 years of complete RCE's to determine if the true root cause was identified and if organizational and programmatic aspects were properly identified.

The inspector determined that appropriate root and contributing causes were specified and that corrective actions were appropriate for the identified root and contributing causes.

- b. Determine that the corrective actions have been prioritized with consideration of the risk significance and regulatory compliance

The inspector determined that the corrective actions for the event were appropriately prioritized.

- c. Determine that a schedule has been established for implementing and completing the corrective actions

The inspector determined that the corrective actions for the event have been scheduled or completed. The collective root cause evaluation denotes a specific date for completion of all corrective actions.

- d. Determine that quantitative or qualitative measures of success have been developed for determining the effectiveness of the corrective actions to prevent recurrence

The inspector determined that qualitative measures of success were developed for determining the effectiveness of the corrective actions to prevent recurrence.

- e. Determine that the corrective actions planned or taken adequately address a Notice of Violation (NOV) that was the basis for the supplemental inspection, if applicable

The White PI did not involve a violation of regulatory requirements.

- f. Findings

No findings were identified.

4OA6 Meetings, Including Exit

.1 Exit Meeting Summary

On February 3, 2011, the inspector presented the inspection results to Mr. Mladen and other members of the staff. The inspectors asked the licensee whether any of the material examined during the inspection should be considered proprietary. No proprietary information was identified.

.2 Regulatory Performance Meeting

On February 3, 2011, a Regulatory Performance Meeting was held with Mr. Mladen and other members of his staff. The licensee staff discussed implementation of corrective actions. NRC staff reviewed the Oversight Process timeline for closing corrective actions and related inspection findings.

ATTACHMENT: SUPPLEMENTAL INFORMATION

Enclosure

SUPPLEMENTAL INFORMATION

KEY POINTS OF CONTACT

Licensee personnel:

W. Anthes, Manager, Nuclear Maintenance
M. Becker, Manager, Nuclear Outage and Planning
M. Crist, Plant Manager
R. Evans, Manager, Radiological Protection and Chemistry
T. Huber, Director, Nuclear Engineering
S. Hughes, Manager, Nuclear Operations
C. Gum, Manager, Nuclear Protection Services
L. Lane, Site Vice President
P. Kemp, Manager, Organizational Effectiveness
F. Mladen, Director, Station Safety and Licensing
D. Taylor, Supervisor, Station Licensing
J. Leberstien, Licensing, Technical Consultant
S. Morris, Supervisor, Auxiliary System Engineering
R. Garver, Manager, Design Engineering

NRC personnel:

J. Reece, Senior Resident Inspector – North Anna
R. Clagg, Resident Inspector – North Anna

LIST OF ITEMS OPENED, CLOSED AND DISCUSSED

None

LIST OF DOCUMENTS REVIEWED

Procedures

PI-AA-200, Corrective Action, Rev. 16
WMAA-301, Operational Risk Assessment, Rev. 2
WM-AA-100, Work Management, Rev. 11
PI-AA-300-3001, Root Cause Evaluation, Rev. 1
PI-AA-300, Cause Evaluation, Rev. 5
ER-AA-PRS-1001, Plant Health Committee, Rev. 1
PI-AA-300-3003, Common Cause Evaluation, Rev. 0
PI-AA-300-3004, Cause Evaluation Methods, Rev. 2
PI-AA-300-3002, Effectiveness Reviews, Rev. 3
LI-NA-1002, Safety Culture Review, Rev. 2

CR's

CR384967, RCE to NSS for U2 trip during severe thunderstorm
CR382722, NANN – Unit 2 Reactor Trip
CR361280, NANN – Loss of U2 Main Condenser vacuum causes reactor trip

Attachment

CR400141, U1 Reactor Trip during physics testing to perform maintenance on in hold out switch
 CR390731, ODEC review of NAPS identified recommendation and suggestions for improvement
 CR392925, NANN – NAPS 2010 Mid-Cycle review Tracking CR
 CR406756, RCE 1030 was rejected by CARB
 CR395826, RCE 1021 rejected by CARB
 CR408206, RCE 1034 was rejected by CARB 12/16/10
 CR384859, Performance Indicator Initiating Event 01 (IE01) will go white
 CR384564, NRC Performance Indicator <50% of the Green NRC PI Color Band
 CR380770, NRC Performance Indicators Indicate a Declining Trend
 CR094635, Identified deficiencies in initial report of RCE000065

Miscellaneous

North Anna Power Station Mid Cycle Assessment August 2010, NAPS SAR000972 Nuclear Safety Culture Assessment, Dominion Generation, North Anna Power Station, December 2009
 Root Cause Evaluation RCE 001017, NRC Performance Indicator for Unplanned Scrams Changing to White Status
 Plant Health Issues List
 Root Cause Evaluation RCE 001015, Reactor Trip due to Lightning Strike
 Root Cause Evaluation RCE 001012, Low RCS Flow Reactor Trip Resulting from Loss of B SS Bus
 Root Cause Evaluation RCE 001007, U2 Trip Due to Digital Automatic Voltage Regulator Software Settings
 Root Cause Evaluation RCE 000995, Inadvertent Manipulation of Lockout Blade Causes Loss of "C" Reserve Station Service Transformer
 Root Cause Evaluation Quality Index, RCE #'s 1030, 1019, 995, 1015, 1012, 1007, 1021, 1023, 1034, 1017
 LER 05000338/2009-004; Automatic Reactor Trip and ESF Actuation due to Human Performance Error during Testing
 LER 05000338/2010-001; Automatic Reactor Trip and ESF Actuation during Automatic Voltage Regulator Testing Due to Inadequate Procedure Guidance
 LER 05000338/2010-002; Automatic Reactor Trip and ESF Actuation due to Lightning Strike (Low Flow)
 LER 5000338/2010-004; Automatic Reactor Trip and ESF Actuation due to Lightning Strike (Overtemperature Delta T)

CRs generated as a result of this inspection

CR412442, Evaluate the last 3 years completed RCE's
 CR412501, Evaluate providing CARB grading sheets from RCEs and ACEs
 CR412502, Evaluate reviewing Safety Culture surveys in RCEs
 CR412504, Evaluate the RCE grading practices

LIST OF ACRONYMS

ADAMS	Agencywide Document Access and Management System
CAPR	Corrective Action Prevent Recurrence
IMC	Inspection Manual Chapter
IP	Inspection Procedure
NAPS	North Anna Power Station
NRC	Nuclear Regulatory Commission
PI	Performance Indicator
RCE	Root Cause Evaluation