

# North Anna 2

## 4Q/2011 Plant Inspection Findings

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### Initiating Events

**Significance:** **G** Dec 31, 2011

Identified By: Self-Revealing

Item Type: NCV NonCited Violation

#### **Failure to Follow Procedure to Ensure Proper Calibration of RHR Valve Control Circuit**

A self-revealing Green NCV of Technical Specification 5.4.1.a was identified for the licensee's failure to implement procedures as required by Regulatory Guide 1.33, Appendix A, Section 8, Procedures for Control of Measuring and Test equipment and for Surveillance Tests, Procedures, and Calibrations, specifically calibration procedures for a control circuit associated with a residual heat removal (RHR) suction valve.

The licensee's incorrect calibration of a comparator card in the permissive control circuit for RHR Loop A Hot Leg to RH Pumps Isolation Valve, 02-RH-MOV-2700, was a performance deficiency (PD). The inspectors reviewed Inspection Manual Chapter (IMC) 0612, Appendix E, and determined the finding was similar to example 4.c. The performance deficiency was more than minor because it is associated with the Initiating Events Cornerstone attribute of Equipment Performance, and adversely affected the cornerstone objective to limit the likelihood of those events that upset plant stability and challenge critical safety functions during shutdown. Specifically, the calibration error caused the open permissive trip setpoint to be lower than required which prevented the generation of the permissive signal to allow 02-RH-MOV-2700 to operate in the open direction and would inhibit their ability to diagnose and prevent loss of residual heat removal (RHR) scenario. In accordance with NRC Inspection Manual Chapter (IMC) 0609, Appendix G, "Shutdown Operations Significance Determination Process," Attachment 1, Checklist 4, the inspectors conducted a Phase 1 SDP screening and determined the finding required a Phase 2 analysis because the calibration error degraded the licensee's ability to recover DHR once it was lost. A phase 2 SDP evaluation was performed by a regional SRA in accordance with NRC IMC 0609 Appendix G, Attachment 2, Phase 2 SDP Template for PWR during Shutdown. The exposure time was < 1 day from when RHR was secured and the valve closed until the licensee restored normal function for the valve. The significant assumptions and influential factors affecting the risk included: (1) The PD only affected opening from the main control room, local manual operation was not affected, (2) Closing of the valve and valve position indication were not affected, (3) Procedural guidance existed for local manual operation, (4) RCS pressure remained low (380psig) during the exposure period, and (5) the plant had been shutdown since August 23, 2011, and decay heat was very low. Large Early Release Fraction (LERF) risk was not significant due to the exposure period existing long after shutdown. The result of the risk analysis was an increase in core damage frequency of < 1E-6 per year, a GREEN finding of very low safety significance. The cause of this finding involved the cross-cutting area of human performance, the component of work practices, and the aspect of human error prevention, H.4(a) because the licensee failed to utilize the human performance tool of self-checking when completing the calibration of PC-2402 C1-245. (Section 1R22)

Inspection Report# : [2011005](#) (*pdf*)

**Significance:** **SL-IV** Dec 31, 2011

Identified By: NRC

Item Type: NCV NonCited Violation

#### **Adverse Changes to the Fire Protection Program Involving Inadequate Control of Transient Combustibles**

The inspectors identified a Severity Level IV Non-cited Violation (NCV) of the North Anna Power Station, Unit 1 and Unit 2 Renewed Facility Operating Licenses, NPF-4 and NPF-7, Condition 2.D, Fire Protection Program (FPP) leading to inadequate controls of transient combustibles. The licensee initiated condition reports CR342754, "Failed to submit request for transient fire loading in U-2 safeguards," Cr 397441, "Appendix R fire wrap in Unit 2 Containment," and CR 396368, "Appendix R fire wrap in Unit 1 Containment."

The inspectors determined that the adverse changes to the FPP involving the control of transient combustibles was a violation involving traditional enforcement because it impacted the NRC's ability to perform its regulatory function.

The finding was determined to be more than minor because the relaxation of transient combustible controls described in the revisions to VPAP-2401, constituted a change which adversely affected the ability to adequately control and evaluate transient combustibles would present potential fire scenarios involving significant, non-liquid transient combustibles that would adversely affect safety-related and safe shutdown components to achieve and maintain safe shutdown in the event of a fire. This violation is characterized at Severity Level (SL) IV in Supplement I of the NRC Enforcement Policy, in that actual fire did not occur, and the potential consequences were limited given that defense in depth was maintained with the existence of auto fire detection and suppression capability and the availability of fire response teams. Although the licensee failed to meet regulatory requirements that have more than minor safety or environmental significance, the inspectors were unable to confirm the introduction of excessive transient combustibles into the plant other than the problem identified on July 27, 2009, which was determined to have very low safety significance. This lack of information was due to the licensee FPP changes that did not require a permit for evaluation and documentation. Because the issue is in the licensee's corrective action program as CR382725, this violation is being treated as an NCV, consistent with the NRC Enforcement Policy. This violation was not screened for associated cross-cutting aspects because it dealt with traditional enforcement. (Section 40A5.4)

Inspection Report# : [2011005](#) (pdf)

**Significance:**  Sep 30, 2011

Identified By: NRC

Item Type: FIN Finding

**Failure to Take Adequate Corrective Action to Preclude a Fire in the Units 1 and 2 Control Room Complex**

• Green. A self-revealing finding was identified for the failure to take adequate corrective action for degradation of annunciator card resistors in accordance with the standards as established by the licensee's corrective action program procedure which resulted in a fire in the respective annunciator cabinet located in the Units 1 and 2 control room complex. The licensee entered the problem into their corrective action program as condition report 412487.

The finding was more than minor because it could be reasonably viewed as a precursor to a significant event based on fire development leading to an evacuation of the control room. The finding was screened using phase 1 of the SDP and was determined to be a fire initiator contributor within the initiating events cornerstone and required a phase 3 fire SDP risk assessment in as it represented a fire within the main control room (MCR). A regional SRA performed an SDP phase 3 fire risk assessment for this finding in accordance with NRC Inspection Manual Chapter (IMC) 0609 Appendix F, NUREG/CR 6850 and NUREG/CR 6850 supplement 1. . The SDP phase 3 risk evaluation determined that the risk of the finding was an increase in core damage frequency of <math>1E-6</math>/year, a Green finding of very low safety significance. The inspectors determined there were no cross-cutting aspects because the performance deficiency was not representative of current licensee performance. (Section 40A5.4)

Inspection Report# : [2011004](#) (pdf)

**Significance:**  Mar 31, 2011

Identified By: NRC

Item Type: NCV NonCited Violation

**Failure to Determine the Cause and Take Corrective Action to Preclude Repetition for Lightning Induced Reactor Trips**

A non-cited violation of 10 CFR 50, Appendix B, Criterion XVI, "Corrective Action," was identified by the inspectors for the licensee's failure to determine the cause of a significant condition adverse to quality (SCAQ) involving an automatic reactor trip following a lightning strike on the Unit 2 containment building. This resulted in the Unit 2 automatic reactor trip on June 16, 2010, because of the insufficient corrective action to preclude repetition. The Licensee entered this issue into the Corrective Action Program as CR 384967.

The inspectors determined that the failure to determine the cause of a SCAQ was a performance deficiency (PD). The inspectors reviewed IMC 0612, Appendix B and determined the PD was more than minor because, if left uncorrected, it has the potential to lead to a more significant safety concern in that failing to identify the cause of SCAQs and thus failing to take corrective action to preclude repetition could result in additional initiating events or impacts on mitigating systems. In addition, the inspectors determined that it adversely impacted the Initiating Events cornerstone objective to limit the likelihood of those events that upset plant stability and challenge critical safety functions during

shutdown as well as power operations, specifically the attribute of Protection Against External Factors in that the removal of the Overtemperature Delta T lag function removed protection from lightning strikes on the reactor protection system. The inspectors reviewed IMC 0609, Attachment 4 and determined that the finding was of very low safety significance, or Green, because it did not contribute to both the likelihood of a reactor trip and the likelihood that mitigation equipment or functions will not be available. The cause of this finding involved the cross-cutting area of problem identification and resolution, the component of operating experience, and the aspect of evaluation of identified problems, P.1(c) because the licensee failed to thoroughly evaluate the cause of the 2005 reactor trip and conduct effectiveness reviews of corrective actions to ensure the problems are resolved.

Inspection Report# : [2011002](#) (pdf)

**Significance:** N/A Feb 04, 2011

Identified By: NRC

Item Type: FIN Finding

### **95001 Inspection**

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.

Inspection Report# : [2011009](#) (pdf)

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## **Mitigating Systems**

**Significance:** TBD Dec 31, 2011

Identified By: Self-Revealing

Item Type: AV Apparent Violation

### **Failure to Provide Adequate Guidance for Installation of 2H EDG Jacket Water Cooling Inlet Jumper**

A self-revealing Apparent Violation of Technical Specifications 5.4.1.a was identified for the licensee’s failure to establish and maintain emergency diesel generator (EDG) maintenance procedures as required by Regulatory Guide 1.33, Appendix A, Section 9, Procedures for Performing Maintenance. The licensee initiated condition report CR439091, “02-EE-EG-2H Emergency Diesel Generator manually secured,” and subsequently completed root cause evaluation (RCE) 001062.

The inspectors determined that the failure to adequately establish and maintain procedure 0-MCM-0701-27 was a performance deficiency. The inspectors reviewed IMC 0609, Appendix B, and determined that the finding was more

than minor because it adversely affected the procedure quality attribute of the Mitigating Systems Cornerstone objective to ensure the availability, reliability, and capability of systems that respond to initiating events to prevent undesirable consequences. Specifically the failure to establish and maintain EDG maintenance procedures led to the inability of the 2H EDG to perform its safety function. The inspectors reviewed IMC 0609, Attachment 4, and determined that since the finding represented an actual loss of safety function of a single train for greater than its Technical Specification allowed outage time, a phase 2 analysis was required. A phase 2 analysis was performed by a resident inspector and resulted in a potentially greater than green significance. Therefore, a phase 3 analysis is required to be performed by a regional SRA in accordance with the guidance of IMC 0609 Appendix A. The cause of this finding involved the cross-cutting area of problem identification and resolution, the component of operating experience, and the aspect of implementing operating experience, P.2(b), because the licensee failed to properly incorporate operating experience into station procedures. (Section 40A5.3)

Inspection Report# : [2011005](#) (pdf)

**Significance:**  Jun 30, 2011

Identified By: NRC

Item Type: NCV NonCited Violation

### **Failure to Maintain Fire Doors in Accordance with the Fire Protection Program**

The inspectors identified a non-cited violation of the North Anna Power Station, Units 1 & 2 Renewed Facility Operating Licenses, NPF-4 & 7, Condition 2.D, Fire Protection, which involved a failure to comply with the requirements for maintaining the operability of fire door, 02-BLD-STR-S71-18, "2H Emergency Diesel Gen Room Door SB Elev 271." The inspectors also identified an additional example of this violation which involved fire door, 01-BLD-STR-S07-3, "Unit 1/Unit 2 Switchgear Door Service Building EL 307." The licensee entered the problems into their corrective action program as condition reports 417750 and 418705 for 02-BLD-STR-S71-18, and 430445, 01-BLD-STR-S07-3.

The inspectors identified a performance deficiency (PD) for the failure to maintain the fire doors operable per the requirements of the Fire Protection Program and consequently failing to declare the fire doors inoperable with appropriate compensatory measures. The PD was more than minor because it impacted the mitigating systems cornerstone objective to ensure the availability, reliability, and capability of systems that respond to initiating events to prevent undesirable consequences, and the related attribute of protection against external factors such as fire. This finding had a credible impact on safety because the inoperability of the fire doors would have an adverse impact on the functionality of the gaseous suppression systems. In accordance with NRC IMC 0609, "Significant Determination Process," Appendix F, the inspectors performed a Phase 1 analysis and determined the finding resulted in very low significance, Green, because although the fire confinement program element was of high degradation, the fire frequencies related to the rooms were 1E-6 and the duration of the component inoperability was less than three days, which resulted in screening check frequency of 1E-8 which was less than the screening criteria of 1E-6. The cause of this finding involved the cross-cutting area of human performance, the component of resources, and the aspect of adequate equipment, H.2(d), because the licensee failed to ensure that fire door closures were adequate for the protection of equipment important to safety. (Section 1R05.2)

Inspection Report# : [2011003](#) (pdf)

**Significance:**  Jun 30, 2011

Identified By: NRC

Item Type: NCV NonCited Violation

### **Inadequate Qualification Testing of Fire Barrier Penetration Seals**

The inspectors identified a non-cited violation of North Anna Power Station, Units 1 & 2 Renewed Facility Operating Licenses, NPF-4 & 7, Condition 2.D, Fire Protection, for failure to maintain in effect all provisions of their NRC-approved fire protection program. Specifically, the licensee failed to have adequate qualification testing results for installed aluminum conduits that penetrate fire barriers separating fire areas containing equipment required for safe shutdown. The requirement to have adequate qualification testing for such fire barrier penetrations is contained in Appendix A to Branch Technical Position APCS 9.5-1, which is part of the licensee's NRC-approved fire protection program. As part of the corrective actions, the licensee performed testing to determine the qualification of aluminum conduit penetrations, and performed modifications, as appropriate, to restore compliance.

The finding is more than minor because it is associated with the reactor safety Mitigating Systems cornerstone attribute of protection against external factors (i.e., fire) and it affects the cornerstone objective of ensuring the reliability and capability of systems that respond to initiating events. Specifically, not having qualification testing results for aluminum conduits that penetrate fire rated barriers adversely affected the fire confinement capability defense-in-depth element, because subsequent testing revealed that some conduits did not meet the penetration seal criteria established in BTP APCS 9.5-1. In accordance with NRC IMC 0609, "Significant Determination Process," Appendix F, the inspectors determined that the performance deficiency represented a finding of very low safety significance (Green). Specifically, the fire barriers in question either provided a 2-hour or greater fire endurance rating, or the barriers separated rooms that did not contain equipment credited for fire safe shutdown of the plant. Inspectors determined that no cross cutting aspect was applicable to this performance deficiency because this finding was not indicative of current licensee performance. (Section 4OA5.4)

Inspection Report# : [2011003](#) (pdf)

**Significance:**  Mar 31, 2011

Identified By: NRC

Item Type: NCV NonCited Violation

### **Inadequate Installation of Unit 2 Low Head Safety Injection Piping and Related Supports**

A non-cited violation of 10 CFR 50, Appendix B, Criterion V, "Instructions, Procedures and Drawings," was identified by the NRC for the failure to accomplish the installation of Unit 2 low head safety injection (LHSI) piping and supports in accordance with prescribed drawings which resulted in no contact between piping and two different pipe supports and caused an operable but degraded and nonconforming condition. The licensee entered this problem into their corrective action program as condition reports 413315 and 418989.

A performance deficiency was identified by the NRC for the failure to adequately install Unit 2 LHSI pipe supports in accordance with prescribed drawings. This PD had a credible impact on safety due to the loss of design basis margin resulting in a reasonable doubt regarding reliability and capability during a seismic event. The PD was more than minor because it impacted the mitigating systems cornerstone objective to ensure the reliability and capability of systems which respond to initiating events and the related attribute of equipment performance because the reliability of the support configurations had been impacted by the reduction in design margin. In accordance with NRC IMC 0609, "Significant Determination Process," the inspectors performed a Phase 1 analysis and determined the finding was of very low safety significance or Green due to a design deficiency confirmed not to result in a loss of operability or functionality. The finding had no cross-cutting aspects due to its legacy nature.

Inspection Report# : [2011002](#) (pdf)

**Significance:**  Mar 31, 2011

Identified By: NRC

Item Type: NCV NonCited Violation

### **Inadequate Post Maintenance Test Program Instructions for Safety-Related Instrument and Control Preventative Maintenance**

A Green, non-cited violation of 10 CFR 50, Appendix B, Criterion V, "Instructions, Procedures, and Drawings," was identified by the NRC for failure to adequately prescribe the correct program instructions to ensure safety-related instrument and control (I&C) preventative maintenance (PMs) received the appropriate post maintenance testing (PMT). The licensee entered this problem into their corrective action program as condition report 417730.

A performance deficiency was identified by the NRC for the failure to adequately prescribe programmatic PMT instructions to ensure safety-related I&C PMs had proper PMT. The inspectors reviewed Inspection Manual Chapter (IMC) 0612, Appendix B, and determined the finding was more than minor because if left uncorrected it would have the potential to result in a more significant safety event. In accordance with IMC 0609, "Significant Determination Process," the inspectors performed a Phase 1 analysis and determined that the finding was of very low significance because the finding was not a design deficiency, did not represent a loss of safety function and did not screen as potentially risk significant due to a seismic, flooding or severe weather initiating event. This finding involved the cross-cutting area of human performance, the component of the resources, and the aspect of complete documentation, H.2(c), because the licensee failed to adequately prescribe programmatic PMT instructions to ensure safety-related

## Barrier Integrity

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## Emergency Preparedness

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## Occupational Radiation Safety

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## Public Radiation Safety

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## Physical Protection

Although the NRC is actively overseeing the Security cornerstone, the Commission has decided that certain findings pertaining to security cornerstone will not be publicly available to ensure that potentially useful information is not provided to a possible adversary. Therefore, the [cover letters](#) to security inspection reports may be viewed.

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## Miscellaneous

**Significance:** N/A Nov 29, 2011

Identified By: NRC

Item Type: FIN Finding

### Startup Monitoring Inspection

The team concluded that your processes ensured that the plant licensing bases had not been degraded and the structures, systems, and components (SSC) of the North Anna Power Station could perform their safety functions following the earthquake event on August 23, 2011, and would support a return to safe power operation without undue risk to the health and safety of the public. The inspection team completed this verification through observation of control room activities and direct inspection of startup activities; including, mode changes, heatup, reactor startup, and power ascension from Mode 5 to rated thermal power. It also included direct inspection of surveillance testing, operability determinations, maintenance risk assessment, emergent work control, modifications, post-maintenance testing, review of corrective action program documents, partial system walkdowns of selected SSC's, including secondary systems, and other activities as applicable.

Inspection Report# : [2011013](#) (*pdf*)

**Significance:** N/A Nov 07, 2011

Identified By: NRC

Item Type: FIN Finding

### Restart Readiness Inspection

The team concluded that your staff adequately inspected plant structures, systems and components (SSCs) to ensure that any damage from the August 23, 2011, seismic event was identified and, if found, would have been properly evaluated and corrected prior to initiating restart activities. As a result of the inspections performed by Dominion, industry and NRC personnel, no significant seismically-induced damage was identified which could affect the

operability or functionality of plant SSCs. However, during the inspection, some examples of minor problems were identified, including: issues that had not been entered into the corrective action or work control programs as required; opportunities to enhance the root cause evaluations conducted following the seismic event; committed actions that were not being processed in accordance with program requirements; and areas which had not been inspected or evaluated before the Restart Readiness Inspection Team engaged your staff. One non-seismic issue associated with a penetration that was found to not be sealed as required is discussed in this report and will be dispositioned in the resident inspector's quarterly inspection report following further review by NRC staff.

Inspection Report# : [2011012](#) (*pdf*)

**Significance:** N/A Apr 29, 2011

Identified By: NRC

Item Type: FIN Finding

**PI&R inspection results**

The inspectors concluded that, in general, problems were properly identified, evaluated, prioritized, and corrected. The licensee was effective at identifying problems and entering them into the corrective action program (CAP) for resolution, as evidenced by the relatively few number of deficiencies identified by external organizations (including the NRC) that had not been previously identified by the licensee, during the review period. Generally, prioritization and evaluation of issues were adequate, formal root cause evaluations for significant problems were adequate, and corrective actions specified for problems were acceptable. Overall, corrective actions developed and implemented for issues were generally effective and implemented in a timely manner. However, the inspectors did identify minor performance deficiencies associated with the CAP in the areas of problem identification, prioritization and evaluation of identified problems, and effectiveness of corrective actions.

The inspectors determined that overall; audits and self-assessments were adequate in identifying deficiencies and areas for improvement in the CAP, and appropriate corrective actions were developed to address the issues identified. However, the inspectors identified a minor performance deficiency associated with the self-assessment program. Operating experience usage was found to be generally acceptable and integrated into the licensee's processes for performing and managing work, and plant operations. However, the inspectors identified minor performance deficiencies associated with the licensee's use of operating experience.

Based on discussions and interviews conducted with plant employees from various departments, the inspectors determined that personnel at the site felt free to raise safety concerns to management and use the CAP to resolve those concerns.

Inspection Report# : [2011008](#) (*pdf*)

Last modified : March 02, 2012