

# North Anna 1

## 3Q/2015 Plant Inspection Findings

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### Initiating Events

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### Mitigating Systems

**Significance:**  Jun 30, 2015

Identified By: NRC

Item Type: NCV Non-Cited Violation

#### **Failure To Maintain An Adequate Maintenance Procedure For The Turbine Driven Auxiliary Feedwater Pump**

A self-revealing NCV of 10 CFR 50 Appendix B, Criterion V, "Instructions, Procedures, and Drawings," was identified for the licensee's failure to maintain an adequate maintenance procedure to set the governor valve on the Unit 1 Turbine Driven Auxiliary Feedwater (TDAFW) pump to the fully closed position. Specifically, the licensee failed to clarify key measurements in Maintenance Procedure 0-MCM-0412-02, "Repair of the Terry Turbine Governor Valve," Revision 11, section 6.4.6, which sets the fully closed position of the governor valve that also adversely impacted the performance of the TDAFW system, and the TDAFW system suction source, the Emergency Condensate Storage Tank (ECST). This issue was entered this into the licensee's corrective action program as CR 572803.

The licensee failed to maintain an adequate maintenance procedure to set the governor valve on the Unit 1 TDAFW pump to the fully closed position was a performance deficiency (PD). Using Manual Chapter 0612, Appendix B, Issue Screening, dated September 7, 2012, the inspectors determined that the PD was more than minor because it was associated with the procedure quality attribute of the Mitigating Systems cornerstone and adversely affected the cornerstone objective of ensuring the availability, reliability, and capability of systems that respond to initiating events to prevent undesirable consequences (i.e. core damage) and is therefore a finding. The finding was screened in accordance with NRC Inspection Manual Chapter (IMC) 0609, Attachment 4, Initial Characterization of Findings, dated June 19, 2012, and was determined to affect the short term secondary system heat removal safety function within the Mitigating Systems Cornerstone. The finding was determined to represent a loss of system function of the auxiliary feedwater (AFW) system as the incorrectly set governor caused the TDAFW pump to run at higher discharge pressure under low flow conditions, lifting the TDAFW discharge relief valve, which bypassed approximately 200 gpm flow to the ground. With the loss of 200 gpm the ECST could not have met its mission time which represented a loss of system function requiring a detailed risk analysis.

A detailed risk analysis was performed by a regional senior reactor analyst (SRA) in accordance with the guidance of NRC IMC 0609, Appendix A, The Significance Determination Process (SDP) for Findings At-Power, dated June 19, 2012, using the NRC North Anna SPAR model. The major analysis assumptions included: the ECST failed for a one year exposure period, no additional failure modes from the incorrectly set TDAFW pump governor valve other than the early depletion of the ECST, and no recovery for the condition other than to align to alternate suction source which remained at nominal failure probability. The dominant sequence was a loss of offsite power with success of reactor protection system, success of the emergency power system and late failure of AFW and late failure of feed and bleed leading to core damage. The risk was mitigated by the availability of other suction sources. The result of the analysis was that the PD represented an increase in core damage frequency of  $< 1.0 \text{ E-6/year}$ , a GREEN finding of very low safety significance.

The finding has a cross-cutting aspect in the area of human performance associated with resources attribute because leaders failed to ensure that personnel, equipment, procedures, and other resources were available and adequate to support nuclear safety to maintain the ECST inventory during the mission time. [H.1]. (1R12).

Inspection Report# : [2015002](#) (*pdf*)

## Barrier Integrity

**Significance:**  Mar 31, 2015

Identified By: Self-Revealing

Item Type: NCV Non-Cited Violation

### Failure To Follow Procedure For RWST Instruments

A self-revealing NCV of 10 CFR 50 Appendix B, Criterion V, “Instructions, Procedures, and Drawings,” was identified for the licensee’s failure to follow work management procedures. Specifically, the licensee failed to follow the conduct of maintenance procedure, MM-AA-100, “Conduct of Maintenance,” Revision 10, where maintenance personnel should use an assortment of techniques and tools to avoid errors during work execution. Attachment 6 step 1b outlines various human error prevention techniques that should have been used during the work execution including “self checking” and “questioning attitude.” This issue was entered this into the licensee’s corrective action program as CR 567185.

The licensee’s failure to follow the conduct of maintenance procedure, MM-AA-100, “Conduct of Maintenance,” Revision 10, was a performance deficiency. Specifically, on December 10, 2014, maintenance personnel failed to effectively use human error prevention tools when performing the maintenance on the Refueling Water Storage Tank (RWST) level channels which resulted in a loss of the safety function of the Recirculation Spray (RS) system. The performance deficiency was more than minor because it was associated with the configuration control attribute of the Barrier Integrity cornerstone and adversely affected the cornerstone objective to ensure that the physical design barriers (fuel cladding, reactor coolant system, and containment) protect the public from radionuclide releases caused by accidents or events and is therefore a finding. Specifically, the RS system safety function was inadvertently rendered inoperable. The inspectors performed a Phase 1 analysis using the IMC 0609, Appendix A, “The Significance Determination Process (SDP) for Findings At-Power”, Exhibit 3 “Barrier Integrity Screening Questions,” dated June 19, 2012 and Appendix H, “Containment Integrity Significance Determination Process,” dated May 6, 2004, and determined the finding required a detailed risk evaluation because it involved the loss of safety function of the RS system.

A detailed risk evaluation was performed in accordance with NRC Inspection Manual Chapter (IMC) 0609, Appendix A by a regional senior reactor analyst using the latest NRC North Anna SPAR model and Sapphire risk program. The major analysis assumptions included: a thirty-two minute exposure interval, and a non-recoverable loss of both inside recirculation spray pumps and both outside recirculation pumps. The dominant risk sequence was a small break loss of coolant accident initiator, success of the reactor protection system, success of feedwater, success of high pressure injection, success of secondary side cooldown and failure of recirculation spray resulting in loss of core and containment heat removal capability. The risk was mitigated by the short exposure period. The risk evaluation result was an increase in core damage frequency of <1 E-6/year and an increase in large early release fraction of <1 E - 7/year, a GREEN finding of very low safety significance.

The finding has a cross-cutting aspect in the area of human performance associated with the work management attribute because the organization failed to implement a process of planning, controlling, and executing work activities

such that nuclear safety is the overriding priority. Furthermore, the licensee work process control includes the identification and management of risk commensurate to the work and the need for coordination with different groups or job activities. Specifically, due to poor communication and coordination between the Control Room and the technicians calibrating the RWST level channels, and amongst the team of technicians calibrating the RWST level transmitters, the RS system was inoperable [H.5] (1R12).

Inspection Report# : [2015001](#) (*pdf*)

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## **Emergency Preparedness**

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## **Occupational Radiation Safety**

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## **Public Radiation Safety**

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## **Security**

Although the Security Cornerstone is included in the Reactor Oversight Process assessment program, the Commission has decided that specific information related to findings and performance indicators pertaining to the Security Cornerstone will not be publicly available to ensure that security information is not provided to a possible adversary. Other than the fact that a finding or performance indicator is Green or Greater-Than-Green, security related information will not be displayed on the public web page. Therefore, the [cover letters](#) to security inspection reports may be viewed.

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## **Miscellaneous**

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