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North Anna 2 – Quarterly Plant Inspection Findings

3Q/2017 – Plant Inspection Findings

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Initiating Events

Significance: G Mar 31, 2017

Identified By: Self-Revealing

Item Type: NCV Non-Cited Violation

Inadequate Design Control of 2-RC-P-1C Piping Supports

A self-revealing Green NCV of 10 CFR 50, Appendix B, Criterion III, "Design Control," was identified for the failure to correctly translate applicable regulatory requirements and the design basis into specifications, drawings, procedures, and instructions. Specifically, the licensee failed to include the pipe support (2-FPH-CH-416-11) in the scope of design change (DC) NA-13-01059, Unit 2 Reactor Coolant Pump Seal Replacement, which resulted in a large mean stress on the socket weld due to the 1.5-inch controlled bleed-off line piping not being properly aligned in the downstream pipe support, and therefore not allowing for the thermal growth of the reactor coolant system (RCS). As a result of the large mean stress, a crack initiated at a small defect (lack of fusion) in the toe of the socket weld and propagated through the weld due to normal cyclic vibration from the Unit 2 "C" reactor coolant pump (RCP). This finding was entered into the licensee's corrective action program as Condition Report (CR) 1043540.

The finding was more than minor because it was associated with the design control attribute of the Initiating Events and Barrier Integrity cornerstones and adversely affected the cornerstone objective to provide reasonable assurance that physical design barriers protect the public from radio-nuclide releases caused by accidents or events. Specifically, the inadequate design control of the piping support following Unit 2 RCP Seal Replacement resulted in an un-isolable through wall leak in the controlled bleed-off line piping and was identified as RCS pressure boundary leakage. The inspectors evaluated the finding in accordance with Manual Chapter 0609.04, "Initial Characterization of Findings," Table 2, dated October 7, 2016, and the inspectors screened the finding using Inspection Manual Chapter (IMC) 0609, Appendix A, "Significance Determination Process (SDP) for Findings at-Power," dated June 19, 2012. The finding screened out in the review of the Barrier Integrity cornerstone as the performance deficiency (PD) was not related to pressurized thermal shock; therefore, the finding will be addressed under the Initiating Events cornerstone. Since the issue affected multiple cornerstones and because the licensee classified the leakage as RCS pressure boundary leakage, the NRC performed a detailed risk evaluation for the PD. The detailed risk evaluation was performed by a regional

SRA in accordance with the NRC IMC 0609 Appendix A utilizing the NRC North Anna SPAR model. The PD was modelled as an increase in the small loss of coolant accident frequency given a failure of the RCP seal. The dominant sequence was a rupture in the controlled bleed off line leading to a small loss of coolant accident due to RCP seal failure with failure of containment sump recirculation leading to loss of core heat removal and core damage. The risk was mitigated by the RCP seal failure probability and the remaining mitigation. The detailed risk evaluation estimated that the PD resulted in an increase in core damage frequency of $< 1.0 \text{ E-6/year}$, a GREEN finding of very low safety significance.

The finding had a cross-cutting aspect in the area of human performance, work management H.5, because the licensee failed to include the pipe support (2-FPH-CH-416-11) in the scope of the design change by engineering information bulletin (EIB) # N10-002 requirements.

Inspection Report# : 2017001 (*pdf*)

Mitigating Systems

Barrier Integrity

Emergency Preparedness

Occupational Radiation Safety

Public Radiation Safety

Security

The security cornerstone is an important component of the ROP, which includes various security inspection activities the NRC uses to verify licensee compliance with Commission regulations and thus ensure public health and safety. The Commission determined in the staff requirements memorandum (SRM) for SECY-04-0191, "Withholding Sensitive Unclassified Information Concerning Nuclear Power Reactors from Public Disclosure," dated November 9, 2004, that specific information related to findings and performance indicators associated with the security cornerstone will not be publicly available to ensure that security-related information is not provided to a possible adversary. Security inspection report cover letters will be available on the NRC Web site; however, security-related information on the details of inspection finding(s) will not be displayed.

Miscellaneous

Current data as of : November 29, 2017

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