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Arkansas Nuclear 2 – Quarterly Plant Inspection Findings

3Q/2017 – Plant Inspection Findings

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Initiating Events

Significance: G Jun 30, 2017

Identified By: NRC

Item Type: NCV Non-Cited Violation

Failure to Follow Various Fire Protection Program Procedures

The inspectors identified a finding and associated non-cited violation of License Conditions 2.C.(3)(b), "Fire Protection," for Arkansas Nuclear One Unit 2, associated with the failure to adequately implement the fire protection program. Specifically, the licensee failed to follow the requirements for control of flammable liquid lockers and compressed hydrogen gas cylinders. The licensee immediately removed the hydrogen cylinders and stored them in an approved location and began processing the flammable liquid lockers through the design change process. The licensee entered these issues into their corrective action program as Condition Reports CR-ANO-2-2017-01525 and CR-ANO-C-2017-01508.

The failure to properly control transient combustible material in accordance with the approved fire protection program was a performance deficiency. The finding was considered more than minor because storing unanalyzed flammable material could result in the potential to exceed combustible material limits, and is associated with the protection against external factors attribute of the Initiating Events Cornerstone and adversely affected the cornerstone objective to limit the likelihood of events that upset plant stability and challenge critical safety functions during power operations. Specifically, the failure to follow procedures resulted in conditions that increased the risk of fire which could upset plant stability and challenge critical safety functions. The inspectors evaluated the finding using Inspection Manual Chapter 0609, Appendix F, "Fire Protection Significance Determination Process," and assigned the finding to the "Fire Prevention and Administrative Controls" category; because it affected the licensee's combustible materials control. The finding was determined to be Green, or very low safety significance, in accordance with Inspection Manual Chapter 0609, Appendix F, Question 1.3.1, because the reactor would have been able to reach and maintain safe shutdown since the postulated fires would not have affected both trains of safe shutdown equipment. This finding had a cross-cutting aspect associated with teamwork within the human performance area since multiple groups in the licensee staff were

involved in the decisions that resulted in the improper introduction of the flammable liquids lockers and the improper storage of the hydrogen cylinders.

Inspection Report# : 2017002 (*pdf*)

Significance: G Dec 02, 2016

Identified By: NRC

Item Type: FIN Finding

Failure to Monitor Startup Transformers #1, #2, and #3 Voltage Regulator/Tap Changer Function

The team identified a Green finding for the failure to meet the surveillance standards of IEEE 308-1971, "Criteria for Class 1E Electric Systems for Nuclear Power Generating Stations," Section 5.2.3, "Preferred Power Supply." Specifically, from 2001 to December 2, 2016, the licensee failed to monitor the operation of the voltage regulator/load tap changer functions on startup transformers 1, 2, and 3. In response to this issue, the licensee provided reasonable assurance that the voltage regulator/load tap changer was operating properly based on review of plant computer voltage plot data following an Arkansas Nuclear One, Unit 1 trip that occurred on December 14, 2015. This finding was entered into the licensee's corrective action program as Condition Reports CR-ANO-C-2016-4777, CR-ANO-C-2016-4879, and CR-ANO-C-2016-5015.

The team determined that the failure to monitor startup transformers 1, 2, and 3 voltage regulator/load tap changers to the extent that they are shown to be ready to perform their intended function, in accordance with IEEE Standard 308-1971, was a performance deficiency. The finding was determined to be more than minor because it was associated with the equipment performance attribute of the Mitigating Systems Cornerstone and affected the cornerstone objective of ensuring the availability, reliability, and capability of mitigating systems to respond to initiating events to prevent undesirable consequences. Specifically, the failure to monitor the adequacy of the voltage supplied from startup transformers 1, 2, and 3 voltage regulator/load tap changer did not ensure that offsite power would be available to perform its necessary functions to provide power to the safety-related mitigation equipment. In accordance with Inspection Manual Chapter 0609, Appendix A, "The Significance Determination Process (SDP) for Findings At-Power," dated June 19, 2012, Exhibit 2, "Mitigating Systems Screening Questions," the issue screened as having very low safety significance (Green) because it was a design or qualification deficiency that did not represent a loss of operability or functionality; did not represent an actual loss of safety function of the system or train; did not result in the loss of one or more trains of non-technical specification equipment; and did not screen as potentially risk-significant due to seismic, flooding, or severe weather. This finding did not have a cross-cutting aspect because the performance deficiency did not reflect current licensee performance.

Inspection Report# : 2016008 (*pdf*)

Significance: Y Feb 10, 2014

Identified By: NRC

Item Type: VIO Violation

Unit 2 - Failure to Follow the Materials Handling Program during the Unit 1 Generator Stator Move

Unit 2 Apparent Violation. The inspectors reviewed a self-revealing apparent violation of 10 CFR 50, Appendix B, Criterion V, "Instructions, Procedures and Drawings," which states, in part, that "activities affecting quality shall be prescribed by documented instructions, procedures, or drawings, of a type appropriate to the circumstances and shall be accomplished in accordance with these instructions, procedures or drawings." The licensee did not follow the

requirements specified in Procedure EN-MA-119, "Material Handling Program," in that, the licensee did not perform an adequate review of the subcontractor's lifting rig design calculation and the licensee failed to conduct a load test of the lifting rig prior to use. The licensee initiated Condition Report CR-ANO-C-2013-00888 to capture this issue in the corrective action program. The licensee's corrective actions included repairing damage to the Unit 1 turbine deck, fire main system, and electrical system. In addition, changes were made to various procedures including Procedure EN-DC-114, "Project Management," to provide guidance on review of calculations, quality requirements, and standards associated with third party reviews.

The inspectors determined that this finding was more than minor because it was associated with the procedural control attribute of the initiating event cornerstone, and adversely affected the cornerstone's objective to limit the likelihood of events that upset plant stability and challenge critical safety functions during shutdown, as well as power operations. The stator drop caused a reactor trip on Unit 2 and damage to the fire main system which resulted in water intrusion into the electrical equipment causing a loss of startup transformer 3. This resulted in the loss of power to various loads, including reactor coolant pumps, instrument air compressors, and the safety-related Train B vital electrical bus. The inspectors used Inspection Manual Chapter 0609, Attachment 0609.04, "Initial Characterization of Findings," dated June 19, 2012, and Appendix A, "The Significance Determination Process (SDP) for Findings At-Power," dated June 19, 2012, to evaluate the significance of the finding. Since this was an initiating event, the inspectors used Exhibit 1 of Appendix A and determined that Section C, "Support System Initiators," was impacted because the finding involved the loss of an electrical bus and a loss of instrument air. The inspectors determined that Section E, "External Event Initiators," of Exhibit 1 should also be applied because the finding impacted the frequency of internal flooding. Since Sections C and E were impacted, a detailed risk evaluation was required. The NRC risk analyst used the Arkansas Nuclear One, Unit 2 Standardized Plant Analysis Risk Model, Revision 8.21, and hand calculation methods to quantify the risk. The model was modified to include additional breakers and switching options, and to provide credit for recovery of emergency diesel generators during transient sequences. Additionally, the analyst performed additional runs of the risk model to account for consequential loss of offsite power risks that were not modeled directly under the special initiator. The largest risk contributor (approximately 96 percent) was a loss of all feedwater to the steam generators, with a failure of once-through cooling. The result of the analysis was a conditional core damage probability of $2.8E-5$; therefore, this finding was preliminarily determined to have substantial safety significance (Yellow).

This finding had a cross-cutting aspect in the area of human performance associated with field presence, because the licensee did not ensure adequate supervisory and management oversight of work activities, including contractors and supplemental personnel. Specifically, the licensee did not provide a sufficient level of oversight in that, the requirements in Procedure EN-MA-119, for design approval and load testing of the temporary hoisting assembly, were not followed [H.2].

Issued as preliminary Yellow AV in IR 05000313,368/2013012 dated March 24, 2014.

Final significance was determined to be Yellow. NOV issued in IR 05000313,368/2014008 dated June 23, 2014.

Inspection Report# : 2014008 (*pdf*)

Inspection Report# : 2013012 (*pdf*)

Inspection Report# : 2016008 (*pdf*)

Inspection Report# : 2016007 (*pdf*)

Mitigating Systems

Significance:  Jun 30, 2017

Identified By: NRC

Item Type: NCV Non-Cited Violation

Failure to Install Set Screw Leads to Breaker Failure

The inspectors documented a Green self-revealing finding and associated non-cited violation of Unit 2 Technical Specification 6.4.1.a, for failure to properly pre-plan and perform maintenance on the Unit 2 containment spray pump B breaker in accordance with written procedures. Specifically, the licensee failed to install a cam shaft set screw during the breaker's last overhaul. The cam eventually became displaced on the shaft, and the breaker failed to close. To correct the issue, the licensee replaced the breaker and installed a cam shaft set screw in the failed breaker. The licensee also inspected all other similar breakers to verify the cams were properly secured. The licensee entered the issue into their corrective action program as Condition Report CR-ANO-2-2017-03168.

The failure to install a cam shaft set screw during the overhaul of the Unit 2 containment spray pump B breaker is a performance deficiency. The performance deficiency is more than minor because it was associated with the equipment performance attribute of the mitigating systems cornerstone and adversely affected the cornerstone objective to ensure the reliability of systems that respond to initiating events to prevent undesirable consequences. Specifically, the performance deficiency resulted in the failure of a Unit 2 containment spray pump breaker. Using Inspection Manual Chapter 0609, Appendix A, "The Significance Determination Process (SDP) for Findings At-Power," dated June 19, 2012, Exhibit 2, "Mitigating Systems Screening Questions," the issue screened as having very low safety significance (Green) because it was not a design or qualification deficiency; did not represent a loss of system; did not result in the actual loss of function of a train of technical specification equipment for greater than its allowed outage time; and did not screen as potentially risk significant due to seismic, flooding, or severe weather events. The inspectors determined this finding did not have a cross-cutting aspect because the most significant contributor did not reflect current licensee performance. Specifically, the error occurred during the breaker's last overhaul, which occurred in 2011.
Inspection Report# : 2017002 (*pdf*)

Significance:  May 01, 2017

Identified By: NRC

Item Type: FIN Finding

Inadequate FLEX Power Supply Connections

The team identified a finding for the failure to assure that FLEX power supply connections would be reliable following all required postulated beyond design basis external events. Specifically, the team identified that one installed cable configuration could potentially be damaged during high wind events preventing operation of the portable diesel generator required to operate plant equipment. This issue was entered into the licensee's corrective action program as Condition Report CR-ANO-C-2017-00316.

The failure to adequately install the electrical modification for connecting the portable diesel generator was a performance deficiency. The performance deficiency was more than minor because it was associated with the protection against external factors attribute of the Mitigating Systems Cornerstone and adversely affected the Mitigating Systems Cornerstone objective of ensuring the availability, reliability, and capability of systems that respond to initiating events to prevent undesirable consequences. The significance of the finding was evaluated using NRC Inspection Manual Chapter 0609, Appendix O, "Significance Determination Process for Mitigating Strategies and Spent Fuel Pool Instrumentation (Orders EA-12-049 and EA-12-051)," dated October 7, 2016, and Appendix M, "Significance Determination Process Using Qualitative Criteria," dated April 12, 2012. A bounding evaluation was performed using the exposure time, tornado frequency, and frequency of a random failure of both emergency diesel generators. The licensee's compliance date with the order was January 12, 2016, so an exposure time of one year was used. The tornado frequency selected was for an F2 or greater tornado striking the site ($5.31E-5/\text{year}$). The random failure frequency of both unit's emergency diesel generators ($3.15E-3/\text{year}$) was selected since the emergency diesel generators are protected from damage during high wind events. This is a conservative bounding analysis because it assumes that any tornado would result in damage causing a loss of offsite power and damage the cables in terminal panel 2TB1011 on the roof. The change in core damage frequency for the finding was determined to be $1.67E-7/\text{year}$. Therefore, the finding was determined to a very low risk significance. The finding had a cross-cutting aspect in the

challenge to the unknown component of Human Performance because the licensee failed to adequately address all potential damage scenarios when developing the modification design requirements for beyond design basis external events.

Inspection Report# : 2017008 (*pdf*)

Significance: **G** May 01, 2017

Identified By: NRC

Item Type: FIN Finding

Inadequate FLEX Procedures

The team identified a finding with three examples for the licensee failing to assure that FLEX procedures were adequate for implementation of the strategies credited in the licensee's Final Implementation Plan. This issue was entered into the licensee's corrective action program as Condition Reports CR-ANO-C-2017-00341, CR-ANO-C 2017-00344, CR-ANO-1-2017-00250, and CR-ANO-C-2017-00295.

The failure to provide adequate procedures for responding to an extended loss of all AC power due to a flooding or high wind event was a performance deficiency. The performance deficiency was more than minor because it was associated with the protection against external factors attribute of the Mitigating Systems Cornerstone and adversely affected the Mitigating Systems Cornerstone objective of ensuring the availability, reliability, and capability of systems that respond to initiating events to prevent undesirable consequences. The significance of the finding was evaluated using NRC Inspection Manual Chapter 0609, Appendix O, "Significance Determination Process for Mitigating Strategies and Spent Fuel Pool Instrumentation (Orders EA-12-049 and EA-12-051)," dated October 7, 2016, and Appendix M, "Significance Determination Process Using Qualitative Criteria," dated April 12, 2012. A bounding evaluation was performed using the exposure time, frequency of random failure of both emergency diesel generators, and tornado frequency or flood frequency. The licensee's order compliance date was January 12, 2016, so an exposure time of one year was used. The random failure frequency of both unit's emergency diesel generators ($3.15E-3/\text{year}$) was selected since the emergency diesel generators are protected from damage during high wind and flood events. For the two examples impacted by flood events, the flood frequency selected was for a flood exceeding the site elevation ($8.47E-5/\text{year}$). The change in core damage frequency for these examples was determined to be $2.67E-7/\text{year}$. For the example which would only impact the licensee's response to a high wind event, the tornado frequency selected was for an F2 or greater tornado striking the site ($5.31E-5/\text{year}$). The change in core damage frequency for this example was determined to be $1.67E-7/\text{year}$. Therefore, the three examples of the finding were determined to be of very low risk significance. The finding had a cross-cutting aspect in the Procedure Adherence component of the Human Performance area because the licensee failed to adequately perform reviews required by the licensee's procedure control program to confirm that: (1) instructions for implementing the strategies in the licensee's Final Implementation Plan were complete and appropriate; and (2) reviews for affected procedures related to other procedure revisions identified impacts on the implementing strategies and revised them appropriately.

Inspection Report# : 2017008 (*pdf*)

Significance: **W** Dec 21, 2016

Identified By: NRC

Item Type: VIO Violation

Failure to Ensure Adequate Lubrication for Emergency Diesel Generator Bearing

The inspectors reviewed a self-revealing finding that was preliminarily determined to have low to moderate safety significance (White) for the failure to perform maintenance activities in a manner that ensured adequate lubrication to Unit 2 emergency diesel generator A. This finding involved a violation of Technical Specification 6.4.1.a, because the licensee failed to provide adequate work instructions for maintenance on the inboard generator bearing oil sight glass to

ensure that the scribe mark indicated the minimum acceptable oil level to ensure adequate lubrication to the bearing. As a result, the licensee reinstalled the sight glass with the oil level scribe mark below the bottom of the bearing rollers. Subsequently, on June 22, 2016, the oil was drained and replaced with oil level close to the sight glass scribe mark, and the bearing failed on September 16, 2016, during a 24-hour surveillance. The licensee entered this issue into the corrective action program as Condition Report CR-ANO-2-2016-03307. The licensee resolved the safety concern by repairing the bearing, successfully testing the diesel, and verifying the condition did not exist in any other safety-related equipment.

The failure to ensure adequate lubrication to the inboard generator bearing so that the Unit 2 emergency diesel generator A would be capable of performing its safety functions for the intended mission time is a performance deficiency. This performance deficiency is more than minor, and therefore is a finding, because it is associated with the procedure quality attribute of the mitigating systems cornerstone, and adversely affected the cornerstone objective to ensure the availability, reliability, and capability of systems that respond to initiating events to prevent undesirable consequences. Specifically, the licensee failed to properly pre-plan and perform work that could affect this safety-related system in accordance with written procedures, documented instructions, or drawings appropriate to the circumstances such that the minimum bearing oil level was correctly marked and maintained. This performance deficiency subsequently affected the availability and reliability of the emergency diesel generator, a mitigating system. The inspectors evaluated the finding with NRC Manual Chapter 0609, Appendix A, "The Significance Determination Process (SDP) for Findings At-Power," dated June 19, 2012, Exhibit 2, "Mitigating Systems Screening Questions." The inspectors determined that the finding required a detailed risk evaluation because an actual loss of function of a single train of mitigating equipment occurred for greater than its technical specification allowed outage time.

UPDATE Inspection Report 2017014: This violation is associated with a White significance determination process finding.

Technical Specification 6.4.1.a requires, in part, that written procedures shall be established, implemented, and maintained covering the applicable procedures recommended in Regulatory Guide 1.33, "Quality Assurance Program Requirements," Revision 2, Appendix A, February 1978. Regulatory Guide 1.33, Appendix A, Section 9.a, states, in part, 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.

Contrary to the above, on November 11, 2014, and on June 22, 2016, the licensee failed to properly pre-plan and perform maintenance that can affect the performance of safety-related equipment in accordance with written procedures, documented instructions, or drawings appropriate to the circumstances. Specifically, on November 11, 2014, while performing Work Order 356569, and on June 22, 2016, while performing Work Order 52656389, the licensee failed to provide adequate documented work instructions for maintenance on the Unit 2 emergency diesel generator A inboard generator bearing, a safety-related component, such that the minimum bearing oil level was correctly marked and maintained to ensure adequate lubrication to the bearing. As a result, the Unit 2 emergency diesel generator A failed on September 16, 2016, during a 24-hour endurance test.

Inspection Report# : 2016011 (*pdf*)

Inspection Report# : 2017014 (*pdf*)

Significance:  Dec 02, 2016

Identified By: NRC

Item Type: NCV Non-Cited Violation

Failure to Incorporate Safety Guide 9 Criteria into Surveillance Procedures

The team identified Green non-cited violation of 10 CFR Part 50, Appendix B,

Criterion XI, "Test Control," which states, "A test program shall be established to assure that all testing required to demonstrate that structures, systems, and components will perform satisfactorily in service is identified and performed in accordance with written test procedures which incorporate the requirements and acceptance limits contained in applicable design documents." Additionally, "Test results shall be documented and evaluated to assure that test requirements have been satisfied." Specifically, as of December 2, 2016, Units 1 and 2 emergency diesel generator surveillance procedures failed to incorporate the applicable voltage and frequency limits of NRC Safety Guide 9, and did not consistently document or evaluate results to assure test requirements have been satisfied. In response to this issue, the licensee provided the team test results which demonstrated that an immediate safety concern was not present. This finding was entered into the licensee's corrective action program as Condition Reports CR-ANO-1-2016-4785 and CR-ANO-2-2016-4257.

The team determined that the failure to incorporate the acceptance limits of NRC Safety Guide 9 into surveillance test procedures for emergency diesel generators and assure that test requirements have been satisfied in accordance with 10 CFR Part 50, Appendix B, Criterion XI, "Test Control," was a performance deficiency. The performance deficiency was determined to be 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 mitigating systems to respond to initiating events to prevent undesirable consequences, and would have the potential to lead to a more significant safety concern. Specifically, the failure to incorporate appropriate acceptance criteria in test procedures and assure that the criteria have been satisfied had the potential to lead to a worse condition, if left uncorrected. In accordance with Inspection Manual Chapter 0609, Appendix A, "The Significance Determination Process (SDP) for Findings At-Power," dated June 19, 2012, Exhibit 2, "Mitigating Systems Screening Questions," the issue screened as having very low safety significance (Green) because it was a design or qualification deficiency that did not represent a loss of operability or functionality; did not represent an actual loss of safety function of the system or train; did not result in the loss of one or more trains of non-technical specification equipment; and did not screen as potentially risk-significant due to seismic, flooding, or severe weather. This finding did not have a cross-cutting aspect because the performance deficiency did not reflect current licensee performance.

Inspection Report# : 2016008 (*pdf*)

Significance:  Dec 02, 2016

Identified By: NRC

Item Type: NCV Non-Cited Violation

Failure to Ensure Safety Systems Would Survive Sustained Degraded Voltage Conditions

The team identified a Green non-cited violation of 10 CFR Part 50, Appendix B, Criterion III, "Design Control," which states, in part, design control measures shall provide for verifying or checking the adequacy of design, such as by the performance of design reviews, by the use of alternate or simplified calculational methods, or by the performance of a suitable testing program. Specifically, from December 17, 1979, to December 2, 2016, the licensee did not verify that the design of the protective devices for the loads required at the beginning of a loss-of-coolant accident were adequate to prevent tripping these devices under degraded voltage conditions, which would render the affected loads non-functional.

In response to this issue, the licensee performed a preliminary analysis to determine that the protective overload devices would not cause safety equipment to fail at degraded voltages allowed by technical specifications. This finding was entered into the licensee's corrective action program as Condition Reports CR-ANO-C-2016-5027 and CR-ANO-C-2016-5191.

The team determined that the failure to ensure that safety-related electrical components would not fail during the allowable time duration of a degraded voltage condition (in accordance with NRC Multi-Plant Action B-23, Position 1.C) was a performance deficiency. The finding was determined to be more than minor because it was associated with the design control attribute of the Mitigating Systems Cornerstone and adversely affected the cornerstone objective of ensuring the availability, reliability, and capability of mitigating systems to respond to initiating events to prevent undesirable consequences. Specifically, the failure to ensure that the protective devices for the loads required at the beginning of a Loss of Control Accident would not fail under degraded voltage conditions did not ensure that these loads would be available to perform their mitigating functions. In accordance with Inspection Manual Chapter 0609, Appendix A, "The Significance Determination Process (SDP) for Findings At-Power," dated June 19, 2012, Exhibit 2, "Mitigating Systems Screening Questions," the issue screened as having very low safety significance (Green) because it was a design or qualification deficiency that did not represent a loss of operability or functionality; did not represent an actual loss of safety function of the system or train; did not result in the loss of one or more trains of non-technical specification equipment; and did not screen as potentially risk-significant due to seismic, flooding, or severe weather. The team determined that this finding did not have a cross-cutting aspect because the most significant contributor did not reflect current licensee performance.

Inspection Report# : 2016008 (*pdf*)

Significance: N/A Dec 02, 2016

Identified By: NRC

Item Type: NCV Non-Cited Violation

Readiness to Cope with External Flooding

The team identified three examples of a Green non-cited violation of 10 CFR Part 50, Appendix B, Criterion V, "Instructions, Procedures, and Drawings," which states, in part that, activities affecting quality shall be prescribed by documented instructions, procedures, or drawings of a type appropriate to the circumstances. Specifically, prior to December 2, 2016, Unit 1 Operating Procedure OP 1203.025, "Natural Emergencies," Revision 60 and Unit 2 Operating Procedure OP 2203.008 "Natural Emergencies," Revision 42 failed to ensure all actions required to establish external flood protection, as specified by flood protection design basis engineering report CALC-ANOC-CS-00003, Revision 00 were implemented. This issue was entered into the licensee's corrective action program as Condition Report CR-ANO-2-2016-4265.

The licensee's failure to prescribe procedures appropriate to the circumstances for combating emergencies or other significant acts of nature such as flooding was a performance deficiency. The performance deficiency 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 mitigating systems to respond to initiating events to prevent undesirable consequences, and would have the potential to lead to a more significant safety concern. In accordance with Inspection Manual Chapter 0609, Appendix A, "The Significance

Determination Process (SDP) for Findings At-Power," dated June 19, 2012, Exhibit 2, "Mitigating Systems Screening Questions," the issue screened as having very low safety significance (Green) because it does not involve the loss or degradation of equipment or function specifically designed to mitigate a seismic, flooding, or severe weather initiating event. This finding had a cross-cutting aspect in the area of problem identification and resolution associated with identification because the licensee failed to identify issues, completely, accurately, and in a timely manner in accordance with the corrective action program. Specifically, the licensee failed to identify these deficiencies during a review of these same procedures as part of actions to close significant performance deficiencies as documented in Arkansas Nuclear One Area Action Plan FP-6.

Inspection Report# : 2016008 (*pdf*)

Significance: Y Aug 01, 2014

Identified By: NRC

Item Type: VIO Violation

Inadequate Flood Protection for Auxiliary and Emergency Diesel Fuel Storage Buildings

The inspectors identified a finding of preliminary substantial safety significance (Yellow) for the failure to design, construct, and maintain the Units 1 and 2 auxiliary and emergency diesel fuel storage buildings in accordance with the safety analysis reports' description of internal and external flood barriers so that they could protect safety-related equipment from flooding. Two apparent violations were associated with this finding:

- a. Contrary to 10 CFR Part 50, Appendix B, Criterion III, "Design Control," the licensee failed to assure that regulatory requirements and the design basis were correctly translated into specifications, drawings, procedures, and instructions, and that design changes were subjected to design control measures commensurate with those applied to the original design.
- b. Contrary to 10 CFR Part 50, Appendix B, Criterion V, "Instructions, Procedures, and Drawings," the licensee failed to prescribe documented instructions for activities affecting quality and accomplish activities affecting quality in accordance with drawings.

The licensee entered these issues into the corrective action program as Condition Reports CR-ANO-C-2013-01304 and CR-ANO-C-2014-00259. The licensee resolved the safety concern by replacing the degraded seals or parts, installing penetration seals, implementing compensatory measures, and/or incorporating instructions into procedures.

The inspectors determined that the finding was more than minor because it was associated with the protection against external factors attribute of the mitigating systems cornerstone and adversely affected the cornerstone objective to ensure the availability, reliability, and capability of systems that respond to initiating events to prevent undesirable consequences. Specifically, the performance deficiency resulted in the vulnerability to flooding of safety-related equipment necessary to maintain core cooling in the auxiliary and emergency diesel fuel storage buildings. The inspectors used Inspection Manual Chapter 0609, Attachment 0609.04, "Initial Characterization of Findings," dated June 19, 2012, and Appendix A, "The Significance Determination Process (SDP) for Findings At-Power," dated June 19, 2012, to evaluate the significance of the finding. In accordance with Appendix A, Exhibit 4, the inspectors determined that a detailed risk evaluation was necessary because, if the flood barriers were assumed to be completely failed, two or more trains of a multi-train system would be degraded during an external flood.

The NRC risk analysts determined that the finding should be evaluated in accordance with NRC Inspection Manual Chapter 0609, Appendix M, "Significance Determination Process Using Qualitative Criteria," April 12, 2012. Appropriate quantitative significance determination process tools did not exist to provide a reasonable estimate of the

significance because a plant-specific flood hazard analysis did not exist and was not expected to be available until sometime in 2015. The risk analysts used NRC Inspection Manual Chapter 0609, Appendix M, Table 4.1, "Qualitative Decision-Making Attributes for NRC Management Review," to determine the preliminary safety significance of the finding. The following were the dominant considerations in reaching a preliminary risk determination conclusion:

1. With respect to the auxiliary and emergency diesel fuel storage buildings, there were more than 100 unknown ingress pathways for a flooding event, therefore if an external flood above grade level were to occur, the buildings would flood.
2. The unexpected rate of flooding would likely be beyond the licensee's capability to prevent or mitigate as equipment and connections associated with alternative mitigating strategies, could be submerged.
3. All reactor core cooling and makeup could fail due to significant flooding of the auxiliary and emergency diesel fuel storage buildings.
4. The change in core damage frequency was quantitatively bounded below 2×10^{-3} and qualitatively determined to likely be less than 1×10^{-4} . The bounding and qualitative results are based on the frequency of the probable maximum flood event and a loss of all equipment needed for core cooling and makeup.

This finding was preliminarily determined to be of substantial safety significance (Yellow) for Unit 1 and Unit 2, as determined by a Significance and Enforcement Review Panel.

This finding had a cross-cutting aspect in the area of human performance related to maintaining design margins. Specifically, the licensee did not design, construct, and/or maintain over 100 flood barriers to ensure design margins were sustained.

The finding was determined to be Yellow (substantial safety significance) for both Units. Final significance determination and NOV issued January 22, 2015 (IR 05000313;638/2014010) (ML15023A076).

Inspection Report# : 2016007 (*pdf*)

Inspection Report# : 2016008 (*pdf*)

Inspection Report# : 2014009 (*pdf*)

Inspection Report# : 2014010 (*pdf*)

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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