

Arkansas Nuclear 1

2Q/2005 Plant Inspection Findings

Initiating Events

G**Significance:** Jun 23, 2005

Identified By: Self Disclosing

Item Type: NCV NonCited Violation

UNTIMELY CORRECTIVE ACTIONS TO ADDRESS REPETITIVE 4160 VAC CABLE FAILURES

The inspectors documented a self-revealing, noncited violation of 10 CFR 50, Appendix B, Criterion XVI, because the licensee failed to correct a 4160 VAC cable failure mechanism (a significant condition adverse to quality). In addition, the licensee failed to properly address industry operating experience on the same topic. The cables were submerged in water but they were not designed for submergence. Consequently, several 4160 VAC service water pump and fire pump motor cables failed in service between 1993 and 2003. The licensee replaced all the vulnerable cables in 2003. This issue had cross-cutting aspects associated with problem identification and resolution in that the licensee failed to adequately evaluate the condition.

The failure to take appropriate corrective measures to address a significant condition adverse to quality was a performance deficiency. This finding was more than minor because it affected the Initiating Events and Mitigating System cornerstone objectives of limiting the likelihood of initiating events and ensuring the availability of systems that mitigate plant accidents. The issue required a Phase 3 significance determination because it had screened out of the Phase 2 significance determination as potentially greater than Green. The Phase 3 significance determination concluded that the issue was of very low risk significance.

Inspection Report# : [2005003\(pdf\)](#)**G****Significance:** Jun 23, 2005

Identified By: Self Disclosing

Item Type: NCV NonCited Violation

FAILURE TO FOLLOW A SERVICE WATER SURVEILLANCE PROCEDURE

A self-revealing noncited violation of Unit 1 Technical Specification 5.4.1, "Procedures," was reviewed by the inspectors when Unit 1 operators secured flow to the auxiliary cooling water system when performing surveillance testing. This resulted in a loss of cooling water to the condensate pumps and increased the potential of a plant transient. This issue involved human performance crosscutting aspects associated with an operator not following a procedure.

The inspectors determined this finding was greater than minor because it affected the initiating events cornerstone objective of limiting the likelihood of those events that upset plant stability and challenge critical safety functions attributable to human performance error. The inspectors concluded this finding was of very low safety significance after performing a Phase 2 analysis using Appendix A, "Technical Basis For At Power Significance Determination Process," of Manual Chapter 0609, "Significance Determination Process," and the Phase 2 worksheets from "Risk-Informed Inspection Notebook for Arkansas Nuclear One - Unit 1," the emergency feedwater and high pressure injection systems remained unaffected which would have been relied upon which would have been relied upon to mitigate a reactor trip transient remained unaffected

Inspection Report# : [2005003\(pdf\)](#)**G****Significance:** Mar 24, 2005

Identified By: Self Disclosing

Item Type: FIN Finding

INADEQUATE MAINTENANCE PROCEDURE FOR THE MAIN FEEDWATER BLOCK VALVE MOTOR ACTUATOR

A self-revealing finding was identified for an inadequate maintenance procedure which did not include vendor recommended maintenance for electrical tightness checks for the Unit 1 main feedwater block valves. As a result of a loose connection, Valve CV-2675 failed to fully close after a reactor trip on August 29, 2003. The valve failure led to an inability to control steam generator level which resulted in an automatic initiation of the emergency feedwater system. This finding had cross cutting aspects of human performance in the area of resources, in that the maintenance procedure did not have technically accurate instructions for this type of actuator since the procedure did not include the connections in the clutch housing.

This finding is more than minor because it affected the initiating events cornerstone objective of limiting the likelihood of those events that upset plant stability and challenge critical safety functions and affected the cornerstone attribute of procedural quality because an inadequate maintenance procedure increased the probability of a steam generator overfeed event. Using the Phase 1 worksheets in Manual Chapter 0609, "Significance Determination Process," the issue was determined to have very low safety significance because emergency feedwater initiation and control and rapid feedwater reduction systems both performed as designed and no steam generator overfeed event occurred.

Inspection Report# : [2005002\(pdf\)](#)

G**Significance:** Dec 31, 2004

Identified By: Self Disclosing

Item Type: NCV NonCited Violation

OPERATOR ACTION DUE TO INADEQUATE PROCEDURE RESULTS IN MOMENTARY INCREASE IN REACTOR POWER ABOVE RATED THERMAL POWER

A self-revealing noncited violation of Unit 1 Technical Specification 5.4.1, "Procedures," was reviewed for an inadequate procedure related to the recovery from a control rod asymmetric fault. Station Procedure OP 1203.003, "Control Rod Drive Malfunction Action," contained no steps for resetting faults utilizing the fault reset switch and, in absence of appropriate guidance, operators took action which allowed outward automatic rod motion which resulted in an unplanned reactor power increase to 101.9 percent. This issue involved human performance crosscutting aspects associated with control room personnel taking non-urgent, non-proceduralized actions without involving management. This issue also involved problem identification and resolution crosscutting aspects associated with the operations staff failing to generate procedural guidance following two previous similar occurrences. Procedural improvements and other corrective actions taken or planned by the licensee have been entered into the licensee's corrective action program as Condition Report (CR) ANO-1-2004-2428.

This finding is more than minor because it is analogous to Example 4.b in Appendix E, "Examples of Minor Issues," to Manual Chapter 0612, "Power Reactor Inspection Reports," because a significant procedural error caused an unplanned reactor power transient. Using the Phase 1 worksheets in Manual Chapter 0609, "Significance Determination Process," the finding was determined to have very low safety significance (Green) because this transient initiator does not contribute to both the likelihood of a reactor trip and the likelihood that mitigation equipment or functions will not be available.

Inspection Report# : [2004005\(pdf\)](#)**G****Significance:** Sep 23, 2004

Identified By: Self Disclosing

Item Type: FIN Finding

INADEQUATE MAINTENANCE PROCEDURE FOR THE MAIN GENERATOR REVERSE POWER RELAYS

A self-revealing finding associated with an inadequate maintenance procedure occurred when the Unit 2 main generator reverse power relays contributed to a turbine trip and a reactor trip. The licensee had not incorporated vendor recommended maintenance on the reverse power relays, and as a result, one of the reverse power relays actuated with no reverse power condition present. Corrective actions taken or planned by the licensee have been entered into the licensee's corrective action program as Condition Report ANO-2-2002-2173.

The finding is more than minor because it was analogous to Example 4.b. in Appendix E, "Examples of Minor Issues," of Manual Chapter 0612, "Power Reactor Inspection Reports," because a procedural error contributed to a reactor trip. This finding affected the initiating events cornerstone. Using the Phase 1 worksheet in Manual Chapter 0609, "Significance Determination Process," the finding is of very low safety significance because, although it resulted in a reactor trip, all mitigating systems remained available.

Inspection Report# : [2004004\(pdf\)](#)

Mitigating Systems

G**Significance:** Jun 24, 2005

Identified By: NRC

Item Type: NCV NonCited Violation

FAILURE TO INCORPORATE DESIGN CHANGE INTO DESIGN BASIS AND TECHNICAL SPECIFICATIONS

The team identified a violation of 10 CFR 50, Appendix B, Criterion III (Design Control) for failing to assure that a design change to the Emergency Cooling Pond (ECP) was incorporated into the design basis and the associated Technical Specification surveillance requirements.

This finding was a performance deficiency because the licensee failed to recognize that the design change reduced the effective volume of the ECP and that the surveillance acceptance criteria needed to be revised. This finding was more than minor because the ECP capacity was degraded due to a reduced volume which was not detected during the design change nor during subsequent surveillances. ANO engineering staff had to perform reanalyses and operability evaluations to address this finding and the minimum required ECP level had to be increased to ensure operability. The finding was of very low safety significance because it did not represent an actual loss-of-safety function.

Inspection Report# : [2005008\(pdf\)](#)**G****Significance:** Jun 24, 2005

Identified By: NRC

Item Type: NCV NonCited Violation

INADEQUATE CORRECTIVE ACTION TO REPAIR DAMAGED STRUCTURE

The team identified a violation of 10 CFR 50, Appendix B, Criterion XVI (Corrective Action) for the failure to take prompt corrective actions to address a longstanding problem. In 1993, a design change incorporated an impermeable membrane fabric over the top of the ECP dam/spillway. On May 19, 2002 a Condition Report (CR-ANO-C-2002-00394) was written to document that the fabric was torn, missing in some areas and in need of replacement. At the time of this inspection, the licensee had not initiated any actions to repair or replace the damaged and missing portions of the fabric.

The failure to address this longstanding problem was a performance deficiency. The issue had more than minor safety significance because it impacted the Mitigating Systems cornerstone objective of ensuring the availability of systems that mitigate plant accidents and could have affected the ability of a safety-related structure to perform its design basis function. The finding was of very low safety significance because the structure remained operable consistent with Generic Letter 91-18, "Information to Licensees Regarding NRC Inspection Manual Section on Resolution of Degraded and Nonconforming Conditions," Revision 1 and because it did not represent an actual loss-of-safety function. Inspection Report# : [2005008\(pdf\)](#)

Significance:  Jun 24, 2005

Identified By: NRC

Item Type: FIN Finding

POTENTIAL DESIGN VULNERABILITY OF SERVICE WATER SYSTEM STRAINERS

The team identified a finding in that the licensee had failed to fully address a vulnerability in the design of the Unit 1 and Unit 2 Service Water system strainers. Specifically, the design did not include any provisions for bypassing or cleaning the strainers while in service, should they become clogged during system operation.

This finding was more than minor because it could affect the availability, reliability, and capability of the service water systems under accident conditions. This design condition was not contrary to any regulatory requirements or the Unit 1 or Unit 2 licensing bases. Consequently, it was not considered to be a violation of regulatory requirements. The finding was of very low safety significance because it did not represent an actual loss-of-safety function.

Inspection Report# : [2005008\(pdf\)](#)

Significance:  Feb 11, 2005

Identified By: NRC

Item Type: FIN Finding

Long-standing reactor coolant pump and molded case circuit breaker problems

Green. The team identified a finding, with two examples, where the licensee did not take prompt actions to address longstanding equipment problems that could impact the initiating events and mitigating system cornerstones. Specifically: 1) reactor coolant pump vibrations on two reactor coolant pumps exceeded vendor recommended alert levels, for approximately 15 years in one case; and 2) the licensee has not promptly addressed the extent of condition for molded case circuit breaker problems. This issue involved crosscutting aspects associated with problem prioritization.

The failure to address these longstanding equipment problems is a performance deficiency. Each issue was more than minor because it either affected the Initiating Events or Mitigating System cornerstone objectives of limiting the likelihood of initiating events (reactor coolant pump vibrations) or ensuring the availability of systems that mitigate plant accidents (molded case circuit breakers). Both issues were of very low safety significance because the affected equipment remained operable consistent with Generic Letter 91-18, "Information to Licensees Regarding NRC Inspection Manual Section on Resolution of Degraded and Nonconforming Conditions," Revision 1.

Inspection Report# : [2005009\(pdf\)](#)

Significance:  Feb 11, 2005

Identified By: NRC

Item Type: NCV NonCited Violation

9 examples of failure to follow boric acid control procedures

Green. The team identified a noncited violation of 10 CFR 50, Appendix B, Criterion V (Procedures) for nine examples of the failure to follow plant procedures with respect to documenting, evaluating and correcting boric acid leaks. This issue has crosscutting aspects associated with problem identification and resolution, as the licensee was not effective at ensuring compliance with the boric acid corrosion program following three similar noncited violations (since 2001).

The failure to follow boric acid control procedures was a performance deficiency. This issue is greater than minor because it affected the mitigating systems cornerstone objective of ensuring availability, reliability, and capability of mitigating systems. The issue is similar to non-minor example 4.a. of Manual Chapter 0609 Appendix E, in that the licensee routinely failed to follow these plant procedures. The finding had very low safety significance (Green) because the affected equipment remained operable consistent with Generic Letter 91-18, "Information to Licensees Regarding NRC Inspection Manual Section on Resolution of Degraded and Nonconforming Conditions," Revision 1.

Inspection Report# : [2005009\(pdf\)](#)

G**Significance:** Dec 31, 2004

Identified By: NRC

Item Type: NCV NonCited Violation

UNTIMELY CORRECTIVE ACTION TO FIX OIL LEAK RENDERS EDG INOPERABLE

A noncited violation of 10 CFR Part 50, Appendix B, Criterion XVI, "Corrective Action," was identified for the failure to take timely corrective action to repair an oil leak on a temperature switch for the Unit 1 Emergency Diesel Generator K-4B in May 2004. This failure resulted in the oil leak progressively worsening and ultimately developing into a leak which challenged the emergency diesel generator safety function. Corrective actions taken or planned by the licensee have been entered into the licensee's corrective action program as CR ANO-1-2004-1705.

The finding was associated with the equipment performance attribute of the Mitigating Systems cornerstone and affected the cornerstone objective of equipment availability and reliability. Therefore, the finding is greater than minor. Using the Phase 1 worksheets in Manual Chapter 0609, "Significance Determination Process," the inspectors determined that the finding was of very low safety significance since the condition that would have rendered the EDG inoperable only existed for five days which was less than the allowed outage time in the Technical Specifications. In addition, this finding did not screen as risk significant due to external initiating events.

Inspection Report# : [2004005\(pdf\)](#)**G****Significance:** Sep 23, 2004

Identified By: NRC

Item Type: NCV NonCited Violation

FAILURE TO ADEQUATELY ASSESS RISK DUE TO EXTERNAL CONDITIONS OR HELB DOORS REMOVED

The inspectors identified two examples of a noncited violation of 10 CFR 50.65(a)(4) for the failure to consider the external risk from changing weather conditions (tornado warning) while a Unit 2 emergency diesel generator was out of service for maintenance and the failure to perform an adequate risk assessment of the removal of a high energy line break barrier between the turbine building and the Unit 1 South switchgear room. This finding involved problem identification and resolution crosscutting aspects associated with operations and engineering personnel not implementing corrective actions to address the extent of condition from a previous noncited violation documented in NRC Inspection Report 05000313/2004003. Corrective actions taken or planned by the licensee have been entered into the licensee's corrective action program as Condition Reports ANO-C-2004-1279 and ANO-C-2004-1402.

The inspectors determined that these issues are more than minor because, if left uncorrected, they would become a more significant safety concern in that actions to manage increases in risk may not be implemented. This finding affected the mitigating systems cornerstone. Using the Phase 1 worksheet in Manual Chapter 0609, "Significance Determination Process," the example involving changing weather conditions was determined to have very low safety significance because the finding did not result in a loss of function per Generic Letter 91-18, Revision 1, "Information to Licensee's Regarding NRC Inspection Manual Section on Resolution of Degraded and Nonconforming Conditions." Next, using Appendix A, "Technical Basis For At Power Significance Determination Process," of Manual Chapter 0609, "Significance Determination Process," and the Phase 2 worksheets from "Risk-informed Inspection Notebook for Arkansas Nuclear One - Unit 1," the finding involving the high energy line break barrier was determined to be of very low safety significance because the only affected initiator was a main steam line break and a redundant train of safety related switchgear always remained available during the short exposure time for the condition.

Inspection Report# : [2004004\(pdf\)](#)**G****Significance:** Sep 23, 2004

Identified By: NRC

Item Type: NCV NonCited Violation

NONCONSERVATIVE CALCULATION OF DESIGN BASIS INTAKE STRUCTURE VENTILATION

The inspectors identified a noncited violation of 10 CFR Part 50, Appendix B, Criterion III, "Design Control," for the failure of the licensee to correctly translate the design basis heat removal requirements for the Unit 1 intake structure into specifications for the ventilation opening sizes. Measurements of the openings by the inspectors were smaller than those assumed in the licensee's heat removal calculations. Analyses using the smaller dimensions resulted in a 13 percent reduction in the heat removal capability. The licensee has taken action to update their calculation with the correct opening sizes. Corrective actions taken or planned by the licensee have been entered into the licensee's corrective action program as Condition Report ANO-1-2004-1829.

This finding is more than minor because it was analogous to Example 3.i of Appendix E, "Examples of Minor Issues," to Inspection Manual Chapter 0612, "Power Reactor Inspection Reports," in that the licensee's engineering staff had to reperform analyses due to a significant dimensional discrepancy. This finding affected the mitigating systems cornerstone. Using the Phase 1 worksheets in Manual Chapter 0609, "Significance Determination Process," the inspectors consider this finding to have very low safety significance because it did not result in an actual loss of safety function.

Inspection Report# : [2004004\(pdf\)](#)

Barrier Integrity

Significance:  Jun 24, 2005

Identified By: NRC

Item Type: NCV NonCited Violation

INADEQUATE CORRECTIVE ACTION TO INCLUDE VALVE IN TESTING PROGRAM

The team identified a violation of 10 CFR 50, Appendix B, Criterion XVI (Corrective Action) for failing to place the closing function of the containment sump isolation valve (2CV-5650-2) into the in-service testing program despite two opportunities to do so over an 11-year period.

This finding was a performance deficiency because a condition adverse to quality was examined in 1994 and in 1997, and was not identified as a deficiency and corrected until 2005. The finding is greater than minor because it had the potential to affect the Barrier Integrity cornerstone objective of ensuring that physical barriers protect the public from radionuclide releases in that failure of the valve to close could release radioactivity from containment following an accident. The violation was of very low safety significance because there was never an actual open pathway from the reactor containment building.

Inspection Report# : [2005008\(pdf\)](#)

Significance:  Sep 23, 2004

Identified By: Self Disclosing

Item Type: NCV NonCited Violation

CORE ALTERATIONS WITH LESS THAN TWO OPERABLE SOURCE RANGE NUCLEAR NEUTRON MONITORS

A self-revealing violation of Unit 1 Technical Specification 3.9.2, "Nuclear Instrumentation," occurred when one of the two required source range nuclear neutron monitors failed during core alterations. The licensee continued movement of spent fuel assemblies from the reactor vessel for approximately 11 hours following the failure of the instrument. Corrective actions taken or planned by the licensee have been entered into the licensee's corrective action program as Condition Report ANO-1-2004-0989.

The finding is more than minor because it affects the barrier integrity cornerstone objective of providing reasonable assurance that physical design barriers protect the public from radionuclide releases caused by accidents or events. Using Appendix G, "Shutdown Operations Significance Determination Process," of Manual Chapter 0609, "Significance Determination Process," the finding was determined to have very low safety significance because the instrument failure did not affect the licensee's ability to maintain reactor coolant system inventory, terminate a leak path, or recover decay heat removal.

Inspection Report# : [2004004\(pdf\)](#)

Emergency Preparedness

Occupational Radiation Safety

Public Radiation Safety

Physical Protection

[Physical Protection](#) information not publicly available.

Miscellaneous

Significance: N/A Feb 11, 2005

Identified By: NRC

Item Type: FIN Finding

PIR Inspection

The team reviewed approximately 260 condition reports, apparent and root cause analyses, as well as supporting documents, to assess problem identification and resolution activities. In general, performance in most areas had improved when compared to the prior problem identification and resolution assessment. Notwithstanding the improvements, poor problem evaluations and untimely resolution of some issues continued to result in self-disclosing and NRC identified violations and findings. The licensee has specified remedies to curb these performance problems. Overall, the procedures and processes were generally effective; thresholds for identifying issues were low and, in most cases, corrective actions were adequate to address conditions adverse to quality.

Based on the interviews conducted, the team concluded that a positive safety conscience work environment exists at Arkansas Nuclear One, Units 1 and 2. The team determined that employees felt free to raise safety concerns to their supervision, the employee concerns program, and the NRC. The team received a few isolated comments regarding trust of site management, an increased work load caused by the corrective action process, and the perception for negative consequences for going to the NRC with safety issues. However, the interviewees all believed that potential safety issues were being addressed and there were no instances identified where individuals had experienced consequences for bringing safety issues to the NRC. The team determined that licensee management was aware of the perceptions and was taking action to address them.

Inspection Report# : [2005009\(pdf\)](#)

Last modified : August 24, 2005