

Arkansas Nuclear 2

3Q/2005 Plant Inspection Findings

Initiating Events

G**Significance:** Sep 23, 2005

Identified By: Self-Revealing

Item Type: FIN Finding

FAILURE TO ADEQUATELY SCOPE THE EFFECTS OF MAINTENANCE ON PRESSURIZER LEVEL INSTRUMENTATION

The inspectors reviewed a self-revealing finding for an inadequate troubleshooting procedure for the Unit 2 pressurizer level instrumentation. When implemented, the procedure resulted in the unplanned energization of all pressurizer heaters with Unit 2 operating at normal operating pressure and a subsequent increase in reactor coolant system pressure which was not anticipated by operators. The licensee entered the procedural failure to address the effect of de-energizing Alarm Relay Bistable 2LC-4627-1BN on the pressurizer heater circuitry into their corrective action program for resolution. The cause of the finding is related to the crosscutting element of human performance.

This finding is greater than minor because it affected the procedure quality attribute under the initiating events cornerstone objective of limiting the likelihood of those events that upset plant stability. Using the significance determination process, the finding was determined to have very low safety significance 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# : [2005004\(pdf\)](#)**G****Significance:** Sep 23, 2005

Identified By: Self-Revealing

Item Type: FIN Finding

INADEQUATE MAINTENANCE PROCEDURE RESULTS IN DROPPED CEA

The inspectors reviewed a self-revealing finding for an inadequate maintenance procedure, which resulted in Control Element Assembly 50 dropping into the core with Unit 2 operating at 100 percent rated thermal power. During troubleshooting efforts for a missing phase on the upper gripper for Control Element Assembly 56, power to the only gripper holding Control Element Assembly 50 fully withdrawn (the lower gripper) was removed by instrumentation and control technicians. The procedure failed to contain detailed guidance to ensure that Control Element Assembly 50 was properly being held by the upper gripper. The licensee performed a thorough root cause of the event to determine the short and long term corrective actions. The cause of the finding is related to the crosscutting element of human performance.

This finding is greater than minor because it affected the procedure quality attribute under the initiating events cornerstone objective of limiting those events that upset plant stability. Using the significance determination process, the finding was determined to have very low safety significance 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# : [2005004\(pdf\)](#)**G****Significance:** Jun 23, 2005

Identified By: Self-Revealing

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\(pdf\)](#)

Mitigating Systems

Significance:  Sep 23, 2005

Identified By: Self-Revealing

Item Type: NCV NonCited Violation

INADEQUATE PROCEDURE LEADS TO REACTOR COOLANT PUMP SEAL DAMAGE

The inspectors reviewed a self-revealing noncited violation of Unit 2 Technical Specification 6.4.1, "Procedures," when reactor coolant pump seal injection flow was established with the reactor coolant pump uncoupled from its motor. This activity led to damage of the seal for Reactor Coolant Pump 2P-32C. This damage required conducting an additional reduced reactor coolant system inventory maintenance period to replace the seal. The licensee performed a thorough root cause of the event to determine the short and long term corrective actions. The cause of the finding is related to the crosscutting element of human performance.

This finding is greater than minor because it affected the procedural quality attribute under the mitigating systems cornerstone objective of ensuring the availability and reliability of the reactor coolant system inventory, such that the licensee had to enter a higher risk plant operating state to repair the seal. Using the shutdown operations Significance determination process, the inspectors determined the finding required a Phase 2 analysis. In the Phase 2 analysis, risk analysts determined the finding to be of very low safety significance because (1) the seal replacement activity required establishing reduced inventory conditions and not to midloop conditions and (2) the time needed to replace the seal was not extensive.

Inspection Report# : [2005004\(pdf\)](#)

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: 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\(pdf\)](#)

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\(pdf\)](#)

G

Significance: Jun 23, 2005

Identified By: Self-Revealing

Item Type: NCV NonCited Violation

INAPPROPRIATE MODE CHANGE WITHOUT ALL REQUIRED EQUIPMENT BEING OPERABLE

A self-revealing noncited violation of Unit 2 Technical Specification 3.0.4 was reviewed by the inspectors when the licensee made an inappropriate mode change without all required equipment being operable. On September 30, 2004, the licensee proceeded from Mode 4 to Mode 3 with an inoperable train of pressurizer proportional heaters. This issue involved problem identification and resolution crosscutting aspects in that operations, engineering, and management personnel did not identify, prioritize, nor evaluate the condition adverse to quality for many years.

The inspectors determined this finding was greater than minor because it affected the mitigating systems cornerstone objective of ensuring the availability and reliability of the pressurizer proportional heaters, such that, if left uncorrected, both banks of pressurizer proportional heaters could have become inoperable. Using the Phase 1 worksheets in Manual Chapter 0609, "Significance Determination Process," the finding was determined to have very low safety significance because mitigating systems were available and it did not affect the likelihood of an external initiating event.

Inspection Report# : [2005003\(pdf\)](#)

G

Significance: Mar 24, 2005

Identified By: Self-Revealing

Item Type: NCV NonCited Violation

FAILURE TO CONDUCT POSTMAINTENANCE TESTING FOR A CONTAINMENT COOLER FAN

A self-revealing noncited violation of 10 CFR Part 50, Appendix B, Criterion V, "Instructions, Procedures, and Drawings," occurred when postmaintenance testing for Unit 2 Containment Cooler Fan 2VSF-1B was not performed after circuit breaker maintenance. This resulted in the failure to detect that the fan was inoperable. Corrective actions taken or planned by the licensee have been entered into the licensee's corrective action program as Condition Report ANO-2-2004-1688.

This finding is more than minor because it affected the mitigating systems cornerstone objective of ensuring the availability and reliability of a system that responds to initiating events to prevent undesirable consequences. Based on the results of Phases 2 and 3 Significance Determination Process analyses, the finding was determined to be of very low safety significance because only Containment Cooling Fan 2VSF-1B was inoperable.

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

G

Significance: Mar 24, 2005

Identified By: Self-Revealing

Item Type: NCV NonCited Violation

CONTAINMENT COOLER FAN INOPERABLE IN EXCESS OF TECHNICAL SPECIFICATION ALLOWED OUTAGE TIME

A self-revealing noncited violation of Unit 2 Technical Specification 3.6.2.3, "Containment Cooling System," occurred since the Unit 2 Containment Cooler 2VSF-1B was inoperable in excess of its specified allowed outage time. The containment cooler was out of service for over 11 months before the licensee discovered that the fan motor had been improperly wired. Corrective actions taken or planned by the licensee have been entered into the licensee's corrective action program as Condition Report ANO-2-2004-1688.

This finding is more than minor because it affected the mitigating systems cornerstone objective of ensuring the availability and reliability of a system that responds to initiating events to prevent undesirable consequences. Based on the results of Phases 2 and 3 Significance Determination Process analyses, the finding was determined to be of very low safety significance because only Containment Cooling Fan 2VSF-1B was inoperable.

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

G

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\(pdf\)](#)

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:  Dec 31, 2004

Identified By: NRC

Item Type: NCV NonCited Violation

FAILURE TO ESTABLISH ADEQUATE MEASURES TO DEMONSTRATE THE PERFORMANCE OR CONDITION OF THE UNIT 2 PRESSURIZER PROPORTIONAL HEATERS

The inspectors identified a noncited violation of 10 CFR 50.65(a)(2) for failure to establish adequate measures to demonstrate that the performance of the Unit 2 pressurizer proportional heaters was effectively monitored in the maintenance rule program. Failures of the heater breakers were not being monitored as part of the reactor coolant system or the 480 volt electrical system in the licensee's maintenance rule program. The inspectors identified human performance cross-cutting aspects associated with engineers not identifying events that should have been entered in the maintenance rule database.

The inspectors determined that this finding is greater than minor because it is analogous to Example 1.i of Appendix E, "Examples of Minor Issues," of Manual Chapter 0612, "Power Reactor Inspection Reports," because the licensee's equipment performance problems were such that an (a)(2) demonstration could not be justified. Using the Phase 1 worksheets in Manual Chapter 0609, "Significance Determination Process," the issue was determined to have very low safety significance because it did not screen as risk significant due to external initiating events and because the licensee always maintained the minimum required amount of heater input from both trains of pressurizer heaters.

Inspection Report# : [2004005\(pdf\)](#)

Significance:  Dec 31, 2004

Identified By: Self-Revealing

Item Type: NCV NonCited Violation

FAILURE TO INCLUDE NONSAFETY RELATED COMPONENTS THAT AFFECT SAFETY-RELATED FUNCTIONS INTO THE MAINTENANCE RULE PROGRAM

A self-revealing noncited violation of 10 CFR 50.65(b)(2) was identified when the licensee failed to include the Unit 2 startup and blowdown demineralizer pressure relief valves in their maintenance rule program. These valves are nonsafety related however, their failure could prevent the safety-related emergency feedwater system from performing its function during accidents occurring during plant startups and shutdowns. Corrective actions taken or planned by the licensee have been entered into the licensee's corrective action program as CR ANO-2-2004-1743.

The inspectors determined that the finding is more than minor because, if left uncorrected, the finding would become a more significant safety concern since failure of these valves could result in an over pressure condition on the emergency feedwater pumps common suction piping. Using the Phase 1 worksheets in Manual Chapter 0609, "Significance Determination Process," the inspectors considered this finding to have very low safety significance because it did not screen as risk significant due to external initiating events and, even though periodic preventative maintenance has not been performed on the relief valves, they have prevented emergency feedwater pumps suction piping from exceeding design values

Inspection Report# : [2004005\(pdf\)](#)

G

Significance: Dec 31, 2004

Identified By: Self-Revealing

Item Type: NCV NonCited Violation

FAILURE TO IDENTIFY AND CORRECT A LOOSE CIRCUIT CONNECTION IN CONTAINMENT SPRAY PUMP CIRCUITRY

The inspectors identified a noncited violation of 10 CFR Part 50, Appendix B, Criterion XV, "Nonconforming Materials, Parts, or Components," for the failure to establish controls to prevent a circuit breaker with a loose connection from being installed in Unit 2. A loose connection in the Containment Spray Pump 2P-35A breaker was not identified prior to installation in the plant even though there were several undocumented instances where similar loose connections were discovered during receipt inspections of other breakers in its group. Corrective actions taken or planned by the licensee have been entered into the licensee's corrective action program as CR ANO-2-2004-1712.

The finding is more than minor because it affected the mitigating systems cornerstone objective of ensuring the reliability of systems that respond to initiating events to prevent undesirable consequences. 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 2," the finding was determined to potentially have greater than very low safety significance because the loose connection could have resulted in an actual loss of the safety function of the Unit 2 Train A containment spray pump during small break loss of coolant accident or stuck open relief valve events. Further examination in a Phase 3 analysis by regional senior risk analysts demonstrated that this finding is of very low safety significance because the fault was highly intermittent and, even if the pump would not have started, it could have been easily started locally.

Inspection Report# : [2004005\(pdf\)](#)

Barrier Integrity

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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\(pdf\)](#)

G

Significance: Feb 11, 2005

Identified By: NRC

Item Type: NCV NonCited Violation

Failure to promptly correct degraded containment isolation valves

Green. The team identified a violation of 10 CFR 50, Appendix B, Criterion XVI (Corrective Actions) for the failure to take prompt corrective actions to address an inadequate containment isolation valve design. In 2000, the licensee identified that the containment isolation valves were not properly designed for their design basis application, in that the valves were designed for a maximum temperature of 200 F but could be exposed to a temperature of 300 F during a design basis accident. The valves were still in service at the time of the inspection. This issue had crosscutting aspects associated with problem prioritization.

The failure to take prompt corrective measures to address a condition adverse to quality was a performance deficiency. The inspectors determined that the issue had more than minor safety significance because it impacted the Barriers cornerstone objective and could have affected the ability of safety-related containment isolation valves to perform their design basis function. The finding was of very low risk significance because it was a design/qualification deficiency that did not result in a loss of function per Generic Letter 91-18, "Information to Licensees Regarding NRC Inspection Manual Section on Resolution of Degraded and Nonconforming Conditions," Revision 1.

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

Emergency Preparedness

Occupational Radiation Safety

Significance:  Jun 23, 2005

Identified By: Self-Revealing

Item Type: NCV NonCited Violation

FAILURE TO EVALUATE RADIOLOGICAL HAZARDS

The inspector reviewed a self-revealing noncited violation of 10 CFR 20.1501(a) resulting from the licensee's failure to evaluate radiological hazards. Because of an inadequate job planning procedure, the licensee did not evaluate the effect on dose rates caused by the lack of water in the cask loading pit during fuel movement. Consequently, when a fuel assembly was moved near the empty cask loading pit on March 20, 2005, higher than anticipated dose rates were experienced by workers on the spent fuel pool bridge. The licensee was alerted to the problem by workers' alarming electronic dosimeters which measured a maximum dose rate of 220 millirems per hour. This issue involved human performance crosscutting aspects associated with an inadequate job planning procedure.

The finding is more than minor because it is associated with the Occupational Radiation Safety Cornerstone attribute of exposure control and affected the cornerstone objective, in that not adequately evaluating the radiological hazards could lead to inadequate radiological controls. Since this occurrence involved workers' unplanned, unintended dose or potential for such a dose that could have been significantly greater as a result of a single minor, reasonable alteration of circumstances, this finding was evaluated with the Occupational Radiation Safety significance determination process. The inspector determined that the finding was of very low safety significance (Green) because it did not involve: (1) ALARA planning and controls, (2) an overexposure, (3) a substantial potential for overexposure, or (4) an impaired ability to assess dose. This finding was entered into the licensee's corrective action program.

Inspection Report# : [2005003\(pdf\)](#)

Significance:  Mar 24, 2005

Identified By: NRC

Item Type: NCV NonCited Violation

FAILURE TO POST A RADIATION AREA

On March 14, 2005, the inspectors identified a noncited violation of 10 CFR 20.1902 (a) because the licensee failed to post a radiation area. When downposting the Unit 2 Train B high pressure safety injection room, a licensee radiation protection technician removed the high radiation area posting and did not replace it with a radiation area posting. The licensee subsequently properly posted the room as a radiation area. This finding had human performance crosscutting aspects in the area of personnel that involved a radiological protection technician's inattention to detail.

The finding was greater than minor because it is associated with the occupational radiation safety cornerstone objective of ensuring adequate protection of worker health and safety from exposure to radiation from radioactive material and affected the cornerstone attribute of program and process because the room was not posted as required due to personnel error. When processed through Appendix C, "Occupational Radiation Safety Significance Determination Process," of Manual Chapter 0609, "Significance Determination Process," the finding was determined to be of very low safety significance because it was not associated with as low as is reasonably achievable planning or work controls, there was no overexposure or a substantial potential for overexposure, and the ability to assess dose was not compromised

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

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 : November 30, 2005