# Arkansas Nuclear 1
# 3Q/2004 Plant Inspection Findings

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## Initiating Events

**Significance:** G 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)*

**Significance:** G Jun 23, 2004
Identified By: Self Disclosing
Item Type: FIN Finding
**FAILURE TO IMPLEMENT CORRECTIVE ACTIONS FOR TURBINE LUBE OIL SYSTEM**
A self revealing finding was reviewed for the inadequate identification and resolution of problems with the main turbine trip oil system that contributed to a turbine trip and reactor trip on Unit 1. Because the licensee did not adequately address problems with operation of the main turbine lube oil system, an operator released the main turbine reset lever after mistakenly thinking a main turbine trip had been reset. Corrective actions taken or planned by the licensee have been entered into the licensee's corrective action program. This issue involved human performance cross-cutting aspects associated with operations personnel not fully informing all members of the on-shift crew of plant conditions.

The finding is greater than minor because it was analogous to Example 4.d in Appendix E, "Examples of Minor Issues," of Manual Chapter 0612, "Power Reactor Inspection Reports," because the failure to take adequate corrective action contributed to an operator error. Using the Phase 1 worksheet in Manual Chapter 0609, "Significance Determination Process," the finding was determined to have very low safety significance because, although it resulted in a reactor trip, no other complicating events were caused by the error and all mitigating systems remained available to the operators.
Inspection Report# : 2004003*(pdf)*

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## Mitigating Systems

**Significance:** G 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)*

**Significance:** G 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)*

**Significance:** G Jun 23, 2004
Identified By: NRC
Item Type: NCV NonCited Violation
**FAILURE TO FOLLOW TAGOUT PROCEDURE IN THE USE OF DO NOT OPERATE TAGS**
The inspectors identified a noncited violation of Unit 1 Technical Specification 5.4.1.a for the failure to follow procedures for equipment control. The licensee failed to follow Procedure OP-102, "Protective Tagging," Revision 1, in several respects in their use of "Do Not Operate" tags on motor-operated valve handwheels prior to the Unit 1 refueling outage.

These failures are greater than minor in that they affected the mitigating systems cornerstone attribute of equipment availability. Using the Phase 1 worksheets in Manual Chapter 0609, "Significance Determination Process," the finding was determined to have very low safety significance because the tagging process did not affect any automatic safety functions.
Inspection Report# : 2004003*(pdf)*

**Significance:** G Jun 23, 2004
Identified By: NRC
Item Type: NCV NonCited Violation
**FAILURE TO ADEQUATELY ASSESS RISK DUE TO EXTERNAL CONDITIONS**
The inspectors identified a noncited violation of 10 CFR 50.65(a)(4) for the failure to perform adequate risk assessments on Units 1 and 2. The licensee failed to update a prior risk assessment due to changing external events (declaration of a tornado watch) that could have had an impact on the existing assessment (increased likelihood of grid instability). In addition, the licensee did not include the added external risk from fire and its impact on safe shutdown equipment in aggregate risk assessments for the plant. Corrective actions taken or planned by the licensee have been entered into the licensee's corrective action program.

The inspectors determined that these issues are more than minor because, if left uncorrected, they would become a more significant safety concern in that future risk assessments could result in failures to properly manage increases in risk. 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 external initiating events.
Inspection Report# : 2004003*(pdf)*

**Significance:** G Jun 23, 2004
Identified By: NRC
Item Type: NCV NonCited Violation

**FAILURE TO PROVIDE ADEQUATE COMPENSATORY MEASURES FOR A LOSS OF FIRE WATER TO THE INTAKE STRUCTURE**
The inspectors identified a noncited violation of Unit 1 Technical Specification 5.4.1.c and Unit 2 Technical Specification 6.8.1.f when the licensee provided inadequate manual suppression firefighting equipment upon a loss of automatic and manual suppression to the intake structures and service water pump areas. The equipment staged by the licensee would have required numerous actions by the fire brigade to ready a fire hose for manual fire suppression. Corrective actions taken or planned by the licensee have been entered into the licensee's corrective action program. This issue involved human performance cross-cutting aspects associated with operations personnel not implementing appropriate compensatory measures.

The finding is greater than minor because it affected the mitigating systems cornerstone objective of ensuring the availability of systems that respond to initiating events to prevent undesirable consequences. Using Appendix F, "Determining Potential Risk Significance of Fire Protection and Post-Fire Safe Shutdown Inspection Findings," of Manual Chapter 0609, "Significance Determination Process," the finding was determined to have very low safety significance because all remaining mitigating systems needed to respond to a loss of service water on either unit were available.
Inspection Report# : 2004003*(pdf)*

**Significance:** W Aug 03, 2001
Identified By: NRC
Item Type: VIO Violation
**THE ACCEPTABILITY OF THE USE OF MANUAL ACTIONS IN LIEU OF PROVIDING PROTECTION FOR CABLES ASSOCIATED WITH EQUIPMENT NECESSARY FOR ACHIEVING AND MAINTAINING HOT SHUTDOWN.**
In a letter dated September 28, 2001, the licensee claimed the NRC position that manual actions cannot be used to comply with 10 CFR Part 50, Appendix R, Section III.G.2, was a backfit. The NRC convened a backfit panel and determined that the NRC's position did not constitute a backfit. On April 15, 2002, the NRC reclassified this unresolved item as an apparent violation pending assessment of the significance of the finding. The question of whether this position was a backfit generic to all plants was addressed in the NRC's letter to the Nucear Energy Institute, dated May 16, 2002.
Inspection Report# : 2001006*(pdf)*

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# Barrier Integrity

**Significance:** G 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)*

**Significance:** G Jun 23, 2004
Identified By: NRC
Item Type: NCV NonCited Violation
**FAILURE TO FOLLOW REACTOR VESSEL BOTTOM HEAD INSPECTION PROCEDURE**
The inspectors identified a noncited violation of Unit 1 Technical Specification 5.4.1.a for the failure to follow written procedures associated with the inspection of the reactor vessel bottom nozzle penetrations during Refueling Outage 1R18. Specifically, the licensee failed to inspect 100 percent of the lower head penetrations during inspections required by Procedure 2311.09, "Unit 1 and Unit 2 Alloy 600 Inspection," Revision 5 as described in NRC Bulletin 2003-002. Corrective actions taken or planned by the licensee have been entered into the licensee's corrective action program. This issue involved human performance cross-cutting aspects associated with inattention to detail by engineering personnel during inservice examinations.

This finding is greater than minor because it affected the reactor safety barrier integrity cornerstone objective for providing reasonable assurance that physical design barriers protect the public from radionuclide releases caused by accidents or events. Using the Phase 1 worksheets in Manual Chapter 0609, "Significance Determination Process," the finding was determined to have very low safety significance

because no actual leakage from the reactor vessel penetrations occurred.
Inspection Report# : 2004003*(pdf)*

**Significance:** G Dec 19, 2003
Identified By: NRC
Item Type: NCV NonCited Violation
**Failure to Prevent Repeat RCS Boundary Leakage**
The inspectors identified a non-cited violation of Technical Specification 3.4.13(a) and 10 CFR 50, Appendix B, Criterion XVI. The inspectors identified an unresolved item on December 20, 2002 (URI 50-313/2002-05-02) for repeat reactor coolant system boundary leakage from Unit 1 Control Rod Drive Mechanism Nozzle #56. During this inspection the team performed additional review of corrective action documents and consulted with NRC senior reactor analysts and Office of Enforcement personnel to close this issue. The inspectors concluded that repetitive leakage from the nozzle violated the licensee's Technical specification of zero reactor coolant system boundary leakage, with the causal factor of a performance deficiency in failing to prevent recurrence of a significant condition adverse to quality. This finding was determined to have cross-cutting aspects of problem identification and resolution.
The finding was considered more than minor due to adversely affecting the performance attribute of the barrier integrity cornerstone for reactor coolant system leakage. The finding is of very low safety significance because a Manual Chapter 0609 phase III significance determination concluded that the flaw did not have a circumferential aspect, and therefore represented relatively low risk of a control rod ejection accident. The licensee entered the condition into the corrective action system and completed a more comprehensive repair as documented in Licensing Event Report (LER 50-313/2002-003-00). (Section 4OA2.c).
Inspection Report# : 2003008*(pdf)*

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## Emergency Preparedness

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## Occupational Radiation Safety

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## Public Radiation Safety

**Significance:** G Jun 18, 2004
Identified By: Self Disclosing
Item Type: NCV NonCited Violation
**RADIOACTIVE SHIPMENT PACKAGE EXCEEDED 10 CFR 71.47 RADIATION LIMITS**
The team reviewed a self-revealing, non-cited violation of 10 CFR 71.47 resulting from the licensee's failure to correctly prepare a radioactive shipment so that dose rates did not exceed regulatory limits. Specifically, on March 24, 2003, the licensee was notified by a shipment recipient that the contact radiation dose rate of a package exceeded 200 millirem per hour. A contact radiation dose rate of 380 millirem per hour was identified on the bottom of the package. However, the accessible radiation levels to the public from underneath the flatbed trailer were only 70 millirem per hour. The finding was placed into the licensee's corrective action program.

The finding was greater than minor because it is associated with the Public Radiation Safety Cornerstone attribute of Program and Process and affected the associated cornerstone objective (to ensure adequate protection of public health and safety from exposure to radioactive materials). The finding had very low safety significance because: (1) it involved radioactive material control, (2) it was a transportation issue, (3) external radiation levels were exceeded, (4) dose rates in excess of regulatory limits were not accessible to the public, and (5) the radiation levels did not exceed two times the federal limits. This finding also had crosscutting aspects associated with human performance
Inspection Report# : 2004009*(pdf)*

**Significance:** G Jun 18, 2004
Identified By: NRC
Item Type: NCV NonCited Violation
**FAILURE TO CALIBRATE SELECT UNIT 1 EFFLUENT PROCESS MONITORS IN ACCORDANCE WITH ODCM REQUIREMENTS**
The team identified a non-cited violation of Unit 1 Technical Specification 5.5.4 because the licensee failed to calibrate selected effluent monitoring instrumentation in accordance with Offsite Dose Calculation Manual specifications. Specifically, the liquid radioactive waste monitor (RE-4642) and the waste gas holdup system monitor (RE-4830) were not calibrated across the full range of energies that the instruments would be expected to detect. Additionally, the licensee's calibration process for these monitors did not establish that the channel

outputs responded with an acceptable range and accuracy to the primary or secondary calibration sources. The licensee used a radioactive source to qualitatively verify that the monitor identified the primary calibration source energy peak but did not require a quantitative response. The finding was placed into the licensee's corrective action program.

The finding is more than minor because it was associated with the Public Radiation Safety Cornerstone plant equipment/process radiation monitoring attribute and affected the associated cornerstone objective to ensure adequate protection of public health and safety from exposure to radioactive materials released into the public domain. The finding had very low safety significance because: (1) the finding did not involve radioactive material control, (2) it involved the effluent release program, (3) it impaired the licensee's ability to assess dose, (4) it did not result in the licensee's failure to assess dose because the licensee was able to assess dose by alternate means, and (5) doses did not exceed 10 CFR Part 50, Appendix I, values
Inspection Report# : 2004009*(pdf)*

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## Physical Protection

Physical Protection information not publicly available.

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## Miscellaneous

**Significance:** G Dec 19, 2003
Identified By: NRC
Item Type: NCV NonCited Violation
**Failure to Identify Multiple Conditions Adverse to Quality**
The inspectors identified a non-cited violation of 10 CFR 50, Appendix B, Criterion XVI, with three examples, for failing to identify conditions adverse to quality and enter them into the corrective action program. a) On February 15, 2002, an inadequate implementation of a modification for a Unit 1 Integrated Control System (ICS) module caused reactor power to increase to 101.3 percent. The licensee missed prior opportunities, from 1999 to 2002, to identify and enter a condition adverse to quality into their corrective action system, associated with the module, which lead to this self-revealing excursion; b) The inspectors further reviewed the conditions of an unresolved item (URI 05000368/2003003-01). From April to June of 2003, inspectors identified numerous physical and electrical conditions which could adversely affect the quality of Unit 2 battery 2D12. The inspectors noted that although several of these conditions were previously known to the licensee, they failed to enter the conditions adverse to quality into the corrective action system; and c) On October 11, 2002, workers inspected the Unit 1 emergency feedwater system turbine driven pump steam admission bypass valve, SV-2663. Although clearly identified in the maintenance document as being environmentally qualified, and referencing a previous degraded condition due to excessive temperature effects, the workers identified heat damage on the inspection form but failed to enter the condition adverse to quality into the corrective action program. This finding was determined to have cross-cutting aspects of problem identification and resolution.
The finding was considered more than minor because, if left uncorrected, they would pose a more significant safety concern. The finding is of very low safety significance because: a) Operators took prompt immediate actions to take manual control of the ICS and terminate the transient. Subsequent corrective actions eliminated the problem with the module. b) The 2D12 battery passed Technical Specification surveillance tests for the remainder of the operating cycle and was subsequently replaced; and c) the licensee repaired SV-2663 prior to evaluated end of qualified life. The license entered the issues, including the failures to enter adverse conditions into their corrective action program, as condition reports CR-1-ANO-2002-00201 for the ICS issue, CR-2-ANO-2003-00457, CR-2-ANO-2003-00646, CR-2-ANO-2003-00703, and CR-2-ANO-2003-00871 for the 2D12 battery, and CR-1-ANO-2003-00346 for SV-2663. (Section 4OA2.a).
Inspection Report# : 2003008*(pdf)*

**Significance:** G Dec 19, 2003
Identified By: NRC
Item Type: NCV NonCited Violation
**Failure to Correct Multiple Conditions Adverse to Quality**
• Green. The inspectors identified a non-cited violation of 10 CFR 50, Appendix B, Criterion XVI, with four examples, for failing to correct conditions adverse to quality. a) The team identified that on June 21, 2002, after the licensee noted a large number of foreign material exclusion (FME) problems with the Unit 1 and 2 spent fuel pools, a root cause analysis was initiated and corrective actions were developed to prevent recurrence. The inspectors concluded the root cause was narrowly focused, and that subsequent spent fuel pool FME problems in 2003 demonstrated that corrective actions did not correct the condition adverse to quality; b) The inspectors closed URI 2003-04-02, for inadequate corrective actions associated with the use of ultrasonic flow instruments in service water heat exchanger performance testing; c) The inspectors identified that on October 11, 2003, the licensee performed an equalizing charge of the Unit 2 battery 2D11, as corrective action, after five cell specific gravities were found below procedural maintenance limits, and after cell #41 was found below Technical Specification minimum voltage on October 9, 2003. While the licensee monitored 2D11 cell #41 several times during the charge, and observed its voltage increased above Technical Specification limits, the licensee failed to perform a post maintenance test of the battery to confirm that corrective actions were effective; and d) The inspectors identified that during a period from 2001 through 2003, the licensee entered numerous problems into their

corrective action program that appeared to represent violations of NRC requirements. However, the inspectors determined, based upon a sampling of 12 such issues, the licensee did not consider the majority of these to be conditions adverse to quality and closed them administratively. The inspectors found that several of the conditions did violate NRC requirements, but were closed in the licensee's corrective action program without corrective actions being taken. This finding was determined to have cross-cutting aspects of problem identification and resolution.

The finding was considered more than minor because, if left uncorrected, they would pose a more significant safety concern. The finding is of very low safety significance because: a) the licensee evaluated the subsequent FME issues and determined that each was of very low safety significance ; b) the licensee changed the heat exchanger performance test to use adequate test equipment and subsequently performed satisfactory tests on each heat exchanger; c) the licensee conducted a surveillance of the 2D11 battery, which demonstrated no Technical Specifications were exceeded, and d) the inspectors determined the licensee subsequently corrected all identified violations of NRC requirements. The inspectors verified the license entered the issues into their corrective action program as condition reports CR-C-ANO-2003-1080. (Section 4OA2.c).

Inspection Report# : 2003008*(pdf)*

Last modified : December 29, 2004