

# Arkansas Nuclear 2

## 4Q/2007 Plant Inspection Findings

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### Initiating Events

**Significance:**  Jun 23, 2007

Identified By: Self-Revealing

Item Type: FIN Finding

#### **Complete Loss of Component Cooling Water Flow During maintenance Operations**

A self-revealing finding was identified when Unit 2 experienced a complete loss of component cooling water flow due to the loss of the Train B component cooling water Pump 2P-33B on February 21, 2007. Specifically, the loss of component cooling water occurred when an operator was attempting to pressurize an out-of-service heat exchanger to support maintenance activities. This issue was entered into the licensee's corrective action program as Condition Report ANO-2-2007-0313.

The finding was determined to be more than minor because it affected the equipment performance attribute of the initiating events and mitigating systems cornerstones. Using the Manual Chapter 0609, "Significance Determination Process," Phase 1 Worksheet, the inspectors concluded that a Phase 2 evaluation was required.

The inspectors performed 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 for Arkansas Nuclear One. The inspectors assumed that the duration of the component cooling water system unavailability was very short, approximately 4 hours. Additionally, the inspectors assumed that only the power conversion system was affected and all other mitigating systems were available. Based on the results of the Phase 2 analysis, the finding was determined to have very low safety significance. The finding had crosscutting aspects in the area of human performance associated with resources (H.2(b)) because the training of personnel and procedural guidance available was inadequate.

Inspection Report# : [2007003](#) (*pdf*)

**Significance:**  Jun 23, 2007

Identified By: Self-Revealing

Item Type: FIN Finding

#### **Inadequate Evaluation of Non-Routine Hot Work Activities Resulted in a Failure to Maintain Fire Watch for Required Amount of Time**

A self-revealing noncited violation of Unit 2 Technical Specification 6.4.1.c, "Fire Protection Program Implementation," was identified for the licensee's failure to provide training and qualification for fire protection designees which resulted in non-routine hot work activities not being adequately evaluated by appropriately trained individuals. Specifically, the roofing contractor working on the auxiliary building roof required that a 2-hour fire watch was to be stationed following roofing activities involving the use of open flames, but the licensee only required the fire watch be stationed for 30 minutes. As a result, on June 7, 2007, following roofing activities on the auxiliary building roof above the spent fuel floor that involved the use of open flames, two fires occurred after approximately one hour from the completion of hot work activities, and there was not an appropriately trained fire watch in the area. This issue was entered into the licensee's corrective action program as Condition Reports ANO-2-2007-0816 and ANO-2-2007-0839.

The finding was determined to be more than minor because it affected the protection against external factors attribute of the initiating events cornerstone, and it directly affected the cornerstone objective to limit the likelihood of those events that upset plant stability and challenge critical safety functions during shutdown as well as power operations. Additionally, if left uncorrected, the practice of not adequately evaluating nonroutine hot work activities by appropriately trained individuals would become a more significant safety concern in that it could result in a fire in or near other risk important equipment. Using the Manual Chapter 0609, Appendix F, "Fire Protection Significance Determination Process," Phase 1 Worksheet, the finding was determined to have very low safety significance because

the condition did not constitute a high degradation of a fire prevention and administrative controls feature. The finding had crosscutting aspects in the area of human performance associated with decision making (H.1(b)) because the licensee did not use conservative assumptions and failed to verify the validity of the underlying assumptions.

Inspection Report# : [2007003](#) (*pdf*)

**Significance:**  Jun 23, 2007

Identified By: Self-Revealing

Item Type: NCV NonCited Violation

### **Ineffective Corrective Actions Fail to Identify and Correct a Condition Adverse to Quality**

A self-revealing noncited violation of 10 CFR Part 50, Appendix B, Criterion XVI, "Corrective Action," was identified associated with the exhaust manifold lagging fire that occurred on Unit 2 Emergency Diesel Generator 2K-4A on May 11, 2007. Specifically, the licensee failed to adequately implement corrective actions from a previous diesel exhaust manifold fire in 2003 and as such, the licensee failed to identify and correct an oil leak from the front cover of the diesel which resulted in a fire during a monthly surveillance run. This issue was entered into the licensee's corrective action program as Condition Report ANO-2-2007-0718.

The finding was determined to be more than minor because it affected the protection against external factors attribute of the initiating events cornerstone, and it directly affected the cornerstone objective to limit the likelihood of those events that upset plant stability and challenge critical safety functions during shutdown as well as power operations. Using the Manual Chapter 0609, Appendix F, "Fire Protection Significance Determination Process," Phase 1 Worksheet, the finding was determined to have very low safety significance because the condition did not constitute a high degradation of a fire prevention and administrative controls feature.

Inspection Report# : [2007003](#) (*pdf*)

**Significance:**  Jun 23, 2007

Identified By: Self-Revealing

Item Type: NCV NonCited Violation

### **Improperly Rated Material Results in Small Flash Fires**

A self-revealing noncited violation of 10 CFR Part 50, Appendix B, Criterion III, "Design Control," was identified associated with small flash fires that occurred on the Unit 2 Emergency Diesel Generator 2K-4A on April 15, 2007. Specifically, the licensee failed to verify that the outer protective cover for insulation used on the exhaust manifold was rated for expected temperatures. This issue was entered into the licensee's corrective action program as Condition Report ANO-2-2007-0630.

The finding was determined to be more than minor because it affected the protection against external factors attribute of the initiating events cornerstone, and it directly affected the cornerstone objective to limit the likelihood of those events that upset plant stability and challenge critical safety functions during shutdown as well as power operations. Using the Manual Chapter 0609, Appendix F, "Fire Protection Significance Determination Process," Phase 1 Worksheet, the finding was determined to have very low safety significance because the condition did not constitute a high degradation of a fire prevention and administrative controls feature. The finding had crosscutting aspects in the area of human performance associated with work practices (H.4(a)) because the licensee personnel proceeded with work in the face of uncertainty.

Inspection Report# : [2007003](#) (*pdf*)

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## **Mitigating Systems**

**Significance:**  Oct 19, 2007

Identified By: NRC

Item Type: NCV NonCited Violation

### **FAILURE TO MAINTAIN ADEQUATE FIRE BRIGADE STAFFING DURING ALTERNATE SHUTDOWN**

The team identified a noncited violation of License Conditions 2.C.(8) for Unit 1 and 2.C.(3)(b) for Unit 2 for failure to implement and maintain in effect all provisions of the approved fire protection program. Specifically, the licensee

failed to maintain adequate fire brigade staffing during fire scenarios requiring an alternative shutdown of Unit 2 coincident with a remote shutdown of Unit 1. The licensee entered the failure to maintain adequate fire brigade staffing under all circumstances into their corrective action process for resolution.

The failure to implement and maintain in effect all provisions of the approved fire protection program by failing to maintain adequate fire brigade staffing was a performance deficiency. The finding was more than minor since it was associated with the Mitigating Systems Cornerstone attribute of protection from external factors and affected the cornerstone objective to ensure the availability, reliability, and capability of systems that respond to initiating events to prevent undesirable consequences. The significance of the finding was assessed using Appendix M of Manual Chapter 0609, "Significance Determination Process Using Qualitative Criteria." This finding was determined to be of very low safety significance (Green) by management review due to the short duration of the violation. The finding has a cross-cutting aspect in the area of human performance associated with resources because the licensee did not adequately ensure the procedures governing the procedure change process were complete and accurate (H.2.(c)).  
Inspection Report# : [2007006](#) (*pdf*)

**Significance:**  Sep 21, 2007

Identified By: NRC

Item Type: NCV NonCited Violation

### **NONCONSERVATIVE ERRORS IN UNIT 2 FUEL OIL CONSUMPTION CALCULATION**

The team identified a non-cited violation of 10 CFR 50 Appendix B, Criterion III, Design Control for the failure to recognize multiple non-conservative errors in a Unit 2 emergency diesel generator fuel oil consumption calculation. The errors were a result of illegible reference data, inconsistently applied methodology, and inadequate calculation reviews, some of which reduced the calculated margin to meeting design bases requirements. The inspectors determined that the failure to recognize multiple errors in a design bases emergency diesel generator fuel oil consumption calculation constituted a performance deficiency and a violation. The licensee entered this into the corrective action program as CR-ANO-2-2007-01325.

The inspectors determined that the violation was more than minor because it is similar to Inspection Manual Chapter 0612 Appendix E minor example 3j, specifically because operability was called into question by the non-conservative errors identified by the NRC. Furthermore, the calculation will need to be re-performed and scrutinized to correct and identify all errors and to ensure all reference data is valid and supportable. In accordance with Inspection Manual Chapter 0609, Significance Determination Process, Appendix A, Significance Determination of Reactor Inspection Findings for At Power Situations, the inspectors conducted a Phase 1 screening and determined the finding was of very low safety significance (Green) because it was a design deficiency confirmed not to result in loss-of-operability in accordance with Part 9900, Technical Guidance, Operability Determination Process for Operability and Functional Assessment. This issue is being treated as a non-cited violation consistent with Section VI.A of the NRC Enforcement Policy: NCV 05000368/2007008-001, Non-conservative Errors in Unit 2 Fuel Oil Consumption Calculation.

Inspection Report# : [2007008](#) (*pdf*)

**Significance:**  Mar 24, 2007

Identified By: NRC

Item Type: NCV NonCited Violation

### **NONCONSERVATIVE BATTERY INTERCELL CONNECTION RESISTANCE VALUE SPECIFIED IN TS SR**

An NRC identified noncited violation of 10 CFR Part 50, Appendix B, Criterion III, "Design Control," was identified for the failure of the licensee to ensure that the 125 Vdc safety-related batteries would remain operable if all the intercell and terminal connections were at the resistance value of 150 micro-ohms as allowed by Unit 2 Technical Specification Surveillance Requirement 4.8.2.3. This issue was entered into the licensee's corrective action program as Condition Report ANO-2-2007-0085.

The finding was greater than minor because it is associated with the mitigating systems cornerstone attribute of design control and affected the associated cornerstone objective to ensure the availability, reliability, and capability of systems that respond to initiating events to prevent undesirable consequences. Using Manual Chapter 0609, "Significance Determination Process," Phase 1 Worksheet, the finding was determined to have very low safety significance because the condition did not result in a loss of safety function of the equipment and did not screen as

potentially risk significant due to a seismic, flooding, or severe weather initiating event. The finding had crosscutting aspects in the area of human performance associated with decision making because the licensee did not use conservative assumptions and failed to verify the validity of the underlying assumptions.[H.1(b)]

Inspection Report# : [2007002](#) (*pdf*)

**Significance:**  Mar 24, 2007

Identified By: NRC

Item Type: NCV NonCited Violation

**FAILURE TO FOLLOW WORK MANAGEMENT PROCEDURES WHILE ADJUSTING REACTOR PROTECTION SYSTEM PARAMETERS**

An NRC identified noncited violation of Unit 2 Technical Specification 6.4.1.a, "Procedures," was identified for the failure of operations personnel to follow applicable work management procedures while conducting instrumentation and control maintenance. In an effort to comply with the requirements of Technical Specifications following a dropped control element assembly event, licensee personnel adjusted the high linear power level trip setpoints without explicit work order instructions and prior to the formal revision of the applicable procedure. Licensee Procedure EN-WM-100 "Work Request Generation, Screening, and Classification," Revision 1, did not allow the shift manager to direct these work activities to commence prior to the completion of detailed work package planning. This issue was entered into the licensee's corrective action program as Condition Reports ANO-2-2007-0125 and ANO-2-2007-0503.

This finding was greater than minor because, if left uncorrected, the conduct of maintenance activities on safety-related systems prior to the formal development of associated work order instructions and/or applicable procedural guidance would become a more significant safety concern. Specifically, the misunderstanding by Unit 2 operations department management of the circumstances under which expedited work order provisions apply could result in the inappropriate bypassing of established work control processes. The finding affected the mitigating systems cornerstone. Using Manual Chapter 0609, "Significance Determination Process," Phase 1 Worksheet, the finding was determined to have very low safety significance (Green) since the finding did not represent an actual loss of system safety function and posed no risk significance due to a seismic, flooding, or severe weather initiating event. The finding had crosscutting aspects in the area of human performance associated with decision making in that operations personnel failed to verify the validity of underlying assumptions that factored into a safety-significant decision involving procedural non-compliance.[H.1(b)]

Inspection Report# : [2007002](#) (*pdf*)

**Significance:**  Mar 08, 2007

Identified By: Self-Revealing

Item Type: NCV NonCited Violation

**INEFFECTIVE CORRECTIVE ACTIONS RESULTS IN A FIRE IN MOTOR CONTROL CENTER 2B-53**

The team reviewed a self-revealing noncited violation of 10 CFR Part 50, Appendix B, Criterion XVI, for failure of the licensee to take effective corrective action for earlier events in 1991 and 2001. This failure to ensure positive engagement of 480 volt circuit breakers resulted, on October 30, 2006, in a fire in Motor Control Center 2B-53 and declaration of an alert. The licensee initiated Condition Report 2-2006-02444 to enter this issue into the corrective action program. In 1991, a fire occurred in Motor Control Center 2B-64 because misaligned breaker stabs created a high resistance connections that overheated when energized. For corrective action, the licensee trained electricians emphasizing the need to use care when installing breakers into breaker cubicles and proposed a revision to the maintenance procedure to inspect and ensure proper stab connections. In 2001, during inspections of Motor Control Center 2B-85, electricians discovered the center stab of one breaker in the breaker cubicle misaligned and found part of the spring clip burned away and part of the bus bar damaged. For corrective action, the licensee trained on proper insertion of a cubicle breaker into the motor control center and initiated a long-term action to perform a visual inspection of all Unit 2 motor control centers and their breakers.

The performance deficiency resulted from licensee personnel failing to take adequate corrective actions (e.g. revising procedures to include appropriate guidance). The finding is greater than minor because it is associated with the mitigating systems cornerstone attribute of protection against external factors and affects the associated cornerstone objective of ensuring the availability, reliability, and capability of systems that respond to initiating events to prevent

undesirable consequences. The Phase 1 worksheets in Manual Chapter 0609, "Significance Determination Process," were used to conclude that a Phase 2 analysis was required because the initiating events, mitigating systems, and barrier integrity cornerstones were affected. The team performed a Phase 2 analysis using Appendix A, "Determining the Significance of Reactor Findings For At-Power Situations," of Manual Chapter 0609 and the Phase 2 worksheets for Arkansas Nuclear One. From the Phase 2 analysis results, the team determined this finding had very low safety significance (Green). The team concluded the cause of the finding had no definitive cross-cutting aspects.  
Inspection Report# : [2007007](#) (*pdf*)

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## Barrier Integrity

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## Emergency Preparedness

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## Occupational Radiation Safety

**Significance:**  Mar 24, 2007

Identified By: Self-Revealing

Item Type: NCV NonCited Violation

### **FAILURE TO POSSESS A RADIATION MONITORING DEVICE THAT APPROPRIATELY ALARMS IN A HIGH RADIATION AREA**

The inspector reviewed a self-revealing noncited violation of Technical Specification 6.7.1.d because a worker entered a high radiation area without possessing a radiation monitoring device that appropriately alarmed when the device's set point was reached. The worker did not possess the required vibrating electronic alarming dosimeter and could not hear dosimeter's audible alarm. The problem was identified when the worker was prevented from logging out of the radiologically controlled area by the dosimetry software. The licensee's immediate corrective action was to counsel and restrict the access of the individual. The licensee plans to implement a software system that can place restrictions on workers such that they would not be able to log into the radiologically controlled area without the required monitoring device.

The finding was greater than minor because it was associated with the Occupational Radiation Safety Cornerstone attribute of program and process and affected the cornerstone objective to ensure the adequate protection of a worker's health and safety from exposure to radiation because the worker could have received additional dose. The finding involved the potential for a worker's unplanned or unintended dose resulting from actions contrary to technical specifications. When processed through the Occupational Radiation Safety Significance Determination Process, the finding was determined to be of very low safety significance because the finding did not involve ALARA planning or work controls, there was no overexposure or substantial potential for an overexposure, and the ability to assess dose was not compromised. In addition, this finding has crosscutting aspects in the area of human performance associated with work practices because the failure to implement human performance error prevention techniques such as peer checking or self checking directly contributed to the finding.[ H.4(a)] The finding was entered into the licensee's corrective action program as Condition Report CR-ANO-2-2006-02342.

Inspection Report# : [2007002](#) (*pdf*)

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## Public Radiation Safety

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## Physical Protection

Although the NRC is actively overseeing the Security cornerstone, the Commission has decided that certain findings pertaining to security cornerstone will not be publicly available to ensure that potentially useful information is not provided to a possible adversary. Therefore, the [cover letters](#) to security inspection reports may be viewed.

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## Miscellaneous

**Significance:** N/A Apr 03, 2007

Identified By: NRC

Item Type: FIN Finding

### Identification and Resolution of Problems

The team reviewed 299 condition reports, several work orders, engineering evaluations, associated root and apparent cause evaluations, and other supporting documentation to assess problem identification and resolution activities. The team concluded that the licensee effectively identified, evaluated and prioritized corrective actions for conditions adverse to quality. The licensee improved in their ability to use the condition report process to track adverse conditions documenting abnormal configurations or potential challenges to the normal station processes. Also the licensee improved in their coordination among plant processes when closing condition reports to other corrective action or work control documents. However, the team concluded that the licensee, generally, implemented timely, effective corrective actions, although some examples, including one violation, indicate continuing weakness in this area.

With minor exceptions, the licensee appropriately evaluated industry operating experience for relevance to the facility and had entered applicable items in the corrective action program. The licensee appropriately used industry operating experience when performing root cause and apparent cause evaluations. The licensee performed effective quality assurance audits and self-assessments, as demonstrated by self-identification of poor corrective action program performance and identification of ineffective corrective actions. The team concluded that the licensee established an acceptable and improving safety conscious work environment. Management took action to address the write-in comments from the 2006 safety culture survey. The team concluded from interviews that, although no safety conscious work environment concerns existed, the complaints related to general culture factors, if not addressed, might result in safety conscious work environment concerns.

Inspection Report# : [2007007](#) (*pdf*)

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