

Arkansas Nuclear 2

3Q/2007 Plant Inspection Findings

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*)

Significance:  Dec 31, 2006

Identified By: Self-Revealing

Item Type: NCV NonCited Violation

FIRE DURING HOT WORK ACTIVITIES ON THE CONTAINMENT SUMP STRAINER

A self-revealing noncited violation of Unit 2 Technical Specification 6.4.1.c, Fire Protection Program Implementation, was identified for the failure of maintenance personnel to follow Procedure EN-DC-127, "Control of Hot Work and Ignition Sources," while performing hot work. Specifically, the licensee failed to ensure that combustible material within 35 feet of the work area was removed or protected. Consequently, torch cutting activities near the Unit 2 containment sump strainer caused a nearby plastic bag containing used protective clothing to ignite. This issue was entered into the licensee's corrective action program as Condition Reports CR-ANO-2-2006-1565 and CR-ANO-2-2006-1701. A number of additional examples of hot work activities that involved inadequate implementation of

applicable hot work control procedures were also identified.

The finding is greater than minor because it is associated with the protection against external factors attribute of the initiating events cornerstone, and directly affects 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 conducting hot work in a manner that results in unintended combustion of nearby materials would become a more significant safety concern in that it could result in a fire in or near risk important equipment. The finding is not suitable for evaluation with the significance determination process because neither the fire protection significance determination process nor the shutdown operations significance determination process addresses shutdown fire protection findings. However, the finding is determined to be of very low safety significance by NRC management review because the finding occurred while the unit was already in a cold shutdown condition, and the operability of equipment necessary to maintain safe shutdown was not challenged. The cause of the finding is related to the crosscutting element of human performance in that maintenance personnel failed to follow procedures.

Inspection Report# : [2006005](#) (*pdf*)

Significance:  Dec 31, 2006

Identified By: Self-Revealing

Item Type: NCV NonCited Violation

INADVERTENT REACTOR COOLANT SYSTEM DRAINING WHILE IN MODE 5

A self-revealing noncited violation of Unit 2 Technical Specification 6.4.1.a, "Procedures," was identified when an operator failed to close Valve 2DCH-11, resin sluice header drain valve, when securing from a resin transfer as required by procedure. One week later, while aligning the plant for alternate purification, with Valve 2DCH-11 being out of position, an unanticipated loss of approximately 230 gallons of reactor coolant system inventory occurred. This issue was entered into the licensee's corrective action program as Condition Report ANO-2-2006-1464.

The finding was determined to be more than minor because it affected the configuration control attribute of the initiating events 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 shutdown operations significance determination process, the finding was determined to have very low safety significance because the finding did not result in a loss of two feet or more of reactor coolant system inventory and did not result in a loss of reactor coolant system inventory while in reduced inventory. The cause of the finding is related to the cross cutting element of human performance because an operator failed to follow a procedure.

Inspection Report# : [2006005](#) (*pdf*)

Significance:  Dec 31, 2006

Identified By: Self-Revealing

Item Type: FIN Finding

UNPLANNED INCREASE IN TIME WITH REACTOR VESSEL WATER LEVEL AT FLANGE LEVEL

A self-revealing finding was identified associated with the licensee's practice of using a hammer to remove the main hook pin on the Unit 2 polar crane. Specifically, this practice resulted in both the polar crane main hook pin and the load cell pin being deformed and not usable with reactor vessel level lowered to just below reactor vessel flange level. As a result, Unit 2 was exposed to an increased likelihood of a loss of decay heat removal while the unit remained in a lowered vessel level condition for an additional unplanned 27 hours. This issue was entered into the licensee's corrective action program as Condition Report ANO-2-2006-1553.

The finding was determined to be more than minor because it affected the equipment performance attribute of the initiating events 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. This finding was determined to be a finding of very low safety significance using the shutdown operations significance determination process because the event did not involve a loss of shutdown control or a reduction in mitigation capability which would have increased the frequency of occurrence of a loss of decay heat removal. The cause of this finding is related to the crosscutting element of human performance because maintenance technicians received training that the use of hammers to remove the pins might be necessary.

Mitigating Systems

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.

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.

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*)

G**Significance:** Dec 31, 2006

Identified By: Self-Revealing

Item Type: NCV NonCited Violation

FAILURE TO PERFORM MODIFICATION RESULTED IN AN INOPERABLE REACTOR COOLANT PUMP OIL COLLECTION SYSTEM

A self-revealing noncited violation of ANO Unit 2 License Condition 2.C.(3)(b), "Fire Protection," was identified for failure of the licensee to maintain the lube oil collection system for reactor coolant Pumps C and D in an operable condition. Specifically, the licensee failed to perform a modification on the motor installed on reactor coolant Pump C which resulted in the oil collection tank and its associated overfill berm being filled with water from the component cooling water system. This issue was entered into the licensee's corrective action program as Condition Report ANO-2-2006-1407.

The finding was determined to be more than minor because it affected the protection against external factors attribute of the mitigating systems cornerstone objective to ensure the availability, reliability, and capability of systems that respond to initiating events to prevent undesirable consequences. Using the fire protection significance determination process, the finding is determined to have very low safety significance because the condition constituted a low degradation of a fire prevention and administrative controls feature.

Inspection Report# : [2006005](#) (*pdf*)

Barrier Integrity

Emergency Preparedness

Occupational Radiation Safety

G**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. The finding was entered into the licensee's corrective action program as Condition Report CR-ANO-2-2006-02342.

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

Public Radiation Safety

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.

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*)

Last modified : December 07, 2007